

PROJECT MANUAL

LAMONT PARK BEAUTIFICATION PROJECT

Bid Opening Tuesday, September 17, 2024, Before 11:00 A.M.



Project Number: 1650.7012.22

Approved: August 06, 2024

Required Contractor's License Classification: B

Construction Estimate: \$6,988,297

**Construction Services Division
General Services Division of the
County Administrative Office
1115 Truxtun Avenue, 3rd Floor
Bakersfield, CA 93301**

MANDATORY PRE-BID JOBWALK

**THURSDAY, AUGUST 22, 2024 @ 11:15 AM
LAMONT PARK BEAUTIFICATION PROJECT**

**INTERESTED CONTRACTORS SHALL ASSEMBLE AT
THE FACILITY LOCATED AT 8304 SEGRUE RD.
LAMONT, CA 93241, NORTHWEST AREA OF THE
PARK.**

DOCUMENT 00 0105

CERTIFICATIONS PAGE

PROJECT TITLE: Lamont Park Beautification Project

CLIENT DEPARTMENT: General Services

LOCATION: 8304 Segrue Rd. Lamont, CA 93241

PROJECT NUMBER: 1650.7012.22

OWNER: COUNTY OF KERN
1115 TRUXTUN AVE., 3RD FLOOR
BAKERSFIELD, CA 93301
TEL: 661-868-3000
FAX: 661-868-3109

OWNER PROJECT MANAGER: Veronica Olivas

CONSULTANT:

ARCHITECT	CIVIL ENGINEER	

DOCUMENT 00 0110

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**DOCUMENT 00 1113
NOTICE TO CONTRACTORS**

ARTICLE 1 – INVITATION TO BID

- 1.01 Notice Inviting Bids:** County of Kern (hereinafter “Owner”) Owner will receive sealed Bids at the County of Kern, General Services Division of the County Administrative Office, 1115 Truxtun Avenue, Third Floor Bakersfield, California 93301-4639 until **10:59 A.M. on Tuesday, September 17, 2024** - for the following public work:

LAMONT PARK BEAUTIFICATION PROJECT – 1650.7012.22

- 1.02 Project Description:** The project, in general, consists of This project consist, in general, of Removing existing baseball field and placing a soccer field with goals, construction of splash pad, skate park, recreation structure with multi-courts, placement of exercise equipment with shade sails, inclusive play equipment with shade sails, enclosed multi-courts with LED lighting, restrooms and drinking fountains, outdoor pavilion with raised stage and canopy, resurface and expansion of basketball courts, covered family picnic shelter, barbeque grills and picnic tables throughout, accessible walking path expansion, landscape, trees, irrigation and controls upgrades, sprinkler modifications, grading, parking and sidewalk modifications, and signage.
- 1.03** Work shall be completed within Three Hundred and Twenty (320) Working Days from the date when Contract Time commences to run.
- 1.04 Procurement of Bidding Documents:** Interested Bidders and subcontractors may obtain Plans, Specifications, Addenda, and Bid Proposal forms to be used for bidding this project at <https://pbsystem.planetbids.com/portal/59079/portal-home>. It is the sole responsibility of the Bidder to contact the County of Kern, Construction Services Division, 661-868-3000 to verify that all Addenda have been received. Addenda will only be available at the site listed above. Bid Proposals that do not contain a signed cover sheet for all addenda may, in the sole discretion of the County, be rejected as non-responsive.
- 1.05 Instructions:** Bidders shall refer to Document 00 2113 Instructions to Bidders for required documents and items to be submitted in a sealed envelope. Sealed proposals will be received on the date and time indicated in Paragraph 1.01, at the following location:
1. Delivered in person, by courier service or by mail to the County of Kern, General Services Division of the County Administrative Office, 1115 Truxtun Avenue, Third Floor, Bakersfield, California 93301.
- It is the sole responsibility of the Bidder to arrive at the General Services Division third floor main lobby at least ten (10) minutes prior to the bid receipt deadline to receive a test time stamp. The time stamp clock in the main lobby of General Services shall be the official time. Any bid received at or after 11:00 A.M. will be returned unopened. Soon after 11:00 A.M. the bids will be publicly opened and read in the third floor conference room of the County Administrative Center.
- 1.06 Mandatory Pre-Bid Site Visit:** Owner will conduct a Mandatory Pre-Bid Conference and Site Visit at 8304 Segrue Rd, Lamont, CA 93241 on Tuesday, August 22, at 11:15 AM.
- 1.07 Bid Preparation Cost:** Bidders are solely responsible for the cost of preparing their Bids.
- 1.08 Reservation of Rights:** Owner specifically reserves the right, in its sole discretion, to reject any or all Bids, to re-bid, or to waive inconsequential defects in bidding not involving time, price or quality of the work.

ARTICLE 2 – LEGAL REQUIREMENTS

- 2.01 Required Contractor's License(s):** A California “B” contractor's license is required to bid this contract. Joint ventures must secure a joint venture license prior to award of this Contract.
- 2.02 Substitution of Securities:** Owner will permit the successful bidder to substitute securities for any retention monies withheld to ensure performance of the contract, as set forth in Document 00 6290 Escrow Agreement For Security Deposits In Lieu Of Retention and incorporated herein in full by this reference, in accordance with Section 22300 of the California Public Contract Code.
- 2.03 Prevailing Wage Laws:** Pursuant to Part 7 of Division 2 of the California Labor Code (Section 1720 et seq.) the Contractor shall pay not less than the prevailing rate of wages to workers on this project as determined by the Director of the California Department of Industrial Relations. The Director's schedule of prevailing rates is on file and open for inspection at County of Kern, General Services Division of the County Administrative Office, 1115 Truxtun Avenue, Third Floor, Bakersfield, California 93301, and is incorporated herein by this reference.
- This project may be subject to monitoring and enforcement by the Department of Industrial Relations (DIR), including the obligation to submit certified payroll records directly to the DIR Compliance Monitoring Unit (CMU) at least monthly in a format prescribed by the Labor Commissioner. The contractor must post job site notices as prescribed by DIR regulation.
- 2.04 Required Registration with the State of California Department of Industrial Relations:** Pursuant to California Labor Code 1725.5, all contractors and subcontractors must be registered with the Department of Industrial Relations (DIR) in order to be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any public work contract. Detailed information about contractor's responsibilities and online registration may be obtained on the State of California Department of Industrial Relations, Public Works website, <http://www.dir.ca.gov/Public-Works/PublicWorks.html>
- 2.05** For projects without Federal Funding, each Bidder must be licensed, as required by law, at the time the bid is submitted. For projects with Federal Funding, each Contractor must be licensed at the time the Contract is awarded.

END OF DOCUMENT

**DOCUMENT 00 2113
INSTRUCTIONS TO BIDDERS**

Bids are requested by the County of Kern ("hereinafter "Owner"), for a general construction contract, or work described in general, as set forth in Document 00 1113 (Notice to Contractors), and the following additional terms.

ARTICLE 1 - PROCEDURES FOR SUBMISSION OF BIDS

1.01 Required Pre-Bid Conference and Site Visit

- A. Owner may conduct Pre-Bid Conference and Site Visit at the date, time and location indicated in Document 00 1113 (Notice to Contractors), to consider such matters as Bidders may request and perform a Site Visit immediately following, at the Site. If the Notice to Contractors specifies a required Site Visit, Bidders must attend Pre-Bid Conference and Site Visit and sign an attendance roster as a condition to bidding.
- B. The Site Visit may be the Bidders' only opportunity to investigate conditions at the Site. Other Pre-Bid Site Visits may be scheduled at Owner's sole discretion, depending on staff availability.

1.02 Required Pre-Bid Investigations

- A. Prior to submission of Bid, Bidder must conduct a careful examination of Bidding Documents and understand the nature, extent, and location of Work to be performed. Refer to Document 00 7200 (General Conditions) on required pre-bid investigations.

1.03 Bidder Questions and Answers

- A. Bidders must direct all questions about the meaning or intent of Bidding Documents to Owner in writing. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by written Addenda. It is the sole responsibility of the Bidder to contact Construction Services Division at 661-868-3000 to verify that all addenda has been received. Addenda will only be available from the website: <https://pbsystem.planetbids.com/portal/59079/portal-home>. Owner may not answer questions received less than ten Calendar Days prior to the date for opening Bids.
- B. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect, and Bidders shall not rely on oral statements.

1.04 Addenda

- A. Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner. It is the sole responsibility of the Bidder to contact the County of Kern, Construction Services Division, 661-868-3000, to verify that all addenda has been received. Bid Proposals that do not contain a signed cover sheet for all addenda may, in the sole discretion of the County, be rejected as non-responsive. Addenda may also be acknowledged by number in Document 00 4100 (Bid Form). All addenda shall be part of the Contract Documents. A complete listing of Addenda may be secured from Owner.

ARTICLE 2 - RECEIPT OF BIDS:

2.01 Date and Time

- A. Sealed Bids will be received by the Owner until the date and time indicated in Document 00 1113 (Notice to Contractors). All Bid envelopes will be time-stamped to reflect their submittal time. Owner shall reject all Bids received after the specified time and will return such Bids to Bidders unopened. Bidders must submit Bids in accordance with this Document 00 2113.

2.02 Bid Submission:

- A. Owner will receive Bids in a sealed envelope, containing the required items described herein.
- B. Bidders should mark their Bid envelope using the name, address, identifying information and project number, indicated in Document 00 1113 (Notice to Contractors).

2.03 Required Contents of Bid Submittal Envelope

- A. Document 00 4100 (Bid Form). Bidders must submit Bids on Document 00 4100 (Bid Form) in accordance with the provisions of Document 00 4100. Bidders must complete all Bid items and supply all information required by Bid documents and specifications.
- B. Document 00 4411 (Bond Accompanying Bid). Bidders must submit Document 00 4411 (Bond Accompanying Bid) accompanied by a cashier's check, 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) or completed form of Document 00 4411 of not less than 10% of the base Bid, payable to Owner and completed in accordance with the provisions of Document 00 4411.
- C. Document 00 4412 (Bidder Registration and Experience Form). Bidders must submit Document 00 4412 (Bidder Registration and Experience Form), completed in accordance with the provisions of Document 00 4412.
- D. Document 00 4430 (Subcontractors List). Bidders must submit Document 00 4430 (Subcontractors List) completed in accordance with the provisions of Document 00 4430. The Subcontractors List must include the names and addresses 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. Any violation of this requirement may result in a Bid being deemed non-responsive and not being considered.
- E. Document 00 4452 (Non-Collusion Affidavit). Bidders must submit Document 00 4452 (Non-Collusion Affidavit) completed in accordance with the provisions of Document 00 4452.
- F. Document 00 4455 (Bidder Certifications). Bidders must submit Document 00 4455 (Bidder Certification) completed in accordance with the provisions of Document 00 4455.
- G. Document 00 4453 (Iran Contracting Act Certification). Bidders must submit Document 00 4453 (Iran Contracting Act Certification) in accordance with Public Contract Code Sections 2200 et seq.

ARTICLE 3 - BID OPENING AND EVALUATION

3.01 Determination of Apparent Low Bidder

- A. Owner will open each Bidders' Envelope at the time and place indicated in Document 00 1113 (Notice to Contractors), initially evaluate them for bid bond, subcontractor listing and addenda. Further evaluation will follow, and notification of the "Apparent Low Responsive, Responsible Bidder" will be recommended to the Board of Supervisors during an open meeting..
- B. If Apparent Low Bidder is determined to be non-responsive or non-responsible, then Owner 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.

3.02 Evaluation of Bids

- A. Bids must be full, complete, clearly written and using the required forms. Bidders shall make any change in the Bid by crossing out the original entry, entering and initialing the new entry. Bidder's

failure to submit all required documents strictly as required entitles Owner to reject the Bid as non-responsive. All Bidders must submit Bids containing each of the fully executed documents supplied in this Project Manual.

- B. In evaluating Bids, Owner will consider Bidders' qualifications, whether or not the Bids comply with the prescribed requirements, unit prices, and other data, as may be requested in Document 00 4100 (Bid Form) or prior to the Notice of Award.
- C. Owner may conduct reasonable investigations and reference checks of Bidder and other persons and organizations as Owner 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 Owner's satisfaction within the prescribed time. Submission of a Bid constitutes Bidder's consent to the foregoing.
- D. Owner shall have the right to consider information provided by sources other than Bidder. Owner shall also have the right to communicate directly with Bidder's surety regarding Bidder's bonds.
- E. 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.
- F. Bids shall be deemed to include the written responses of the Bidder to any questions or requests for information of Owner made as part of Bid evaluation process after submission of Bid.

3.03 Reservation of Rights

- A. Owner reserves the right to reject any or all nonconforming, non-responsive, unbalanced, or conditional Bids, and to reject the Bid of any Bidder as non-responsive as a result of any error or omission in the Bid, or if Owner believes that it would not be in the best interest of Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. For purposes of this paragraph, an "unbalanced Bid" is one having nominal prices for some Bid items and enhanced prices for other Bid items.
- B. Owner may retain Bid securities and Bid bonds of other than the Apparent Low Bidder for a period of 90 Calendar Days after award or full execution of the Contract, whichever first occurs.
- C. Owner may reject any or all Bids and waive any informalities or minor irregularities in the Bids. Owner also reserves the right, in its discretion, to reject any or all Bids and to re-Bid the Project.

ARTICLE 4 - MANDATORY BID PROTEST PROCEDURES:

4.01 Submission of Written Bid Protest

- A. Any Bid protest in connection with the construction contract or work described in general in Document 00 1113 (Notice to Contractors) must be submitted in writing to the General Services Division of the County Administrative Office, 1115 Truxtun Avenue, Third Floor, Bakersfield, California 93301-4639, before 4:30 P.M. of the fifth Business Day following opening of the Bids.
- B. The initial protest document must contain a complete statement of the basis for the protest.
- C. The protest must refer to the specific portion of the document that forms the basis for the protest.
- D. The protest must include the name, address, and telephone number of the person representing the protesting party.
- E. Only Bidders who the Owner otherwise determines are responsive and responsible are eligible to protest a Bid; protests from any other Bidder will not be considered. In order to determine whether a protesting Bidder is responsive and responsible, Owner may evaluate all information contained in any protesting Bidder's Bid.,.

- F. 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.

4.02 Exclusive Remedy

- A. The procedure and time limits set forth in this paragraph are mandatory and are Bidder's sole and exclusive remedy in the event of 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.

ARTICLE 5 - AWARD AND EXECUTION OF CONTRACT

5.01 Notice of Award and Submittal of Executed Contract Documents

- A. If Contract is to be awarded, it will be awarded to the lowest responsible responsive Bidder. . Such Award, if made, will be made within sixty (60) Calendar Days after the opening of the Bid Proposals.
- B. Successful Bidder must execute and submit to Owner the "Required Contract Documents and Proof of Insurance" set forth below, within the time limits requested by County. Failure to deliver the "Required Contract Documents" to County by 5:00 p.m. of the 10th Day following Contractor's receipt of the Documents, will entitle the Owner to consider the Bid abandoned, and to declare the Bid security forfeited.

5.02 Required Contract Documents and Proof of Insurance

- A. Document 00 5200 (Agreement), fully executed by successful Bidder. Submit three originals, each bearing an original signature.
- B. Document 00 6001 (Construction Performance Bond), fully executed by successful Bidder and surety, in the amount set forth in Document 00 6001. Submit three originals.
- C. Document 00 6002 (Construction Labor and Material Payment Bond), fully executed by successful Bidder and surety, in the amount set forth in Document 00 6002. Submit three originals.
- D. Document 00 6003 (Guaranty), fully executed by successful Bidder. Submit three originals.
- E. Insurance certificates and endorsements required by Document 00 7300 (Supplementary Conditions—Insurance): Submit three original set.
- F. Connelly Asbestos Notification. Submit three originals.
- G. Corporate Resolution IF APPLICABLE. Submit three originals.
- H. Fictitious Business form IF APPLICABLE (copy of recorded document). Submit three originals.

5.03 Failure to Execute and Deliver Documents:

- A. If Bidder to whom Contract is awarded, within the period described in this Document 00 2113, fails or neglects to execute and deliver all required Contract Documents and file all required bonds, insurance certificates, and other documents, Owner may, in its sole discretion, rescind the award, recover on Bidder's surety bond, or deposit Bidder's cashier's check or certified check for collection, and retain the proceeds thereof as liquidated damages for Bidder's failure to enter into the Contract. Bidder agrees that calculating the damages Owner may suffer as a result of Bidder's failure to execute and deliver all required Contract Documents would be extremely difficult and impractical and that the amount of Bidder's required Bid security shall be the agreed and presumed amount of Owner's damages.

- B. Upon such failure to timely deliver all required Contract Documents as set forth herein, Owner may determine the next Apparent Low Bidder and proceed accordingly.

ARTICLE 6 - GENERAL CONDITIONS AND REQUIREMENTS

6.01 Modification of Commencement of Work:

- A. Owner expressly reserves the right to modify the date for the Commencement of Work under the Contract and to independently perform and complete work related to Project. Owner accepts no responsibility to Contractor for any delays attributed to its need to complete independent work at the Site.
- B. Owner shall have the right to communicate directly with Apparent Low Bidder's proposed performance bond surety, to confirm the performance bond. Owner may elect to extend the time to receive faithful performance and labor and material payment bonds.

6.02 Conformed Project Manual:

- A. Following Award of Contract, Owner may prepare a conformed Project Manual reflecting Addenda issued during bidding, which will constitute the approved Project Manual.

6.03 Payment Bond:

- A. If the Project described in Document 00 1113 (Notice to Contractors) involves an expenditure in excess of twenty-five thousand dollars (\$25,000), the successful Bidder must file a payment bond with and approved by Owner prior to entering upon the performance of the Work, in accordance with Civil Code § 9550.

6.04 Wage Rates:

- A. 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 on file at the General Services Division of the County Administrative Office, 1115 Truxtun Avenue, Third Floor, Bakersfield, California 93301-4639 and are deemed included in the Bidding Documents. Upon request, Owner will make available copies to any interested party. Also, Contractor shall post the applicable prevailing wage rates at the Site.

6.05 Withdrawal of Bids:

- A. Bidders may withdraw their Bids at any time prior to the Bid opening time fixed in this Document 00 2113, only by written request for the withdrawal of Bid filed with Owner at the General Services Division of the County Administrative Office, 1115 Truxtun Avenue, Third Floor, Bakersfield, California 93301. Bidder or its duly authorized representative shall execute request to withdraw Bid.

6.06 Ineligible Contractors and Subcontractors:

- A. Owner 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 California Labor Code section 1777.1 or 1777.7. Bidders and the Contractor who is awarded the project contract shall not utilize, or allow work by, any subcontractor who is ineligible to bid or work on, or be awarded, a public works project pursuant to California Labor Code Section 1777.1 or 1777.7. (See California Public Contract Code Section 6109.) The California Division of Labor Standards Enforcement publishes a list of debarred contractors and subcontractors on the Internet at www.dir.ca.gov/DLSE/debar.html.

6.07 Substitutions:

- A. Bidders must base their Bids on products and systems specified in Contract Documents or listed by name in Addenda. Owner will consider substitution requests only for "or equal items." Bidders wanting to use "or equal" item(s) shall submit Document 01 6000-A (Substitution Request Form) no later than 14 Calendar Days following the execution of the Contract by Owner. As a limitation on Bidder's privilege to request substitution of "or equal" items, Owner has found that

certain items are designated as Owner standards and certain items are designated to match existing items in use on a particular public improvement either completed or in the course of completion or are available from one source. As to such items, Owner will not permit substitution. Such items are described in the Bidding Documents.

6.08 Definitions:

- A. All abbreviations and definitions of terms used in this Document 00 2113 are set forth in Document 00 7200 (General Conditions) and Section 01 4216 (Definitions).

END OF DOCUMENT

DOCUMENT 00 3100
GEOTECHNICAL DATA AND EXISTING CONDITIONS

ARTICLE 1 - REPORTS AND INFORMATION ON EXISTING CONDITIONS

1.01 Inspection of Reports:

- A. The County of Kern (hereinafter "Owner"), its consultants, and prior contractors may have collected documents providing a general description of the Site and conditions of the Work. These documents may consist of geotechnical reports for and around the Site, contracts, contract specifications, tenant improvement contracts, as-built drawings, utility drawings, and information regarding Underground Facilities (collectively, "Existing Conditions Data".)
- B. Bidders may inspect Geotechnical and Existing Conditions Data. These documents are listed in Section 01 1000 (Summary) and are available for review at the address identified therein. Copies may be obtained by contacting the owner at the following website <https://pbsystem.planetbids.com/portal/59079/portal-home>.
- C. Existing Conditions Data is for information only and does not describe labor, materials or equipment furnished by Contractor, but rather, information regarding conditions of the work. Such Existing Conditions Data is not a Contract Document.

ARTICLE 2 - USE OF EXISTING CONDITIONS DATA

2.01 Above-Ground Existing Conditions:

- A. Owner makes no warranty or representation of existing aboveground conditions, as-built conditions, or other aboveground actual conditions verifiable by reasonable independent investigation. These conditions are verifiable by Bidder by the performance of its own independent investigation that Bidder must perform prior to bidding and Bidder must not rely on the information supplied by Owner regarding existing conditions.
- B. Bidder represents and agrees that in submitting its Bid, it is not relying on any information regarding above-ground existing conditions supplied by Owner.
- C. Owner is not responsible for information regarding Underground Facilities owned by others.

2.02 Underground Facilities:

- A. Information supplied regarding existing Underground Facilities at or contiguous to the Site is based on information furnished to Owner by others (e.g., the builders of such Underground Facilities or others).
- B. Owner assumes responsibility for only the general accuracy, completeness or thoroughness of information regarding Underground Facilities that are owned by Owner. This express assumption of responsibility applies only if Bidder has conducted the independent investigation required of it under Document 00 7200 (General Conditions) and discrepancies were not apparent. Bidder is solely responsible for any interpretation or conclusion drawn from this information.
- C. Owner is not responsible only for information regarding Underground Facilities owned by others.

2.03 Hazardous Materials Surveys:

- A. Bidders may rely on this data and information for general accuracy regarding the locations of potentially hazardous materials subject of the Work. Owner does not warrant and makes no representation regarding the completeness or thoroughness of any data or information regarding existing conditions or hazardous materials, including, but not limited to, quantities, characteristics, volumes, or associated structural features. Bidder represents and agrees that in submitting a Bid it is not relying on any such data, information or deductions.
- B. Data and information regarding the locations of hazardous materials are not part of Contract Documents.

2.04 Geotechnical Data:

- A. Bidder may rely upon the general accuracy of the "technical data" contained in the geotechnical reports and drawings identified above, but only insofar as it relates to subsurface conditions,

provided Bidder has conducted the independent investigation required of it and discrepancies were not apparent.

- B. The term “technical data” shall include actual reported depths, reported quantities, reported soil types, reported soil conditions, and reported material, equipment, or structures that were encountered during subsurface exploration. The term “technical data” does not include, and Bidder may not rely upon, any other data, interpretations, opinions or information shown or indicated in such drawings or reports that otherwise relate to subsurface conditions or described structures. The term “technical data” shall not include the location of Underground Facilities.
- C. Bidder may not rely on the completeness of reports and drawings for the purposes of bidding or construction. Bidder is solely responsible for any interpretation or conclusion drawn from any “technical data” or any other data, interpretations, opinions, or information contained in supplied geotechnical data.
- D. Except as expressly set forth in this Document 00 3100, Owner does not warrant, and makes no representation regarding, the accuracy or thoroughness of any geotechnical data.
- E. Bidder represents and agrees that in submitting its Bid, it is not relying on any geotechnical data supplied by Owner, except as specifically set forth herein.

ARTICLE 3 - INVESTIGATIONS

3.01 Required Investigations:

- A. Before submitting a Bid, each Bidder shall be responsible to obtain such additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise, which may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto or which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of Contract Documents.
- B. Bidders shall advise Owner in writing during the Bid period of any questions, suppositions, inferences or deductions Bidders may have for Owner’s review and response.
- C. Owner has provided time in the period prior to bidding for Bidder to perform these investigations.

3.02 Access to Site for Investigations:

- A. During the Pre-Bid Site Visit(s), Owner will provide each Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies, as each Bidder deems necessary for submission of a Bid. Bidders must fill all holes and clean up and restore the Site to its former conditions upon completion of such explorations, investigations, tests, and studies. Such investigations may be performed only under the provisions of Document 00 2113 (Instructions to Bidders) and Document 00 7200 (General Conditions) including, but not limited to, proof of insurance and obligation to indemnify against claims arising from such investigation work. Each Bidder shall supply all equipment required to perform any investigations as each Bidder deems necessary. Owner has the right to limit the number of pieces of machinery operating at one time due to safety concerns.

END OF DOCUMENT

**DOCUMENT 00 4100
BID FORM**

TO THE COUNTY OF KERN

THIS BID IS SUBMITTED BY:

(Firm/Company Name)

Project: **LAMONT PARK BEAUTIFICATION PROJECT**
Project Number: **1650.7012.22**

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the County of Kern (hereinafter "Owner") in the form included in the Contract Documents, Document 00 5200 (Agreement), to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Sum and within the Contract Time indicated in this Bid and in accordance with all other terms and conditions of the Contract Documents.
2. Bidder accepts all of the terms and conditions of the Contract Documents, Document 00 1113 (Notice to Contractors), and Document 00 2113 (Instructions to Bidders), including, without limitation, those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for 60 Calendar Days after the day of Bid opening, unless there is a bid protest, then 90 Calendar days after the day of bid opening.
3. In submitting this Bid, Bidder represents that Bidder has examined all of the Contract Documents, performed all necessary Pre-Bid investigations, received, reviewed and has included the signed cover sheet for each of the following Addenda in this bid submission:

Addendum Number	Addendum Date	Signature of Bidder

4. The undersigned, as Bidder, declares that: the Bidder is duly licensed under the Contractor's State License Law Business and Professions Code Section 7000 et.seq.; the only persons or parties interested in this proposal as principals are those named herein; this proposal is made without collusion with any other person, firm or corporation; the bidder has examined the location of the proposed work, the attached proposed form of Agreement, Plans, Specifications, and Addenda referred to; the Bidder agrees that if this proposal is accepted by the County, Bidder will contract with the County of Kern by execution of the documents required by Document 00 2113(Instruction to Bidders); to do all the work and furnish all the materials specified in the contract, in the manner and time therein prescribed, and according to the requirements of the Assistant County Administrative Officer, County of Kern, General Services Division of the County

Administrative Office as therein set forth, and that the Bidder will accept in full payment the following amounts:

Total Bid Price:

_____ (\$ _____)
(Words)

5. Subcontractors for work included in all Bid items are listed on Document 00 4430 (Subcontractors List) submitted herewith.
6. The undersigned Bidder understands that Owner reserves the right to reject this Bid.
7. If the documents required by Document 00 2113 (Instructions to Bidders) are mailed or delivered to the undersigned Bidder within the time described in Paragraph 2 of this Document 00 4100, or at any other time thereafter before it is withdrawn, the undersigned Bidder will execute and deliver the documents required by Document 00 2113 (Instructions to Bidders) within the times specified therein.
8. 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 authorized to do a surety business in the State of California, in form specified in Document 00 2113 (Instructions to Bidders), in the amount of ten percent (10%) of the Total Bid Price and made payable to the County of Kern.
9. The undersigned Bidder agrees to commence Work under the Contract Documents on the date established in Document 00 7200 (General Conditions) and to complete all Work within the time specified in Document 00 5200 (Agreement).
10. The undersigned Bidder agrees that, in accordance with Document 00 7200 (General Conditions), liquidated damages for failure to complete all Work in the Contract within the time specified in Document 00 5200 (Agreement) shall be as set forth in Document 00 5200.
11. The names of all persons interested in the foregoing Bid as principals are:

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.

NAME OF BIDDER: _____

licensed in accordance with an act for the registration of Contractors, and with license number: _____ Expiration: _____.

(Place of Incorporation, if Applicable) (Principal)

(Principal)

(Principal)

I certify (or declare) under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

(Signature of Bidder)

NOTE: If Bidder is a corporation, set forth the legal name of the corporation together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If Bidder is a partnership, set forth the name of the firm together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership.

Business Address:

Contractor's Representative(s):

(Name/Title)

(Name/Title)

(Name/Title)

Officers Authorized to Sign Contracts

(Name/Title)

(Name/Title)

(Name/Title)

Telephone Number(s):

(Area Code) (Number)

(Area Code) (Number)

Fax Number(s):

(Area Code) (Number)

(Area Code) (Number)

Date of Bid:

END OF DOCUMENT

DOCUMENT 00 4411

BOND ACCOMPANYING BID

COUNTY OF KERN

KNOW ALL MEN BY THESE PRESENTS,

That we, _____ as PRINCIPAL, and _____, as SURETY, are held and firmly bound unto the County of Kern (hereinafter Obligee), a political subdivision of the State of California, in the penal sum of ten percent (10%) of the total amount of the bid of the Principal above named, submitted by said Principal to Obligee for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents. In no case shall the liability of the Surety hereunder exceed the sum of \$_____.

THE CONDITION OF THIS OBLIGATION IS SUCH,

THAT WHEREAS THE PRINCIPAL has submitted the above mentioned bid to Obligee for certain construction specifically described as follows, for which bids are to be opened at Bakersfield, California, on the date as indicated on the bid documents for the **Lamont Park Beautification Project (1650.7012.22)**.

NOW, THEREFORE, if the aforesaid Principal is awarded the contract and, within the time and manner required under the Specifications, after the prescribed forms are presented to him for signature, enters into a written Agreement, in the prescribed form, in accordance with the bid, files the two bonds with the Obligee, one to guaranty faithful performance and the other to guaranty payment for labor and materials, as required by law, provides all required insurance certificates, Guaranty, and all other endorsements, forms, and documents required under Document 00 2113 (Instructions to Bidders), then this obligation shall be null and void; otherwise, it shall remain in full force and virtue.

If suit is brought upon this Bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including reasonable costs and Attorney's fees to be fixed by the Court.

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

Correspondence of claims
relating to this bond
should be sent to the
surety at the following
address:

(SEAL)

(SEAL)

(SEAL)

PRINCIPAL

(SEAL)

(SEAL)

(SEAL)

SURETY

Phone: () _____

Note: Signatures of those executing for the Surety must be properly acknowledged.

END OF DOCUMENT

**DOCUMENT 00 4412
BIDDER INFORMATION FORM**

INSTRUCTIONS

In order to register to undertake work for Owner, Bidder **must**:

- 1) Fill out this registration form completely; do not leave blanks.
- 2) Provide certificates of insurance or a letter evidencing coverage

INDEPENDENT CONTRACTOR REGISTRATION

Contractors DIR Registration Number: _____

Contractor's License # _____

Date: _____ Fed I.D. # _____

Full Corporate Name of Company: _____

Street Address: _____

Mailing Address: _____

Phone: _____ Fax: _____

Name of Principal Contact: _____

Type of Business: _____ Sole Proprietor _____ Partnership
 _____ Non-Profit 501(c)(3) _____ Corporation
 _____ other (please explain: _____)

INSURANCE

Workers' Compensation:

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

General Liability:

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

Policy Limits: \$ _____

A.M. Best Rating: _____

Automobile Liability:

Carrier: _____

Address: _____

Phone and Fax: _____

Policy Number: _____

Policy Limits: \$ _____

A.M. Best Rating: _____

BONDING

Surety Company Providing Bonds: _____

Address: _____

Phone and Fax: _____

Admitted in California YES _____ NO _____

A.M. Best Rating: _____

BIDDER CERTIFIES, UNDER PENALTY OF PERJURY, THAT THE FOREGOING INFORMATION IS CURRENT AND ACCURATE AND AUTHORIZES THE COUNTY OF KERN AND ITS AGENTS AND REPRESENTATIVES TO OBTAIN A CREDIT REPORT AND/OR VERIFY ANY OF THE ABOVE INFORMATION.

SIGNATURE

DATE

SAFETY EXPERIENCE

The following statements as to the Bidder's safety experience are submitted with the Bid, as part thereof, and the Bidder guarantees the truthfulness and accuracy of all information.

1. List Bidder's interstate Experience Modification Rate for the last three years.
[20__] ____ **[20__]** ____ **[20__]** ____
2. Use Bidder's last year's Cal/OSHA 200 log to fill in the following number of injuries and illnesses:
 - a. Number of lost workday cases _____
 - b. Number of medical treatment cases _____
 - c. Number of fatalities _____
3. Employee hours worked last year _____
4. State the name of Bidder's safety engineer/manager: _____

Attach a resume or outline of this individual's safety and health qualifications and experience.

I CERTIFY, UNDER PENALTY OF PERJURY, THAT THE FOREGOING INFORMATION IS CURRENT AND ACCURATE AND I AUTHORIZE THE COUNTY OF KERN, AND ITS AGENTS AND REPRESENTATIVES TO OBTAIN A CREDIT REPORT AND/OR VERIFY ANY OF THE ABOVE INFORMATION.

BIDDER:

By: _____
Signature

Its: _____
Title

Date _____

END OF DOCUMENT

SUBCONTRACTORS LIST

Contractors Name: _____

Project Name/Number: **Lamont Park Beautification Project (1650.7012.22)**

Bidder submits the following information as to the subcontractors Bidder intends to employ if awarded the Contract. Only list subcontractors whose contract with Contractor is in an amount greater than one-half of 1 percent of Contractor's total bid.

Full Name of Subcontractor and Address of Mill or Shop	Description of Work: Reference To Bid Items	Subcontractor's License No.	DIR Registration No.

(Bidder to attach additional sheets if necessary)

Bidder must provide Subcontractor DIR Registration Number within twenty-four hours of bid opening.

END OF DOCUMENT

DOCUMENT 00 4452
NON-COLLUSION DECLARATION

PUBLIC CONTRACT CODE §7106

PROJECT TITLE: **LAMONT PARK BEAUTIFICATION PROJECT (1650.7012.22)**

NON-COLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares:

I am the _____ of _____
(Office of Affiant) (Name of Bidder)

the party 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. The Bidder 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. All statements contained in the Bid are true. The Bidder has not, directly or indirectly, submitted his or her price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, 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 _____, at _____,
(State) (Date) (City)

(Name of Bidder)

(Signature of Principal)

NOTE: If Bidder is a partnership or a joint venture, a copy of this declaration must be signed and sworn to by every member of the partnership or venture.

END OF DOCUMENT

DOCUMENT 00 4453
IRAN CONTRACTING ACT CERTIFICATION
(Public Contract Code Sections 2200 *et seq.*)

Project Name/Number: Lamont Park Beautification Project (1650.7012.22)

As required by California Public Contract Code section 2204, the Contractor certifies that the option checked below relating to the Contractor's status in regard to the Iran Contracting Act of 2010 (Public Contract Code sections 2200 *et seq.*) is true and correct:

- ☐ The Contractor is not:
- (i) identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code section 2203; or
 - (ii) a financial institution that extends, for 45 days or more, credit in the amount of \$20,000,000 or more to any other person or entity identified on the current list of persons and entities engaging in investment activities in Iran prepared by the California Department of General Services in accordance with subdivision (b) of Public Contract Code section 2203, if that person or entity uses or will use the credit to provide goods or services in the energy sector in Iran.
- ☐ Kern County has exempted the Contractor from the requirements of the Iran Contracting Act of 2010 after making a public finding that, absent the exemption, Kern County will be unable to obtain the goods and/or services to be provided pursuant to the Contract.
- ☐ The amount of the Contract payable to the Contractor for the project is less than \$1,000,000.

CERTIFICATION

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the bidder to the above selected option. This certification is made under the laws of the State of California.

Firm

Signed

Date

Name/Title

Note: In accordance with Public Contract Code section 2205, false certification of this form shall be reported to the California Attorney General and may result in civil penalties equal to the greater of \$250,000 or twice the Contract amount, termination of the Contract and/or ineligibility to bid on contracts for three years.

END OF DOCUMENT

**DOCUMENT 00 4455
BIDDER CERTIFICATIONS**

TO BE EXECUTED BY ALL BIDDERS AND SUBMITTED WITH BID

The undersigned Bidder certifies to the County of Kern (hereinafter "Owner") as set forth in sections 1 through 6 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. STATEMENT OF BIDDER

Have you, or any officer of yours, or any employee of yours who may have a proprietary interest in your Bid, ever been disqualified, removed, or otherwise prevented from bidding on or completing any Federal, State, or Local Governmental project because of a violation of law or safety regulations:

YES _____ NO _____

3. CERTIFICATION OF WORKER'S COMPENSATION INSURANCE

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Section 3700 of the Labor Code which 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.

4. CERTIFICATION OF PREVAILING WAGE RATES AND RECORDS

By my signature hereunder, as the Contractor, I certify that I am aware of the provisions of Section 1773 of the California Labor Code, which requires the payment of prevailing wage on public projects. Also, that the Contractor and any subcontractors under the Contractor shall comply with California Labor Code §1776, regarding wage records, and with California Labor Code §1777.5, regarding the employment and training of apprentices. It is the Contractor's responsibility to ensure compliance by any and all subcontractors performing work under this Contract.

5. CERTIFICATION OF COMPLIANCE WITH PUBLIC WORKS CHAPTER OF LABOR CODE

By my signature hereunder, as the Contractor, I certify that I am aware of Sections 1777.1 and 1777.7 of the California Labor Code and am eligible to bid and work on public works projects.

6. 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 the County will be relying on this certification if it awards the Contract to the undersigned.

BIDDER:

(Name of Bidder)

Date: _____, [202] By: _____
(Signature)

Name: _____
(Print Name)

Its: _____
(Title)

END OF DOCUMENT

**DOCUMENT 00 5199
PROPOSED CONTRACT DOCUMENTS TRANSMITTAL**

Contractor
Address
City State Zip

Date

SUBJECT **LAMONT PARK BEAUTIFICATION PROJECT (1650.7012.22)**

The Contract Sum of your proposed contract is _____ Dollars (\$_____).

1. The proposed Contract Documents listed below accompany this Document 00 5199. Several departments and entities will require original documents with original "wet" signatures. Therefore, Contractor shall return TWO copies of each of the required documents, each of the TWO copies require original "wet" signatures.

2. Contractor shall return the required documents to the County no later than _____ in order to meet the Board of Supervisors agenda requirements imposed on the Clerk of the Board.

- a. Document 00 5200 (Agreement) **DO NOT DATE THE AGREEMENT. DATE OF BOARD MEETING WILL BE INSERTED BY THE CLERK OF THE BOARD.**
- b. Document 00 6001 (Construction Performance Bond), executed by you and your surety. **BE CERTAIN TO HAVE A POWER OF ATTORNEY AND NOTARY FOR EACH OF THE PERFORMANCE BONDS (TWO IN TOTAL FOR THE PERFORMANCE BOND)**
- c. Document 00 6002 (Construction Labor and Material Payment Bond), executed by you and your surety. **BE CERTAIN TO HAVE A POWER OF ATTORNEY AND NOTARY FOR EACH OF THE LABOR AND MATERIAL PAYMENT BONDS (TWO IN TOTAL FOR THE LABOR AND MATERIAL PAYMENT BOND)**
- d. Insurance certificates **(INCLUDE ENDORSEMENTS AND WAIVER OF SUBROGATION)**, as required under Document 00 7300 (Supplementary Conditions – Insurance).
- e. Document 00 6003 (Guaranty)
- f. Document 00 6200 (Withheld Contract Funds Certification)
- g. Connelly Asbestos Notification
- h. Corporate Resolution, if applicable
- i. Fictitious Business form, if applicable (must be copy of recorded document)

3. Failure to comply with these conditions will entitle Owner to consider your Bid abandoned, and to declare your Bid security forfeited.

4. Upon commencement of the Work, you and each of your Subcontractors shall certify copies of payroll records on forms provided by the Division of Labor Standards Enforcement, in accordance with California Labor Code §1776. Contractor and Subcontractors shall provide copies of certified payroll records upon request by the County.

5. General Services Division will recommend the Board of Supervisors execute the Agreement during the meeting of _____, 2:00 p.m. session. You will receive a copy of the Board letter under separate cover.

6. General Services Division has identified the following staff for this project:

- a. Project Manager - Name – Phone Number
- b. Project Inspector - Name – Phone Number
- c. Contract Specialist – Name – Phone Number

END OF DOCUMENT

**DOCUMENT 00 5200
AGREEMENT**

THIS AGREEMENT, entered into on _____, is by and between _____, whose place of business is located at _____ ("Contractor"), and the COUNTY OF KERN, a political subdivision of the State of California (hereinafter "Owner"), acting under and by virtue of the authority vested in Owner by the laws of the State of California

WHEREAS, in consideration for the promises and payment to be made and performed by County, and under the conditions expressed in the incorporated Bid Proposal (Bid), bonds and related papers, Contractor agrees to do all the work and furnish all the materials at the expense of Contractor (except such as the Specifications state will be furnished by County) necessary to construct and complete in a good and workmanlike manner to the satisfaction of the County Administrative Officer of General Services Division of the County Administrative Office all the work shown and described in the plans and specifications for the project known as:

LAMONT PARK BEAUTIFICATION PROJECT (1650.7012.22)

NOW, THEREFORE, in consideration of the mutual covenants hereinafter set forth, Contractor and Owner agree as follows:

ARTICLE 1 - SCOPE OF WORK OF THE CONTRACT

1.01 Work of the Contract

- A. Contractor shall complete all Work specified in the Contract Documents, in accordance with the Specifications, Drawings, and all other terms and conditions of the Contract Documents (**Work**).

1.02 Price for Completion of the Work

- A. Owner shall pay Contractor the following Contract Sum of _____ (**\$XXX,XXX**) for completion of Work in accordance with Contract Documents as set forth in Contractor's Bid, attached hereto.

ARTICLE 2 - COMMENCEMENT AND COMPLETION OF WORK

2.01 Commencement of Work

- A. Contractor shall commence Work on the date established in the Notice to Proceed (**Commencement Date**).
B. Owner reserves the right to modify or alter the Commencement Date.

2.02 Completion of Work

- A. Contractor shall achieve Final Completion of the entire Work **[320] Working** Days from the Commencement Date.

ARTICLE 3 - LIQUIDATED DAMAGES FOR DELAY IN COMPLETION OF WORK

3.01 Liquidated Damage Amounts

- A. As liquidated damages for delay Contractor shall pay Owner **one thousand five hundred dollars (\$1,500.00)** for each Calendar Day that expires after the time specified herein for Contractor to achieve Final Completion of the entire Work, until achieved.

3.02 Scope of Liquidated Damages

- A. Measures of liquidated damages shall apply cumulatively.

- B. Limitations and stipulations regarding liquidated damages are set forth in Document 00 7200 (General Conditions).

ARTICLE 4 - CONTRACT DOCUMENTS

- 4.01** Contract Documents consist of the following documents, including all changes, Addenda, and Modifications thereto:

Document 00 0101	Title Page
Document 00 1113	Notice to Contractors
Document 00 2113	Instruction to Bidders
Document 00 3100	Geotechnical Data and Existing Conditions
Document 00 4100	Bid Form
Document 00 4412	Bidder Information Form
Document 00 4430	Subcontractors List
Document 00 4452	Non-Collusion Declaration
Document 00 4453	Iran Contracting Act Certification
Document 00 4455	Bidder Certifications
Document 00 5199	Proposed Contract Documents Transmittal
Document 00 5200	Agreement
Document 00 5590	Release of Claims
Document 00 6001	Construction Performance Bond
Document 00 6002	Construction Labor and Material Payment Bond
Document 00 6003	Guaranty
Document 00 6200	Withheld Contract Funds Certification
Document 00 7200	General Conditions
Document 00 7280	Apprenticeship Programs
Document 00 7300	Supplementary Conditions – Insurance
Master Specifications	Divisions 01 through 52
Drawings	

- 4.02** There are no Contract Documents other than those listed above. The Contract Documents may only be amended, modified or supplemented as provided in Document 00 7200 (General Conditions).

ARTICLE 5 - MISCELLANEOUS

- 5.01** Terms and abbreviations used in this Agreement are defined in Document 00 7200 (General Conditions) and Section 01 4216 (Definitions) and will have the meaning indicated therein.
- 5.02** It is understood and agreed that in no instance are the persons signing this Agreement for or on behalf of Owner or acting as an employee, agent, or representative of Owner, 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 Owner is limited and confined to such liability as authorized or imposed by the Contract Documents or applicable law.
- 5.03** 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 Owner tenders final payment to Contractor, without further acknowledgment by the parties.
- 5.04** 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 Owner'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.

- 5.05** 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 three original Agreements on the day and year first above written.

RECOMMENDED AND APPROVED
AS TO CONTENT:
GENERAL SERVICES DIVISION OF THE
COUNTY ADMINISTRATIVE OFFICE

CONTRACTOR:

Firm's Name

By _____
Joseph Clark, Supervising Engineer

Type of Entity
(Corporation, partnership, sole proprietorship)

APPROVED AS TO FORM:
OFFICE OF THE COUNTY COUNSEL

By _____
Signature

By _____
Brian Van Wyk, Deputy County Counsel

Typed Name

COUNTY OF KERN

Title of Individual Executing Document on behalf of Firm

By _____
Geoffrey Hill,
Chief General Services Officer

NOTICE: CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND ARE REGULATED BY CONTRACTORS' 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, CALIFORNIA 95814.

END OF DOCUMENT

DOCUMENT 00 5590

AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS
[Public Contract Code § 7100]

THIS AGREEMENT AND RELEASE OF ANY AND ALL CLAIMS ("Agreement and Release"), made and entered into this [date] day of [Month], [202__], by and between the County of Kern (hereinafter "Owner"), and [Insert name of Contractor] ("Contractor"), whose place of business is at [Insert address of Contractor].

RECITALS

- A. Owner and Contractor entered into Contract Number [1650.7012.22] (the "Contract") for construction of Owner **Lamont Park Beautification** located at **8304 Segrue Rd, Lamont, CA 93241**.
- B. The Work under the Contract has been completed.

AGREEMENT

NOW THEREFORE, it is mutually agreed between Owner and Contractor as follows:

- 1. Contractor will not be assessed liquidated damages except as detailed below:

Original Contract Sum	\$ _____
Modified Contract Sum	\$ _____
Payment to Date	\$ _____
Liquidated Damages	\$ _____
Payment Due Contractor	\$ _____
- 2. Subject to the provisions of this Agreement and Release, Owner will forthwith pay to Contractor the sum of [_____ Dollars and _____ Cents (\$_____)] under the Contract, less any amounts withheld under the Contract or represented by any Notice to Withhold Funds on file with Owner as of the date of such payment.
- 3. Contractor acknowledges and hereby agrees that there are no unresolved or outstanding claims in dispute against Owner arising from the Contract, except for the claims described in Paragraph 4 of this Document 00 5590. It is the intention of the parties in executing this Agreement and Release that this Agreement and Release shall be effective as a full, final and general release of all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities of Contractor against Owner, and all if its agents, employees, consultants, inspectors, representatives, assignees and transferees, except for the Disputed Claims set forth in Paragraph 4 of this Document 00 5590. Nothing in this Agreement and Release shall limit or modify Contractor's continuing obligations described in Paragraph 6 of this Document 00 5590.
- 4. The following claims submitted under Document 00 7200 (General Conditions), Article 12, are disputed (hereinafter, the "Disputed Claims") and are specifically excluded from the operation of this Agreement and Release.

[Insert information in Chart below, affix attachment if necessary]

CLAIM NO.	DATE SUBMITTED	DESCRIPTION OF CLAIM	AMOUNT OF CLAIM

5. Consistent with California Public Contract Code §7100, Contractor hereby agrees that, in consideration of the payment set forth in Paragraph 2 of this Document 00 5590, Contractor hereby releases and forever discharges Owner, and all of its agents, employees, consultants, inspectors, assignees and transferees from any and all liability, claims, demands, actions or causes of action of whatever kind or nature arising out of or in any way concerned with the Work under the Contract.
6. Guarantees and warranties for the Work, and any other continuing obligation of Contractor, shall remain in full force and effect as specified in the Contract Documents.
7. Contractor shall immediately defend, indemnify and hold harmless Owner, any of the Owner's Representatives, Project Manager, and all of their agents, employees, consultants, inspectors, assignees and transferees, from any and all claims, demands, actions, causes of action, obligations, costs, expenses, damages, losses and liabilities that may be asserted against them by any of Contractor's suppliers and/or Subcontractors of any tier and/or any suppliers to them for any and all labor, materials, supplies and equipment used, or contemplated to be used in the performance of the Contract, except for the Disputed Claims set forth in Paragraph 4 of this Document 00 5590.
8. Contractor hereby waives the provisions of California Civil Code §1542, which provide as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER, MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR.

9. The provisions of this Agreement and Release are contractual in nature and not mere recitals and shall be considered independent and severable, and if any such provision or any part thereof shall be at any time held invalid in whole or in part under any federal, state, county, municipal or other law, ruling, or regulation, then such provision, or part thereof shall remain in force and effect only to the extent permitted by law, and the remaining provisions of this Agreement and Release shall also remain in full force and effect, and shall be enforceable.
10. Contractor represents and warrants that it is the true and lawful owner of all claims and other matters released pursuant to this Agreement and Release, and that it has full right, title and authority to enter into this instrument. Each party represents and warrants that it has been represented by counsel of its own choosing in connection with this Agreement and Release.
11. All rights of Owner shall survive completion of the Work or termination of the Contract, and execution of this Agreement and Release.

*** * * CAUTION: THIS IS A RELEASE - READ BEFORE EXECUTING * * ***

APPROVED AS TO FORM:
OFFICE OF THE COUNTY COUNSEL

COUNTY OF KERN

By _____
Brian Van Wyk, Deputy County Counsel

By _____
Geoffrey Hill

"COUNTY"

APPROVED AS TO CONTENT:
CONSTRUCTION SERVICES

Contractor's Name

By _____
Supervising Engineer

Type of Entity
(corporation, partnership, sole proprietorship)

By _____
Signature

Typed Name

Title of Individual Executing
Document on behalf of Firm

END OF DOCUMENT

DOCUMENT 00 6001
CONSTRUCTION PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

1.01 THAT WHEREAS, the COUNTY OF KERN (hereinafter "**Owner**"), a public agency of the State of California, has awarded to _____ as Principal, a contract dated the ____ day of _____, 20__ (the "**Contract**"), in the amount of \$_____. The Contract is by this reference made a part hereof, for the work of the following project:

LAMONT PARK BEAUTIFICATION PROJECT (1650.7012.22)

1.02 AND WHEREAS, Principal is required to furnish a bond in connection with the Contract, guaranteeing the faithful performance thereof;

1.03 NOW, THEREFORE, we, the undersigned Principal and _____, as Surety are held and firmly bound unto Owner in the sum of 100% OF THE CONTRACT PRICE to be paid to Owner 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.

1.04 THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its heirs, executors, administrators, successors, or assigns approved by Owner, 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 Owner, 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 Owner 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.

1.05 No extension of time, change, alteration, modification, or addition to the Contract, or of the work required thereunder, or work or actions by Owner to mitigate the damages resulting from any breach in performance by Contractor, 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.

1.06 Whenever Principal shall be and declared by Owner in default under the Contract, Surety shall promptly remedy the default, or shall promptly, and in no event later than thirty (30) days from notice:

- A. Undertake through its agents or independent contractors (but having qualifications and experience reasonably acceptable to Owner), 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 Owner of the lowest responsible bidder, arrange for a contract between such bidder and Owner 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 Owner to the Principal under the Contract and any amendments thereto, less the amount paid by Owner to Principal.
- 1.07** 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 Owner's rights against the others. If suit is brought upon this bond the Surety shall pay reasonable costs and attorney's fees to be fixed by the court.
- 1.08** Surety may not use Contractor to complete the Contract absent Owner's Consent. Owner shall have the right in its sole discretion to continue the work of the Contract, as necessary following a default and/or termination, as necessary to prevent risks of personal injury, property damage or delay to the Project.
- 1.09** No right of action shall accrue on this bond to or for the use of any person or corporation other than Owner or its successors or assigns.
- 1.10** Surety shall join in any proceedings brought under the Contract upon Owner's demand, and shall be bound by any judgment.
- 1.11** 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

Company (Corp. Seal)

Signature

Name & Title

Address

City, State, Zip Code

Company (Corp. Seal)

Signature

Name & Title

Address

City, State, Zip Code

Phone

END OF DOCUMENT

DOCUMENT 00 6002
CONSTRUCTION LABOR AND MATERIAL PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS:

1.01 THAT WHEREAS, the COUNTY OF KERN (hereinafter "**Owner**"), a public agency of the State of California, has awarded to _____ as Principal, a contract dated the ____ day of _____, 20__ (the "**Contract**"), in the amount of \$_____. The Contract is by this reference made a part hereof, for the work of the following project:

LAMONT PARK BEAUTIFICATION PROJECT (1650.7012.22)

- A. 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;
- B. NOW, THEREFORE, we, the undersigned Principal _____, as Surety, are held and firmly bound unto Owner in the sum of 100% OF THE CONTRACT PRICE (\$_____), 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.
- C. THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal, or its executors, administrators, successors, or assigns approved by Owner, or its subcontractors shall fail to pay any of the persons named in California Civil Code §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 Section 13020 of the State of California Unemployment Insurance Code 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.
- D. This bond shall inure to the benefit of any of the persons named in California Civil Code §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.
- E. 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.
- F. 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

Owner's rights against the other. If suit is brought upon this bond the Surety shall pay reasonable costs and attorney's fees to be fixed by the court.

- G. 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

Company (Corp. Seal)

Company (Corp. Seal)

Signature

Signature

Name & Title

Name & Title

Address

Address

City, State, Zip Code

City, State, Zip Code

Phone

END OF DOCUMENT

**DOCUMENT 00 6003
GUARANTY**

TO: THE COUNTY OF KERN (hereinafter "Owner"), for construction of **Lamont Park Beautification Project** located at **8304 Segrue Rd. Lamont, CA 93241**.

The undersigned guarantees all construction performed on this Project and also guarantees all material and equipment incorporated therein.

Contractor hereby grants to Owner for a period of one year following the date of Final Acceptance of the Work completed, or such longer period specified in the Contract Documents, its unconditional warranty of the quality and adequacy of all of the Work including, without limitation, all labor, materials and equipment provided by Contractor and its Subcontractors of all tiers in connection with the Work.

Neither final payment nor use nor occupancy of the Work performed by the Contractor shall constitute an acceptance of Work not done in accordance with this Guaranty or relieve Contractor of liability in respect to any express warranties or responsibilities for faulty materials or workmanship. Contractor shall remedy any defects in the Work and pay for any damage resulting therefrom, which shall appear within one year, or longer if specified, from the date of Final Acceptance of the Work completed.

If within one year after the date of Final Acceptance of the Work completed, or such longer period of time as may be prescribed by laws or regulations, or by the terms of Contract Documents, any Work is found to be Defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions, correct such Defective Work. Contractor shall remove any Defective Work rejected by Owner and replace it with Work that is not Defective, and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor fails to promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the Defective Work corrected or the rejected Work removed and replaced. Contractor shall pay for all claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor fails to correct Defective Work, or defects are discovered outside the correction period, Owner shall have all rights and remedies granted by law.

Inspection of the Work shall not relieve Contractor of any of its obligations under the Contract Documents. Even though equipment, materials, or Work required to be provided under the Contract Documents have been inspected, accepted, and estimated for payment, Contractor shall, at its own expense, replace or repair any such equipment, material, or Work found to be Defective or otherwise not to comply with the requirements of the Contract Documents up to the end of the guaranty period.

All abbreviations and definitions of terms used in this Agreement shall have the meanings set forth in the Contract Documents.

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The foregoing Guaranty is in addition to any other warranties of Contractor contained in the Contract Documents, and not in lieu of, any and all other liability imposed on Contractor under the Contract Documents and at law with respect to Contractor's duties, obligations, and performance under the Contract Documents. In the event of any conflict or inconsistency between the terms of this Guaranty and any warranty or obligation of the Contractor under the Contract Documents or at law, such inconsistency or conflict shall be resolved in favor of the higher level of obligation of the Contractor.

Date

Name/Title

Contractor

Signature

For maintenance, repair or replacement service contact:

Name

Telephone

Address

Alt. Telephone

City, State, and Zip

END OF DOCUMENT

DOCUMENT 00 6200
WITHHELD CONTRACT FUNDS CERTIFICATION

Public Contract Code Section §22300 requires the inclusion in invitations for public agency bids and in public agency contracts a provision which will, at the expense of the contractor, permit the substitution of securities of equal value for any construction progress monies withheld to ensure performance under a contract. Therefore, as a contractor on: **Lamont Park Beautification Project (1650.7012.22)**

- [] I do not intend to substitute securities for monies withheld and thereby avail myself of the process and rights provided in Public Contract Code Section §22300.
- [] I do intend to exercise my option as specified in Public Contract Code Section §22300 and hereby agree to the following:
1. I will establish an escrow agreement satisfactory to the County, with a state or federally chartered bank, which shall contain at a minimum provisions governing inter alia:
 - a. The amount of securities to be deposited;
 - b. The type of securities to be deposited, (eligible securities for deposit are described in Government Code Section 16430);
 - c. The providing of powers of attorney or other documents necessary for the transfer of the securities deposited;
 - d. The terms and conditions of conversion to cash to provide funds to meet defaults by the Contractor including, but not limited to termination of the Contractor's control over the work, stop notices filed pursuant to law, assessment of liquidated damages or other amounts to be kept or retained under the provisions of the contract;
 - e. The decrease in value of securities on deposit; and
 - f. The termination of the escrow agreement upon completion of the contract and acceptance by the County.
 2. I will obtain written consent of the surety to any such agreement; and
 3. I will attach to each progress payment submitted a notarized copy of escrow instructions executed by agents thereof and on bank letterhead as proof that such an account has been established. Such instructions will set forth that securities deposited shall not be withdrawn for any purpose (with contractor's complete and unreserved agreement) without prior written approval by the County of Kern with respect to the project herein above referenced.

Signature of Bidder

END OF DOCUMENT

DOCUMENT 00 6210

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

California Public Contract Code §22300

(County of Kern – Contractor.)

This Escrow Agreement is made and entered into on _____ by and between the County of Kern whose address is 1115 Truxtun Avenue, Third Floor, Bakersfield, California 93301 (hereinafter "County"), and _____, whose address is _____ (hereinafter "Contractor") and _____, whose address is _____ (hereinafter "Escrow Agent"),

W I T N E S S E T H:

For the consideration hereinafter set forth, the County, Contractor, and Escrow Agent agree as follows:

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by County pursuant to the Construction Contract entered into between the County and the Contractor in the amount of One Million Dollars (\$1,000,000), dated November 7, 2023 (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the County shall make payments of the retention earnings directly to the Escrow Agent. When the Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the County within 10 days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the County and Contractor. Securities shall be held in the name of County of Kern, and shall designate the Contractor as the beneficial owner.

2. County shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that Escrow Agent holds securities in the form and amount specified herein.

3. When County makes payment of retentions earned directly to Escrow Agent, Escrow Agent shall hold them for the benefit of Contractor until the time that the escrow created under this Contract is terminated. Contractor may direct the investment of the payments into securities.

All terms and conditions of this Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when County pays Escrow Agent directly.

4. Contractor shall be responsible for paying all fees, costs, and expenses incurred by Escrow Agent in administering the escrow account and all expenses of County. These expenses and payment terms shall be determined by County, Contractor and Escrow Agent.

5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to County.

6. Contractor shall have the right to withdraw all or any part of the principal in the escrow account only by written notice to Escrow Agent accompanied by written authorization from County to Escrow Agent that County consents to the withdrawal of the amount sought to be withdrawn by Contractor.

7. County shall have a right to draw upon the securities in the event of default by Contractor. Upon Seven (7) days written notice to the Escrow Agent from County of the default, Escrow Agent shall immediately convert the securities, any interest earned on the securities, and all interest earned on the interest, to cash and shall distribute the cash as instructed by County. Escrow Agent shall have no duty to determine whether a default has occurred and may rely solely upon the written notice of such default from County.

8. Upon receipt of written notification from County certifying that the Contract is final and complete, and that Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payment of fees and charges.

9. Escrow Agent shall rely on the written notifications from County and Contractor pursuant to Sections 5 to 8 of this Agreement. County and Contractor shall hold Escrow Agent harmless from Escrow Agent's release, conversion, and disbursement of the securities and interest as set forth above.

10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the County and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

(a) On behalf of the County:

Aimee Espinoza
Auditor-Controller-County Clerk
1115 Truxtun Avenue, 2nd Floor
Bakersfield, CA 93301

Signature

or

Geoffrey Hill,
Chief General Services Officer
1115 Truxtun Avenue, 3rd Floor
Bakersfield, CA 93301

Signature

(b) On behalf of the Contractor

Signature

(c) On behalf of the Escrow Agent

Signature

At the time the Escrow Account is opened, the County and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

RECOMMENDED AND APPROVED
AS TO CONTENT:
GENERAL SERVICES DIVISION OF THE
COUNTY ADMINISTRATIVE OFFICE

COUNTY OF KERN
BOARD OF SUPERVISORS

By _____
Geoffrey Hill,
Chief General Services Officer

By _____
Chairman, Board of Supervisors

"COUNTY"

APPROVED AS TO FORM:
OFFICE OF THE COUNTY COUNSEL

Contractor's Name

By _____
Brian Van Wyk, Deputy

Type of Entity
(corporation, partnership, sole
proprietorship)

NAME OF BANK

By _____
Signature

By _____
Signature

Print Name

Name, Title

Title of Individual Executing
Document on behalf of Firm

"ESCROW AGENT"

"CONTRACTOR"

END OF DOCUMENT

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DOCUMENT 00 7200

GENERAL CONDITIONS

ARTICLE 1 - INTERPRETATION OF CONTRACT DOCUMENTS

1.1 Interpretation Of Documents

- A. Contract Documents are complementary; what is called for by one is as binding as if called for by all.
- B. Individual Contract Documents subdivide at first level into Articles, and then into paragraphs.

1.2 Order Of Precedence Of Documents

- A. In the case of discrepancy or ambiguity in the Contract Documents, the following order of precedence shall prevail:
 - 1. Modifications in inverse chronological order (i.e., most recent first), and in the same order as specific portions they are modifying;
 - 2. Agreement Forms (Document 00 5200), and terms and conditions referenced therein;
 - 3. Supplementary General Conditions, if included;
 - 4. General Conditions (Document 00 7200);
 - 5. Division 1 Specifications, if included;
 - 6. Drawings and Technical Specifications (Division 2 and above);
 - 7. Written numbers over figures, unless obviously incorrect;
 - 8. Figured dimensions over scaled dimensions;
 - 9. Large-scale Drawings over small-scale Drawings.
- B. Any conflict between Drawings and Technical Specifications (Division 2 and above) will be resolved in favor of the document of the latest date (i.e., the most recent document), and if the dates are the same or not determinable, then in favor of Specifications.
- C. Any conflict between a bill or list of materials shown in the Contract Documents and the actual quantities required to complete Work required by Contract Documents, will be resolved in favor of the actual quantities.
- D. All Technical Specifications included in the Project manual shall be included within the Contract Documents unless identified otherwise.

ARTICLE 2 - PRE-BID INVESTIGATIONS

2.1 Pre-Bid Investigations Required

- A. Prior to and as a condition of submitting a Bid and executing Document 00 5200 (Agreement), Contractor shall investigate fully the Work of the Contract. Contractor shall visit the Site, examine thoroughly and understand fully the nature and extent of the Contract Documents, Work, Site, locality, actual conditions and as-built conditions.
- B. During performance of the Contract, Contractor will be charged with knowledge of all information that it should have learned in performing these pre-bid investigations and other obligations, and shall not be entitled to Change Orders (time or compensation) due to any information, error, inconsistency, omission, or conditions that Contractor should have known as a part of this Work. Contractor shall be responsible for the resultant losses, including, without limitation, the cost of correcting Defective Work.

2.2 Limited Reliance Permitted On Owner's Existing Conditions Data

- A. Regarding aboveground and as-built conditions shown on the Contract Documents or supplied by Owner, such information has been compiled in good faith, however, Owner does not expressly or impliedly warrant or represent that such information is correctly shown or indicated, or otherwise complete for construction purposes. Contractor must independently verify such information as part of its pre-bid investigations, and where conditions are not reasonably verifiable or discrepancies are identified, bring such matters to Owner's attention through written question issued during the bid period. In executing Document 00 5200 (Agreement), Contractor shall rely

on the results of its own independent investigation and shall not rely on Owner-supplied information regarding aboveground conditions and as-built conditions, and Contractor shall accept full responsibility for its verification work sufficient to complete the Work as intended.

- B. Regarding subsurface conditions other than Underground Facilities shown on the Contract Documents or otherwise supplied by Owner, Contractor 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. Owner is not responsible for the completeness of any subsurface condition information, Contractor's conclusions or opinions drawn from any subsurface condition information, or subsurface conditions that are not specifically shown. (For example, Owner is not responsible for soil conditions in areas contiguous to areas where a subsurface condition is shown.)

2.3 Pre-Bid Investigation Requirements For Excavation And Utilities Relocation Projects

- A. As part of its pre-bid investigations for Projects involving excavation and/or relocation of existing utilities, Contractor shall verify information regarding Underground Facilities, including but not limited to, requesting additional information or verification of information as necessary.
- B. Because of the nature and location of 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. Contractor shall, 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. Contractor shall carefully consider all supplied information, request additional information Contractor may deem necessary, and visually inspect the Site for above ground indications of Underground Facilities (such as, for example not by way of limitation, 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, new asphalt, meters and junction boxes, on or adjacent to the Site). Contractor shall also consider local underground conditions and typical practices for Underground Facilities, either through its own direct knowledge or through its subcontractors, and fully consider this knowledge in assessing the existing information and the reasonableness of its reliance.

ARTICLE 3 - SUBCONTRACTORS

3.1 Subcontractor Listing Law

- A. Contractor shall comply with the Subcontractor Listing law, California Public Contract Code §§4101 et seq. Contractor shall not substitute any other person or firm in place of any Subcontractor listed in the Bid except as may be allowed by law.
- B. Subcontractors shall not assign or transfer their subcontracts or permit them to be performed by any other contractor without Owner's written approval. At Owner's request, Contractor shall provide Owner with a complete copy of all executed subcontracts or final commercial agreements with Subcontractors and/or suppliers.

3.2 Subcontracts

- A. Subcontract agreements shall preserve and protect the rights of Owner under the Contract Documents so that subcontracting will not prejudice such rights. To the extent of the Work to be performed by a Subcontractor, Contractor shall require the Subcontractor's written agreement (1) to be bound to the terms of Contract Documents and (2) to assume all the obligations and responsibilities that Contractor assumes toward Owner under the Contract Documents. (These agreements include for example, and not by way of limitation, all warranties, claims procedures and rules governing submittals of all types to which Contractor is subject under the Contract Documents.)
- B. Contractor shall provide for the assignment to Owner of all rights any Subcontractor (of any tier) may have against any manufacturer, supplier, or distributor for breach of warranties and guarantees relating to the Work performed by the Subcontractor under the Contract Documents.

Subcontracts shall provide and acknowledge Owner as an intended third-party beneficiary of each subcontract and supply contract (of any tier).

ARTICLE 4 - DRAWINGS AND SPECIFICATIONS

4.1 Intent Of Drawings And Specifications

- A. Contractor shall interpret words or phrases used to describe Work (including services), materials, or equipment that have well-known technical or construction industry or trade meaning in accordance with that meaning. Drawings' intent specifically includes the intent to depict construction that complies with all applicable laws, codes and standards.
- B. As part of the "Work," Contractor shall provide all labor, materials, equipment, machinery, tools, facilities, services, employee training and testing, hoisting facilities, Shop Drawings, storage, testing, security, transportation, disposal, the securing of all necessary or required field dimensions, the cutting or patching of existing materials, notices, permits, documents, reports, agreements and any other items required or necessary to timely and fully complete Work described and the results intended by Contract Documents and, in particular, Drawings and Specifications. Divisions and Specification Sections and the identification on any Drawings shall not control Contractor in dividing Work among Subcontractors or suppliers or delineating the Work to be performed by any specific trade.
- C. Contractor shall perform reasonably implied parts of Work as "incidental work" although absent from Drawings and Specifications. Incidental work includes any work not shown on Drawings or described in Specifications that is necessary or normally or customarily required as a part of the Work shown on Drawings or described in Specifications. Incidental work includes any work necessary or required to make each installation satisfactory, legally operable, functional, and consistent with the intent of Drawings and Specifications or the requirements of Contract Documents. Contractor shall perform incidental work without extra cost to Owner. Incidental work shall be treated as if fully described in Specifications and shown on Drawings, and the expense of incidental work shall be included in price Bid and Contract Sum.

4.2 Checking Of Drawings And Specifications

- A. Before undertaking each part of Work, Contractor shall carefully study and compare Contract Documents and check and verify pertinent figures shown in the Contract Documents and all applicable field measurements. Contractor shall be responsible for any errors that might have been avoided by such comparison. Figures shown on Drawings shall be followed; Contractor shall not scale measurements. Contractor shall promptly report to Owner, in writing, any conflict, error, ambiguity or discrepancy that Contractor may discover. Contractor shall obtain a written interpretation or clarification from Owner before proceeding with any Work affected thereby. .

4.3 Interpretation Of Drawings And Specifications

- A. A typical or representative detail on Drawings shall constitute the standard for workmanship and material throughout corresponding parts of Work. Where necessary, and where reasonably inferable from Drawings, Contractor shall adapt such representative detail for application to such corresponding parts of Work. The details of such adaptation shall be subject to prior approval by Owner. Repetitive features shown in outline on Drawings shall be in exact accordance with corresponding features completely shown.
- B. Should any discrepancy appear or any misunderstanding arise as to the import of anything contained in Drawings and Specifications, or should Contractor have any questions or requests relating to Drawings or Specifications, Contractor shall refer the matter to Owner, in writing, with a copy to the Architect/Engineer, where applicable. Owner will issue with reasonable promptness written responses, clarifications or interpretations as Owner may determine necessary, which shall be consistent with the intent of and be reasonably inferable from Contract Documents. Such written clarifications or interpretations shall be binding upon Contractor. If Contractor believes that a written response, clarification or interpretation justifies an adjustment in the Contract Sum or Contract Time, Contractor shall give Owner prompt written notice. If the parties are unable to agree to the amount or extent of the adjustment, if any, then Contractor shall perform the Work in

conformance with Owner's response, clarification, or interpretation and may make a written claim for the adjustment as provided in Article 12.

- C. The following general specifications shall apply wherever in the Specifications, or in any directions given by Owner in accordance with or supplementing Specifications, it is provided that Contractor shall furnish materials or manufactured articles or shall do Work for which no detailed specifications are shown. Materials or manufactured articles shall be of the best grade, in quality and workmanship, obtainable in the market from firms of established good reputation. If not ordinarily carried in stock, the materials or manufactured articles shall conform to industry standards for first class materials or articles of the kind required, with due consideration of the use to which they are to be put. Work shall conform to the usual standards or codes, such as those cited herein, for first class work of the kind required. Contractor shall specify in writing to Owner the materials to be used or Work to be performed under this Paragraph ten Working Days prior to furnishing such materials or performing such Work.

4.4 Use Of Drawings And Specifications.

- A. Drawings, Specifications and other Contract Documents were prepared for use for Work of Contract Documents only. No part of Contract Documents shall be used for any other construction or for any other purpose except with the written consent of Owner. Any unauthorized use of Contract Documents is prohibited and at the sole liability of the user.

4.5 Standard Specifications.

- A. Standard Specifications refers to the most recent edition of the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation.
- B. In case of conflict between the Standard Specifications and these General Conditions or the Division 1 Specifications, the General Conditions and Division 1 Specifications shall take precedence over and be used in lieu of the conflicting provisions of the Standard Specifications.

ARTICLE 5 - COMMENCEMENT OF THE WORK

5.1 Submission Of Required Schedules

- A. Contractor shall submit to Owner in draft for review and discussion at the Preconstruction Conference, and in final prior to the first payment application, the following schedules:
 - 1. Schedule of Values
 - 2. Critical Path Method Construction Schedule
 - 3. Schedule of Submittals.
- B. No progress payment shall be due or owing to Contractor until such schedules are submitted to and acceptable to Owner and/or Architect/Engineer as meeting the requirements of the Contract Documents. In Owner's sole discretion, Owner may elect to instead withhold a portion of any progress payment for unacceptable compliance with contract requirements for such schedules.
- C. Owner's acceptance of Contractor's schedules will not create any duty of care or impose on Owner any responsibility for the sequencing, scheduling or progress of Work nor will it interfere with or relieve Contractor from Contractor's full responsibility therefore.

5.2 Commencement Date Of Contract Time

- A. The Contract Time will commence ten (10) Working Days following execution of the Agreement by the Board of Supervisors , if a Notice to Proceed is given, on the date indicated in the Notice to Proceed.

ARTICLE 6 - CONTRACTOR'S ORGANIZATION AND EQUIPMENT

6.1 Contractor's Legal Address

- A. Address, facsimile number, and email address given in Contractor's Bid are hereby designated as Contractor's legal address, facsimile number, and email address. Contractor may change its legal address, facsimile number, and email address by notice in writing, delivered to Owner,

which in conspicuous language advises Owner of a change in legal address, facsimile number, or email address, and which Owner accepts in writing. Delivery to Contractor's legal address or depositing in any post office or post office box regularly maintained by the United States Postal Service, in a wrapper with postage affixed, directed to Contractor at legal address, or of any drawings, notice, letter or other communication, shall be deemed legal and sufficient service thereof upon Contractor. Facsimile or email to Contractor's designated facsimile number or email address of any letter, memorandum, or other communication on standard or legal sized paper, with proof of facsimile transmission or email confirmation, shall be deemed legal and sufficient service thereof upon Contractor.

6.2 Contractor's Superintendents Or Forepersons

- A. Contractor shall at all times be represented on Site by one or more superintendents or forepersons authorized and competent to receive and carry out any instructions that Owner may give, and shall be liable for faithful observance of instructions delivered to Contractor or to authorized representative or representatives on Site. The Superintendent shall not be changed except with the consent of the County unless the Superintendent proves to be unsatisfactory to the Contractor and ceases to be in its' employ. If the Superintendent proves to be unsatisfactory to Owner, they shall be replaced within ten (10) Calendar Days after written notice from Owner to Contractor.

6.3 Proficiency In English

- A. Supervisors, security guards, safety personnel and employees who have unescorted access to the Site shall possess proficiency in the English language in order to understand, receive and carry out oral and written communications or instructions relating to their job functions, including safety and security requirements.

6.4 Contractor's And Subcontractors' Employees

- A. Contractor shall employ, and shall permit its Subcontractors to employ, only competent and skillful personnel to do Work. If Owner notifies Contractor that any of its employees, or any of its Subcontractors' employees on Work is incompetent, unfaithful, disorderly or profane, or fails to observe customary standards of conduct or refuses to carry out any provision of the Contract Documents, or uses threatening or abusive language to any person on Work representing Owner, or violates sanitary rules, or is otherwise unsatisfactory, and if Owner requests that such person be discharged from Work, then Contractor or its Subcontractor shall immediately discharge such person from Work and the discharged person shall not be re-employed on the Work except with consent of Owner.

6.5 Contractor's Use Of The Site

- A. Contractor shall not make any arrangements with any person to permit occupancy or use of any land, structure or building within the limits of the Work, for any purpose whatsoever, either with or without compensation, in conflict with any agreement between Owner and any Owner, former Owner or tenant of such land, structure or buildings. Contractor may not occupy Owner-owned property outside the limit of the Work as indicated on the Drawings unless it obtains prior approval from Owner.

ARTICLE 7 - OWNER'S ADMINISTRATION OF WORK

7.1 Owner's Representative(s)

- A. Owner's Representative(s) will have limited authority to act on behalf of Owner as set forth in the Contract Documents.
- B. Except as otherwise provided in these Contract Documents or subsequently identified in writing by Owner, Owner will issue all communications to Contractor through Owner's Representative, and Contractor shall issue all communications to Owner through Owner's Representative in a written document delivered to Owner.

- C. Should any direct communications between Contractor and Owner's consultants, architects or engineers not identified in Article 2 of Document 00 5200 (Agreement) occur during field visits or by telephone, Contractor shall immediately confirm them in a written document copied to Owner.

7.2 Owner's Observation Of The Work

- A. Work shall be performed under Owner's general observation and administration. Contractor shall comply with Owner's directions and instructions in accordance with the terms of Contract Documents, but nothing contained in these General Conditions shall be taken to relieve Contractor of any obligations or liabilities under the Contract Documents. Owner's failure to review or, upon review, failure to object to any aspect of Work reviewed, shall not be deemed a waiver or approval of any non-conforming aspect of Work.
- B. Subject to those rights specifically reserved in the Contract Documents, Owner will not supervise, or direct, or have control over, or be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or Contractor's failure to comply with laws and regulations applicable to the furnishing or performance of Work. Owner will not be responsible for Contractor's failure to perform or furnish the Work in accordance with Contract Documents.

7.3 Architect/Engineer's Observation Of Work

- A. Owner may engage an Architect/Engineer, an independent consultant or Project Manager (collectively for purposes of this Paragraph, "Project Manager/Architect") to assist in administering the Work. If so engaged, Project Manager/Architect will advise and consult with Owner, but will have authority to act on behalf of Owner only to the extent provided in the Contract Documents or as set forth in writing by Owner. Project Manager/Architect will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with Work. Project Manager/Architect will not be responsible for or have control over the acts or omissions of Contractor, Subcontractors or their agents or employees, or any other persons performing Work.
- B. Project Manager/Architect may review Contractor's Submittals, such as Shop Drawings, Product Data, and Samples, but only for conformance with design concept of Work and with information given in the Contract Documents.
- C. Project Manager/Architect may visit the Site at intervals appropriate to stage of construction to become familiar generally with the progress and quality of Work and to determine in general if Work is proceeding in accordance with Contract Documents. Based on its observations, Project Manager/Architect may recommend to Owner disapproval or rejection of Work that Project Manager/Architect believes to be Defective or will not produce a complete Project that conforms to Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by Contract Documents. Owner will also have authority to require special inspection or testing of Work, whether or not the Work is fabricated, installed or completed.

7.4 Owner's And Architect/Engineer's Exercise Of Contract Responsibilities

- A. Owner, Project Manager, Architect/Engineer and all Owner's representatives, in performing their duties and responsibilities under the Contract Documents, accept no duties, responsibilities or duty of care, nor may the same be implied or inferred, towards Contractor, any Subcontractor, sub-Subcontractor or supplier, except those set forth expressly in the Contract Documents.

7.5 Owner's Right Of Access To The Work

- A. During performance of Work, Owner and its agents, consultants, and employees may at any time enter upon Work, shops or studios where any part of the Work may be in preparation, or factories where any materials for use in Work are being or are to be manufactured, and Contractor shall provide proper and safe access and facilities for this purpose, and shall make arrangements with manufacturers to facilitate inspection of their processes and products to such extent as Owner's interests may require. Other contractors performing work for Owner may also enter upon Work for all purposes required by their respective contracts. Subject to the rights reserved in the

Contract Documents, Contractor shall have sole care, custody, and control of the Site and its Work areas.

7.6 Owner's Right Of Separate Construction

- A. Owner may perform with its own forces, construction or operations related to the Project, or the Site during Contractor's operations. Owner may also award separate contracts in connection with other portions of the Project or other construction or operations, on the Site or areas contiguous to the Site, under conditions similar to these Contract Documents, or may have utility Owners perform other work.
- B. Contractor shall adjust its schedule and fully coordinate with and shall afford all other contractors, utility districts and Owner (if Owner is performing work with its own forces), proper and safe access to the Site, and reasonable opportunity for the installation and storage of their materials. Contractor shall ensure that the execution of its Work properly connects and coordinates with others' work, do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work, and shall cooperate with them to facilitate the progress of the Work.
- C. To the extent that any part of Contractor's Work is to interface with work performed or installed by other contractors or utility owners, Contractor shall inspect and measure the in-place work. Contractor shall promptly report to Owner in writing any defect in in-place work that will impede or increase the cost of Contractor's interface unless corrected.

ARTICLE 8 - CONTRACTOR'S PROSECUTION AND PROGRESS OF THE WORK

8.1 Contractor To Supervise The Work

- A. Subject to those rights specifically reserved in the Contract Documents, Contractor shall supervise, direct, have control over, and be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction, safety precautions and programs incident thereto, and compliance with laws and regulations applicable to the furnishing or performance of Work.
- B. Contractor shall keep on the Site at all times during Work progress a competent resident Superintendent, who shall not be replaced without Owner's express written consent. The Superintendent shall be Contractor's representative at the Site and shall have complete authority to act on behalf of Contractor. All communications to and from the Superintendent shall be as binding as if given to or by Contractor.
- C. Contractor shall supervise, inspect, and direct Work competently and efficiently, devoting the attention and applying such personal skills and expertise as may be required and necessary to perform Work in accordance with Contract Documents. Contractor shall be solely responsible for and have control and charge of construction means, methods, techniques, sequences and procedures, safety precautions and programs in connection with the Work. Contractor shall be responsible to see that the completed Work complies accurately with Contract Documents.
- D. Contractor is fully responsible for Contractor's own acts and omissions. Contractor is responsible for all acts and omissions of its Subcontractors, suppliers, and other persons and organizations performing or furnishing any of the Work, labor, materials, or equipment under a direct or indirect contract with Contractor.
- E. Contractor shall conduct monthly Contractor Safety Committee meetings, and weekly toolbox safety talks.

8.2 Contractor To Maintain Cost Data

- A. Contractor shall maintain full and correct information as to the number of workers employed in connection with each subdivision of Work, the classification and rate of pay of each worker in form of certified payrolls, the cost to Contractor of each class of materials, tools and appliances used by Contractor in Work, and the amount of each class of materials used in each subdivision of Work. Contractor shall provide summaries or reports comparing actual Project costs with Bid estimates or budgets, upon Owner's request.
- B. Contractor shall maintain daily job reports recording all significant activity on the job, including the number of workers on Site, Work activities, problems encountered and delays. Contractor shall

provide Owner with copies for each Day Contractor works on the Project, to be delivered to Owner either the same Day or the following morning before starting work at the Site. Contractor shall take pre-construction and monthly progress photographs of all areas of the Work. Contractor shall maintain copies of all correspondence with Subcontractors and records of meetings with Subcontractors.

- C. Owner shall have the right to audit and copy Contractor's books and records of any type, nature or description relating to the Project (including but not limited to financial records reflecting in any way costs claimed on the Project), and to inspect the Site, including Contractor's trailer, or other job Site office, and this requirement shall be contained in the subcontracts of Subcontractors working on Site. By way of example, Owner shall have the right to inspect and obtain copies of all Contract Documents, planning and design documents, Bid proposal and negotiation documents, cost records and job cost variance reports, design modification proposals, value engineering or other cost reduction proposals, revisions made to the original design, job progress reports, photographs, and as-built drawings maintained by Contractor. Owner and any other applicable governmental entity shall have the right to inspect all information and documents maintained hereunder at any time during the Project and for a period of five years following Final Completion, in accordance with the provisions of Section 8546.7 of the California Government Code. This right of inspection shall not relieve Contractor of its duties and obligations under the Contract Documents. This right of inspection shall be specifically enforceable in a court of law, either independently or in conjunction with enforcement of any other rights in the Contract Documents.

8.3 Contractor To Supply Sufficient Workers And Materials

- A. Unless otherwise required by Owner under the terms of Contract Documents, Contractor shall at all times keep on the Site materials and employ qualified workers sufficient to prosecute Work at a rate and in a sequence and manner necessary to complete Work within the Contract Time. This obligation shall remain in full force and effect notwithstanding disputes or claims of any type.

8.4 Contractor To Maintain Project Record Documents

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Contract Modifications, Change Orders, Work Directives, Force Account orders, and written interpretations and clarifications in good order and annotated to show all as-built changes made during construction. These Project Record Documents, together with all approved Samples and a counterpart of all approved Shop Drawings, shall be maintained and available to Owner for reference. Upon completion of the Work, Contractor shall deliver to Owner, the Project Record Documents, Samples and Shop Drawings and as-built drawings.
- B. Throughout Contractor's performance of the Work of the Project, Contractor shall maintain construction records to include: shop drawings; product data/material data sheets; samples; submittal; purchases; materials; equipment; inspections; applicable handbooks; applicable codes and standards; maintenance and operating manuals and instructions; RFI Log; Submittal Log; other related documents and revisions which arise out of the Construction Contracts. Contractor shall maintain records of principal building layout lines, elevations for the bottom of footings, floor levels, and key site elevations (certified by a qualified surveyor or professional engineer). Contractor shall make all records available to Owner. At the completion of the Project, Contractor shall deliver all such records to the Owner to have a complete set of record as-built drawings.

8.5 Contractor To Not Disrupt Owner Operation

- A. Contractor shall schedule and execute all Work in a manner that does not interfere with or disrupt Owner operations, including but not limited to, parking, utilities (electricity, gas, water), noise, access by employees and administration, access by vendors, physicians, patients and any other person or entity using Owner facilities or doing business with Owner. Contractor shall produce and supply coordination plans and requests to Owner, following Owner procedures, for all necessary interference of construction with Owner, which Owner will reasonably cooperate with.

8.6 Contractor To Provide Temporary Facilities And Controls

- A. Unless expressly provided otherwise in the Contract Documents, Contractor shall provide all temporary utilities (including without limitation electricity, water, natural gas), lighting, heating, cooling and ventilating devices, telephone, sanitary facilities, barriers, fences and enclosures, tree and plant protection, fire protection, pollution, erosion, Storm Water Pollution Prevention controls, noise and traffic control, and any other necessary services required for construction, testing or completion of the Work.

ARTICLE 9 - WARRANTY, GUARANTY, AND INSPECTION OF WORK

9.1 Warranty And Guaranty

- A. General Representations and Warranties: Contractor represents and warrants that it is and will be at all times fully qualified and capable of performing every Phase of the Work and to complete Work in accordance with the terms of Contract Documents. Contractor warrants that all construction services shall be performed in accordance with generally accepted professional standards of good and sound construction practices and all requirements of the Contract Documents. Contractor warrants that Work, including but not limited to each item of materials and equipment incorporated therein, shall be new, of suitable grade of its respective kind for its intended use, and free from defects in design, engineering, materials, construction and workmanship. Contractor warrants that Work shall conform in all respects with all applicable requirements of federal, state and local laws, applicable construction codes and standards, licenses, and permits, Drawings and Specifications and all descriptions set forth therein, and all other requirements of Contract Documents. .
- B. Extended Guarantees: Any guarantee exceeding one year provided by the supplier or manufacturer of any equipment or materials used in the Project shall be extended for such term. Contractor shall supply Owner with all warranty and guarantee documents relative to equipment and materials incorporated in the Project and guaranteed by their suppliers or manufacturers.
- C. Environmental and Toxics Warranty: The covenants, warranties and representations contained in this Paragraph are effective continuously during Contractor's Work on the Project and following cessation of labor for any reason including, but not limited to, Project completion. Contractor covenants, warrants and represents to Owner that:
 - 1. To Contractor's knowledge after due inquiry, no lead or Asbestos-containing materials were installed or discovered in the Project at any time during Contractor's construction thereof. If any lead or Asbestos-containing materials were discovered, Contractor made immediate written disclosure to Owner.
 - 2. To Contractor's knowledge after due inquiry, no electrical transformers, light fixtures with ballasts or other equipment containing PCBs are or were located on the Project at any time during Contractor's construction thereof. If any such materials were discovered, Contractor made immediate written disclosure to Owner.
 - 3. To Contractor's knowledge after due inquiry, no storage tanks for gasoline or any other toxic substance are or were located on the Project at any time during Contractor's construction thereof. If any such materials were discovered, Contractor made immediate written disclosure to Owner.
 - 4. Contractor's operations concerning the Project are and were not in violation of any applicable environmental federal, state, or local statute, law or regulation dealing with hazardous materials substances or toxic substances and no notice from any governmental body has been served upon Contractor claiming any violation of any such law, ordinance, code or regulation, or requiring or calling attention to the need for any Work, repairs, construction, alteration, or installation on or in connection with the Project in order to comply with any such laws, ordinances, codes, or regulations, with which Contractor has not complied. If there are any such notices with which Contractor has complied, Contractor shall provide Owner with copies thereof.

9.2 Inspection Of Work

- A. Work and materials, and manufacture and preparation of materials, from beginning of construction until Final Completion and acceptance of Work, shall be subject to inspection and

rejection by Owner, its agents, representatives or independent contractors retained by Owner to perform inspection services, or governmental agencies with jurisdictional interests. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and program so that they may comply therewith as applicable. Upon request or where specified, Owner shall be afforded access for inspection at the source of supply, manufacture or assembly of any item of material or equipment, with reasonable accommodations supplied for making such inspections.

- B. Contractor shall furnish, in such quantities and sizes as may be required for proper examination and tests, Samples or test specimens of all materials to be used or offered for use in connection with Work, in addition to tests and submittals required in the individual material or equipment specification sections. Contractor shall prepare Samples or test specimens at its expense and furnish them to Owner. Contractor shall submit all Samples in ample time to enable Owner to make any necessary tests, examinations, or analyses before the time it is desired to incorporate the material into the Work.
- C. Contractor shall give Owner no less than 48 hours notice of readiness of Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- D. If applicable laws or regulations of any authority having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, and furnish Owner with the required certificates of inspection, or approval. Owner will pay the cost of initial testing and Contractor shall pay all costs in connection with any follow-up or additional testing. Contractor shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for the acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.
- E. If Contractor covers any Work, or the work of others, prior to any required inspection, test or approval without written approval of Owner, Contractor shall uncover the Work at Owner's request. Contractor shall bear the expense of uncovering Work and replacing Work.
- F. Contractor shall furnish tools, labor and materials necessary to make examination of Work that may be completed or in progress, even to the extent of uncovering or taking down portions of finished Work. Cost of making examination and of reconstruction shall be borne by Contractor.
- G. Inspection of the Work by or on behalf of Owner, or Owner's failure to do so, shall not under any circumstances be deemed a waiver or approval of any non-conforming aspect of the Work. Contractor shall have an absolute duty, in the absence of a written Change Order signed by Owner, to perform Work in conformance with the Contract Documents and to immediately correct Defective Work immediately upon Contractor's knowledge.
- H. Any inspection, evaluation, or test performed by or on behalf of Owner relating to the Work is solely for the benefit of Owner, and shall not be relied upon by Contractor. Contractor shall not be relieved of the obligation to perform Work in accordance with the Contract Documents, nor relieved of any guaranty, warranty, or other obligation, as a result of any inspections, evaluations, or tests performed by Owner, whether or not such inspections, evaluations, or tests are permitted or required under the Contract Documents. Contractor shall be solely responsible for testing and inspecting Work already performed to determine whether such Work is in proper condition to receive later Work.

9.3 Correction Of Defective Work

- A. Owner may direct Contractor to correct any Defective Work or remove it from the Site and replace it with Work that is not Defective and satisfactorily correct or remove and replace any damage to other Work or the work of others resulting from the correction or removal. Contractor shall be responsible for any and all claims, costs, losses and damages caused by or resulting from such correction or removal. Owner's rights under this Paragraph shall be in addition to any other rights it may have under the Contract Documents or by law.
- B. If Contractor fails to supply sufficient skilled workers, suitable materials or equipment, or to furnish or perform the Work in such a way that the completed Work will conform to Contract Documents,

Owner may order Contractor to replace any such Defective Work, or stop any portion of Work to permit Owner (at Contractor's expense) to replace such Defective Work. These Owner rights are entirely discretionary on the part of Owner, and shall not give rise to any duty on the part of Owner to exercise the rights for the benefit of Contractor or any other party.

9.4 Acceptance And Correction Of Defective Work By Owner

- A. Owner may in its sole discretion elect to accept Defective Work. Contractor shall pay all claims, costs, losses and damages attributable to Owner's evaluation of and determination to accept such Defective Work. If Owner accepts any Defective Work prior to final payment, a Change Order may be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, Owner may deduct from monies due Contractor, all claims, costs, losses, damages, expenses and liabilities attributable to the Defective Work. If Contractor disagrees with Owner's calculations, Contractor may make a claim as provided in Article 12 of this Document 00 7200. If Owner accepts any Defective Work after final payment, Contractor shall pay to Owner, an appropriate amount as determined by Owner.
- B. Owner may correct and remedy deficiency if, after five (5) Calendar Days of written notice to Contractor, Contractor fails to correct Defective Work or to remove and replace rejected Work; or provide a plan for correction of Defective Work acceptable to Owner; or perform Work in accordance with Contract Documents. In connection with such corrective and remedial action, Owner may exclude Contractor from all or part of the Site; take possession of all or part of Work and suspend Contractor's Work related thereto; and incorporate in Work any materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, its representatives, agents, employees, and other contractors and Project Manager/Architect's consultants' access to the Site to enable Owner to exercise the rights and remedies under this Paragraph. Contractor shall be responsible for all claims, costs, losses, damages, expenses and liabilities incurred or sustained by Owner in exercising such rights and remedies. A Change Order may be issued incorporating the necessary revisions in the Contract Documents with respect to Work and the Contract Sum. If the parties are unable to agree to the amount of an appropriate decrease in the Contract Sum, Owner may deduct from monies due Contractor, all claims, costs, losses and damages caused by or resulting from the correction or removal. If Contractor disagrees with Owner's calculations, Contractor may make a claim as provided in Article 12 of this Document 00 7200.

9.5 Rights Upon Inspection, Correction Or Acceptance

- A. Contractor shall not be allowed an extension of Contract Time because of any delay in the performance of Work attributable to the exercise by Owner of its rights and remedies under this Article. Where Owner exercises its rights under this Article, it retains and may still exercise all other rights it has by law or under the Contract Documents including, but not limited to, the right to terminate Contractor's right to proceed with the Work under the Contract Documents for cause and/or make a claim or back charge where a Change Order cannot be agreed upon.
- B. Inspection by Owner or its authorized agents or representatives shall not relieve Contractor of its obligation to have furnished material and workmanship in accordance with Contract Documents. Payment for Work completed through periodic progress payments, final payment or otherwise shall not operate to waive Owner's right to require full compliance with Contract Documents and shall in no way be deemed as acceptance of any defective Work paid therefor. Contractor's obligation to complete the Work in accordance with Contract Documents shall be absolute, unless Owner agrees otherwise in writing.

9.6 Proof Of Compliance Of Contract Provisions

- A. In order that Owner may determine whether Contractor has complied or is complying with requirements of Contract Documents not readily enforceable through inspection and tests of Work and materials, Contractor shall at any time, when requested, submit to Owner properly authenticated documents or other satisfactory proofs of compliance with all applicable requirements.

- B. Before commencing any portion of Work, Contractor shall inform Owner in writing as to time and place at which Contractor wishes to commence Work, and nature of Work to be done, in order that proper provision for inspection of Work may occur, and to assure measurements necessary for record and payment. Information shall be given to Owner a reasonable time in advance of time at which Contractor proposes to begin Work, so that Owner may complete necessary preliminary work without inconvenience or delay to Contractor.

9.7 Correction Period And Project Warranty Period:

- A. If within one year after the Date of Completion as identified on the recorded Notice of Completion, or such longer period of time as may be prescribed by laws, regulations or by the terms of Contract Documents or any extended warranty or guaranty, any Work (completed or incomplete) is found to be Defective, Contractor shall promptly without cost to Owner and in accordance with Owner's written instructions, correct such Defective Work. Contractor shall remove any Defective Work rejected by Owner and replace it with Work that is not Defective, and satisfactorily correct and remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor fails to promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the Defective Work corrected or the rejected Work removed and replaced. Contractor shall pay for all claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor fails to correct Defective Work, or defects are discovered outside the correction period, Owner shall have all rights and remedies granted by law.
- B. In special circumstances where a part of the Work is occupied or a particular item of equipment is placed in continuous service before the date of completion as identified in the recorded Notice of Completion of all the Work, the correction period for that part of Work or that item may start to run from an earlier date if so provided by Change Order.
- C. Where Defective Work or rejected Work (and damage to other Work resulting therefrom) has been corrected, removed, or replaced under this provision after the commencement of the correction period, the correction period hereunder with respect to such Work shall be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

9.8 No Waiver

- A. Neither recordation of the Notice of Completion nor final certificate for payment nor provision of the Contract nor partial or entire use or occupancy of premises by Owner shall constitute acceptance of Work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.
- B. If, after installation, operation, or use of materials or equipment to be provided under Contract proves to be unsatisfactory to Owner, Owner shall have right to operate and use materials or equipment until said materials and equipment can, without damage to Owner, be taken out of service for correction or replacement. Period of use of Defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.
- C. Nothing in the Contract Documents shall be construed to limit, relieve, or release Contractor's, Subcontractors', and equipment suppliers' liability to Owner for damages sustained as result of latent defects in materials or equipment caused by negligence of Contractor, its agents, suppliers, employees, or Subcontractors.

ARTICLE 10 - MODIFICATIONS OF CONTRACT DOCUMENTS

10.1 Owner's Right To Direct Changed Work.

- A. Owner may, without notice to the sureties and without invalidating the Contract, make changes in the Work ("Changed Work"), including without limitation: alterations, deviations, additions to, or deletions from Contract Documents; increase or decrease the quantity of any item or portion of the Work; expand, reduce or otherwise change the Contract Time; delete any item or portion of the Work; and require extra Work. Contractor shall perform such Work under applicable

provisions of the Contract Documents, unless specifically provided otherwise at the time the change is ordered.

- B. If Changed Work is of such a nature as to increase or decrease the time or cost of any part of Work, price fixed in Contract shall be increased or decreased by amount as the Contractor and Owner may agree upon as reasonable and proper allowance for increase or decrease in cost of Work using the cost guidelines set forth in this Article, and absent such agreement, then as Owner may direct (with Contractor retaining its rights under Article 12 herein).

10.2 Required Documentation For Changed Work

- A. Changes affecting the Contract Time or Contract Sum of the Work shall be set forth in a written Change Order that shall specify:
 - 1. The Work performed in connection with the change to be made;
 - 2. The amount of the adjustment of the Contract Sum, if any, and the basis for compensation for the Work ordered; and
 - 3. The extent of the adjustment in the Contract Time, if any.
- B. A Change Order will become effective when signed by Owner, notwithstanding that Contractor has not signed it. A Change Order will become effective without Contractor's signature, provided Owner indicates same thereon (by indicating it as a "unilateral change order").

10.3 Procedures And Pricing Of Changed Work

- A. Procedures for changed work and pricing of changed work, claims and all forms of extra compensation, are set forth in Section 01 2050 (Modification Procedures).

ARTICLE 11 - TIME ALLOWANCES

11.1 Time Allowances

- A. Time is of the essence. Contract Time may only be changed by Change Order, and all time limits stated in the Contract Documents are to mean that time is of the essence.

11.2 Excusable Delay And Inexcusable Delay Defined.

- A. Excusable Delay. Subject to the provisions on Notice of Delay below, Contract Time may be adjusted in an amount equal to the time lost due to:
 - 1. Changes in the Work ordered by Owner ("**Changes**");
 - 2. Acts or neglect by Owner, Architect, any Owner Representative, utility owners or other contractors performing other work, not permitted or provided for in the Contract Documents, provided that Contractor has performed its responsibilities under the Contract Documents (including but not limited to pre-bid investigations) ("**Acts or Neglect**"); or
 - 3. Fires, floods, epidemics, abnormal weather conditions beyond the parameters otherwise set forth in this Article, earthquakes, civil or labor disturbances, or acts of God (together, "force majeure events"), provided damages resulting therefrom are not the result of Contractor's failure to protect the Work as required by Contract Documents ("**Force Majeure**").
- B. Inexcusable Delay. Contract Time shall not be extended for any period of time where Contractor (and/or any Subcontractor) is delayed or prevented from completing any part of the Work due to a cause that is within Contractor's risk or responsibility under the Contract Documents. Delays attributable to or within the control of a Subcontractor, or its subcontractors, or supplier, are deemed delays within the control of Contractor.
- C. Float. Float shall be treated as a Project resource. Contractor shall not be entitled to a time extension for impacts that consume float, but do not impact the critical path.

11.3 Notice Of Delay

- A. Within five (5) Working Days of the beginning of any delay (excepting adverse weather delays), Contractor shall notify Owner in writing, by submitting a notice of delay that shall describe the anticipated delays resulting from the delay event in question. If Contractor requests an extension

of time, Contractor shall submit a TIE within seven (7) WorkingDays of the notice of delay. Owner will determine all claims and adjustments in the Contract Time. No claim for an adjustment in the Contract Time will be valid and such claim will be waived if not submitted in accordance with the requirements of this subparagraph. In cases of substantial compliance with the seven-day notice requirement here (but not to exceed fifteen (15) Working Days from the beginning of the delay event), Owner may in its sole discretion recognize a claim for delay accompanied with the proper TIE, provided Contractor also shows good faith and a manifest lack of prejudice to Owner from the late notice.

11.4 Compensable Time Extensions

- A. Subject to other applicable provisions of the Contract Documents, Contractor may be entitled to adjustment in Contract Sum in addition to Contract Time for:
 - 1. Excusable delay caused solely by Changes in the Work ordered by Owner, as provided above, and/or
 - 2. Excusable delay caused solely by Acts or Neglect by Owner or other person, as provided above.

11.5 Non-Compensable Time Extensions

- A. Subject to other applicable provisions of the Contract Documents, Contractor may be entitled to adjustment in Contract Time only, without adjustment in Contract Sum, for
 - 1. Periods of excusable delay caused solely by weather or Force Majeure events as provided above in this Article, or
 - 2. Periods of concurrent delay, where delay results from two or more causes, one of which is compensable (resulting from Changes or Acts or Neglect as set forth above in this Article), and the other of which is non-compensable or inexcusable, such as: acts or neglect of Contractor, Subcontractors or others for whom Contractor is responsible; other acts, omissions and conditions which would not entitle Contractor to adjustment in Contract Time; adverse weather; and/or actions of Force Majeure as provided above in this Article.

11.6 Adverse Weather

- A. If the Contractor is delayed in the performance of the Work because of acts of God, fire, strikes, unavailability of materials or similar occurrences beyond his control, the Owner may grant such extension of time to complete the contract as he deems appropriate, providing the contractor has notified the Owner in writing of the causes of the delay within five (5) Working Days of the beginning of the delay.
- B. Requests for extensions of time to complete the contract based on delays in the performance of the work due to inclement weather must be submitted in writing to the County with appropriate justification on the number of days of delay. The Contractor and County will review the inclement weather days weekly. The Contractor will not be entitled to payment for costs incurred as a result of taking such actions.
- C. During unfavorable weather, wet ground, or other unsuitable construction conditions, Contractor shall employ best practices to protect the Work, manage the construction site and rainwater during inclement weather and provide requirements of implemented SWPPP and BMP's. Persons performing the Work shall examine surfaces to receive their Work and shall report in writing to Contractor, with copy to Owner representative and the Architect conditions detrimental to the Work. Failure to examine and report discrepancies makes the Contractor responsible, at no increase in Contract Sum, for corrections Owner may require. Commencement of Work constitutes acceptance of surface.

11.7 Liquidated Damages

- A. Time is of the essence. Execution of Contract Documents by Contractor shall constitute its acknowledgement that Owner 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 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.

ARTICLE 12 - CLAIMS BY CONTRACTOR

12.1 Obligation to File Claims for Disputed Work

- A. Should it appear to Contractor that the Work to be performed or any of the matters relative to the Contract Documents are not satisfactorily detailed or explained therein, or should any questions arise as to the meaning or intent of the Contract Documents, or should any dispute arise regarding the true value of any work performed, work omitted, extra work that the Contractor may be required to perform, time extensions, payment to the Contractor during performance of this Contract, performance of the Contract, and/or compliance with Contract procedures, or should Contractor otherwise seek extra time or compensation FOR ANY REASON WHATSOEVER, then Contractor shall first follow procedures set forth in the Contract (including but not limited to other Articles of this Document 00 7200 and Section 01 2050). If a dispute remains, then Contractor shall give written notice to Owner that expressly invokes this Article 12. Owner shall decide the issue in writing within 15 Working Days; and Owner's written decision shall be final and conclusive. If Contractor disagrees with Owner's decision, or if Contractor contends that Owner failed to provide a decision timely, then Contractor's SOLE AND EXCLUSIVE REMEDY is to promptly file a written claim setting forth Contractor's position as required herein.

12.2 Form And Contents Of Claim

- A. Contractor's written claim must identify itself as a "Claim" under Article 12 and must include the following: (1) a narrative of pertinent events; (2) citation to contract provisions; (3) theory of entitlement; (4) complete pricing of all cost impacts; (5) a time impact analysis of all time delays that shows actual time impact on the critical path; (6) documentation supporting items 1 through 5; a verification under penalty of perjury of the claim's accuracy. The Claim shall be submitted to Owner within thirty (30) Calendar Days of receiving Owner's written decision, or the date Contractor contends such decision was due, and shall be priced like a change order according to Section 01 2050, and must be updated monthly as to cost and entitlement if a continuing claim. Routine contract materials, for example, correspondence, RFI, Change Order requests, or payment requests shall not constitute a claim. Contractor shall bear all costs incurred in the preparation and submission of a claim.

12.3 Administration During/After Claim Submission

- A. 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.
- B. 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.
- C. 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.
- D. 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

12.4 Informal Conference and Mediation

- A. If the Contractor disputes the Owner's written statement, or if the Owner fails to respond to a Claim issued pursuant to this Article within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested,

the Owner shall schedule a meet and confer conference within thirty (30) calendar days of the demand.

- B. 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.
- C. 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.
- D. 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 in this Article.
- E. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside this Article.
- F. 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.
- G. The Claim resolution procedures in this Article do not preclude Owner from requiring arbitration of disputes under private arbitration if mediation under this Article does not resolve the parties' dispute.
- H. Amounts not paid in a timely manner as required by this Article shall bear interest at 7 percent per annum.

12.5 Claims by Subcontractors

- A. 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.

12.6 Compliance

- A. The provisions of this Article 12 constitute a non-judicial claim settlement procedure that, pursuant to Section 930.2 of the California Government Code, shall constitute a condition precedent to submission of a valid Government Code Section 910 Claim under the California Government Code. Contractor shall bear all costs incurred in the preparation, submission and administration of a claim. Any claims presented thereafter in accordance with the Government Code must affirmatively indicate Contractor's prior compliance with the claims procedure herein and the previous dispositions under Paragraph 12.03 above of the claims asserted. Pursuant to Government Code Section 930.2, the one-year period in Government Code section 911.2 shall

be reduced to 150 Calendar Days from either accrual of the cause of action, substantial completion or termination of the contract, whichever occurs first; in all other respects, the requirements of the Government Code shall apply unchanged, including, without limitation, Contractor's obligation to file a Government Code Section 910 Claim.

- B. Failure to submit and administer claims as required in Article 12 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 protest and timely claim submitted under this Article 12 may not be asserted in any subsequent litigation, Government Code Section 910 Claim, or legal action.
- C. Owner shall not be deemed to waive any provision under this Article 12, if at Owner's sole discretion, a claim is administered in a manner not in accord with this Article 12. Waivers or modifications of this Article 12 may only be made a signed change order approved as to form by legal counsel for both Owner and Contractor; oral or implied modifications shall be ineffective.

12.7 Civil Actions; Consistency with Public Contract Code Section 9204 and 20104 et seq.

- A. 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.
- B. 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.

ARTICLE 13 - UNDERGROUND CONDITIONS

13.1 Contractor To Locate Underground Facilities.

- A. 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 (2) Working Days, but no more than ten (10) Working 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."
- B. Contractor shall contact Underground Service Alert (USA) or the appropriate regional notification center, 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 underground utility records. Contractor shall advise Owner of any conflict between information provided in Document 00 3100 (Geotechnical Data and Existing Conditions), the Drawings and that provided by underground utility records. Contractor's excavation shall be subject to and comply with the Contract Documents.
- C. 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 implied by the presence of visible facilities, such as buildings, new asphalt, meters and junction boxes, on or adjacent to the Site, even if not shown or indicated in Document 00 3100 (Geotechnical Data and Existing Conditions), or the Drawings or that provided by underground utility records. Contractor shall immediately secure all such available information and notify Owner and the utility owner, in writing, of its discovery.

13.2 Contractor To Protect Underground Facilities.

- A. 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; 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.

- B. 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 Underground Facilities Data. 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 Owner 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 this Document 00 7200.
- C. If during construction, an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated in the materials supplied by Owner for bidding or in information on file at USA or otherwise reasonably available to Contractor, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby (and in no event later than five (5) Working 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 Underground Facility owner and Owner. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. The cost of all of the following will be included in the Contract Sum and Contractor shall have full responsibility for (a) reviewing and checking all available information and data including, but not limited to, information made available for bidding and information on file at USA; (b) locating all Underground Facilities shown or indicated in the Contract Documents, available information, or indicated by visual observation including, but not limited to, and by way of example only, 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.
- E. Consistent with California Government Code §4215, as between Owner and Contractor, Owner 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. Owner 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 Owner or the utility to provide for removal or relocation of such utility facilities.

13.3 Concealed Or Unknown Conditions

- A. 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 Owner promptly before conditions are disturbed, except in an emergency as set forth in this Document 00 7200, and in no event later than five (5) Working 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.
- B. In response to Contractor's Notice of Differing Site Conditions under this Paragraph, Owner 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, Owner will

negotiate the appropriate change order following the procedures set forth in the Contract Documents. If Owner 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, Owner will so notify Contractor in writing, stating reasons (with Contractor retaining its rights under Article 12 of this Document 00 7200.)

- C. Contractor shall not be entitled to any adjustment in the Contract Sum 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.
- D. Regarding Underground Facilities, Contractor shall be allowed an increase in the Contract Sum or 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 Owner only where the Underground Facility:
 - 1. Was not shown or indicated in the Contract Documents or in the information supplied for bidding purposes or in information on file at USA; and
 - 2. Contractor did not know of it; and
 - 3. Contractor could not reasonably have been expected to be aware of it or to have anticipated it from the information available. (For example, if surface conditions such as pavement repairs, valve covers, or other markings, indicate the presence of an Underground Facility, then an increase in the Contract Sum or an extension of the Contract Time will not be due, even if the Underground Facility was not indicated in the Contract Documents, in the information supplied to Contractor for bidding purposes, in information on file at USA, or otherwise reasonably available to Contractor.)
- E. Contractor shall bear the risk that Underground Facilities not owned or built by Owner may differ in nature or locations shown in information made available by Owner 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 Owner's Project, and Contractor is to apply its skill and industry to verify the information available.
- F. 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. For example, if Contractor excavates in an area unexpected, then such costs would be recoverable entirely; while if Contractor extends an existing excavation, then such costs would be recoverable if the resulting excavation costs in that work area exceeded the reasonable expectations therefore.

13.4 Notice Of Hazardous Waste Or Materials Conditions

- A. Contractor shall give a written Notice of Hazardous Materials Condition to Owner promptly, before any of the following conditions are disturbed (except in an emergency as set forth in this Document 00 7200), and in no event later than 24 hours after first observance of any:
 - 1. Material that Contractor believes may be hazardous waste or hazardous material, as defined in Section 25117 of the Health and Safety Code (including, without limitation, Asbestos, lead, PCBs, petroleum and related hydrocarbons, and radioactive material) that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law ("hazardous material"); or
 - 2. Other material that may present an imminent substantial danger to persons or property exposed thereto in connection with Work at the Site ("other materials").
- B. Except as otherwise provided in the Contract Documents or as provided by applicable law, Contractor shall not be required to give any notice for the disturbance or observation of any such

hazardous materials or other materials where such matter is disturbed or observed as part of the scope of Work under the Contract Documents (such as hazardous waste or hazardous material investigation, remediation or disposal activities which are identified as the subject of Work under the Contract Documents), where Contractor complies with all requirements in the Contract Documents and applicable law respecting such materials.

- C. Contractor's Notice of Hazardous Materials Condition shall indicate whether the hazardous materials or other materials were shown or indicated in the Contract Documents to be within the scope of Work, and whether the hazardous materials or other materials were brought to the Site by Contractor, its Subcontractors, suppliers, or anyone else for whom Contractor is responsible.
- D. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed hazardous waste or materials if:
 - 1. Contractor knew of the existence of such hazardous materials or other materials at the time Contractor submitted its Bid; or
 - 2. Contractor should have known of the existence of such hazardous material or other materials as a result of its having the responsibility to obtain additional or supplementary examinations, investigation, explorations, tests, studies, and data concerning the conditions at or contiguous to the Site prior to submitting its Bid; or
 - 3. Contractor failed to give the written notice within the required timeframe set forth below.
- E. If Owner determines that conditions involve hazardous materials or other materials and that a change in Contract Document terms is justified, Owner may issue either a Request for Proposal or Construction Change Order under the procedures described in the Contract Documents. If Owner determines that conditions do not involve hazardous materials or other materials or that no change in Contract Document terms is justified, Owner will notify Contractor in writing, stating the reasons for its determination.
- F. In addition to the parties' other rights under this Document 00 7200, if Contractor does not agree to resume Work based on a reasonable belief that it is unsafe, or does not agree to resume Work under special conditions, Owner may order the disputed portion of Work deleted from the Work, or performed by others, or Owner may invoke its right to terminate Contractor's right to proceed under the Contract Documents in whole or in part, for convenience or for cause as the facts may warrant.
- G. If Contractor does not agree with any Owner determination of any adjustment in the Contract Sum or Contract Time under this Article, Contractor may make a claim as provided in Article 12 of this Document 00 7200.

ARTICLE 14 - LEGAL AND MISCELLANEOUS

14.1 Laws And Regulations

- A. Contractor shall keep fully informed of and shall comply with all laws, ordinances, regulations and orders of any properly constituted authority affecting the Contract Documents, Work and persons connected with Work, and shall protect and indemnify Owner and its officers, employees, consultants and agents against any claim or liability, including attorney's fees, arising from or based on violation of law, ordinance, regulation or order, whether by Contractor or by Subcontractors, employees or agents. Authorized persons may at any time enter upon any part of Work to ascertain compliance of all applicable laws, ordinances, regulations and orders.

14.2 Permits And Taxes

- A. Contractor shall procure all permits and licenses applicable to the Work (including environmental matters to the extent applicable); pay all charges and fees, including fees for street opening permits; comply with, implement and acknowledge effectiveness of all permits; initiate and cooperate in securing all required notifications or approvals therefore; and give all notices necessary and incident to due and lawful prosecution of Work, unless otherwise provided herein. Owner will pay applicable building permits, sanitation and water fees for the completed construction, except as otherwise provided in the Contract Documents. Contractor shall pay all sales and/or use taxes levied on materials, supplies, or equipment purchased and used on or incorporated into Work, and all other taxes properly assessed against equipment or other

property used in connection with Work, without any increase in the Contract Sum. Contractor shall make necessary arrangements with proper authorities having jurisdiction over roads, streets, pipelines, navigable waterways, railroads, and other works in advance of operations, even where Owner may have already obtained permits for the Work.

14.3 Communications And Information Distribution

- A. All communications recognized under the Contract Documents shall be in writing, in the form of a serialized document, by type of communication. For example, RFI's shall be serialized beginning with RFI No. 1; payment applications shall be serialized beginning with Payment Application No. 1, submittals shall be serialized per specification section and transmitted with transmittal sheets beginning with Transmittal No. 1; and correspondence shall be serialized beginning with letter No. 1. Contractor may propose other record management and identification systems or protocols, intended to facilitate orderly transmittal of project information, storage and retrieval of such information, which Owner will review consistent with these stated objectives, and accept or reject in its sole discretion.
- B. Documents Requiring Signatures. All documents requiring signatures for approval prior to implementing action, as stipulated in other portions of Contract Documents, shall require a manually signed, serialized letter delivered to the other party at its address for notice otherwise specified in the Contract Documents, either personally or by mail.
- C. Electronic data transfer of such correspondence will serve to expedite preliminary concurrence of information, only. Receipt of "hard copy" signature on forms is required prior to implementing action or work as the conditions may require. For example, change orders and authorizations for extra cost, require signatures. A party may acknowledge receipt of portable document file (PDF) copies of required correspondence by e-mail, but in the absence of such acknowledgment, mail or personal delivery is required.
- D. All emails shall be copied to Owner's and Contractor's Project Representative. Owner reserves the right to preclude e-mail communication, in whole or in part, as Project needs may require. Communication between Owner and Contractor shall not be via Twitter, Facebook, or other types of instant text message systems. Any such communications shall be inadmissible for any purpose related to this Contract.

14.4 Suspension Of Work

- A. Owner may, without cause, order Contractor in writing to suspend, delay or interrupt Work in whole or in part for such period of time as Owner may determine. An adjustment shall be made for increases in cost of performance of Work of the Contract Documents caused by any such suspension, delay or interruption, calculated using the measures set forth in Section 01 2050 (Modification Procedures). No adjustment shall be made to extent that performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible.

14.5 Termination Of Contract For Cause

- A. The Contractor shall be in default of the Contract Documents and Owner may terminate the Contractor's right to proceed under the Contract Documents, for cause, in whole or in part, should the Contractor commit a material breach of the Contract Documents and not cure such breach within ten (10) Calendar Days of the date of notice from Owner to the Contractor demanding such cure; or, if such breach is curable but not curable within such ten (10) day period, within such period of time as is reasonably necessary to accomplish such cure. (In order for the Contractor to avail itself of a time period in excess of ten (10) Calendar Days, the Contractor must provide Owner within the ten (10) day period with a written plan acceptable to Owner 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).
- B. In the event of termination by Owner for cause as provided herein, the Contractor shall deliver to Owner possession of the Work in its then condition, including but not limited to, 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 Owner may have to claim and recover damages for any breach of the Contract Documents or otherwise, but rather, the Contractor shall compensate Owner for all loss, cost, damage, expense, and/or liability suffered by Owner as a result of such termination and/or failure to comply with the Contract Documents.

- C. 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, and the Contractor shall have no greater rights than it would have had following a termination for convenience. Any Contractor claim arising out of a termination for cause shall be made in accord with Article 12 herein. No other loss, cost, damage, expense or liability may be claimed, requested or recovered by the Contractor.

14.6 Termination Of Contract For Convenience

- A. Owner may terminate performance of the Work under the Contract Documents in accordance with this clause in whole, or from time to time in part, whenever Owner shall determine that termination is in Owner's best interest. Termination shall be effected by Owner delivering to the Contractor notice of termination specifying the extent to which performance of the Work under the Contract Documents is terminated, and the effective date of the termination.
- B. Contractor shall comply strictly with Owner's direction regarding the effective date of the termination, the extent of the termination, and shall stop work on the date and to the extent specified.
- C. Contractor shall be entitled to a total payment on account of the Contract work so terminated measured by (i.) the actual cost to Contractor of Work actually performed, up to the date of the termination, with profit and overhead limited to twelve percent (12%) of actual cost of work performed, up to but not exceeding the actual contract value of the work completed as measured by the Schedule of Values and Progress Schedule, (ii.) offset by payments made and other contract credits. In connection with any such calculation, however, Owner shall retain all rights under the Contract Documents, including but not limited to claims, indemnities, or setoffs.
- D. Under no circumstances may Contractor recover legal costs of any nature, nor may Contractor recover costs incurred after the date of the termination or lost profits on terminated Work.

14.7 Remedies

- A. Subject to Contract Documents provisions regarding Contractor claims, claim review, and claim resolution, and subject to the limitations therein, the exclusive jurisdiction and venue for resolving all claims, counter claims, disputes and other matters in question between Owner and Contractor arising out of or relating to Contract Documents, any breach thereof or the Project shall be the applicable court of competent jurisdiction located in the State and County where the Project is located.
- B. All Owner remedies provided in the Contract Documents shall be taken and construed as cumulative and not exclusive; that is, in addition to each and every other remedy herein provided; and in all instances Owner shall have any and all other equitable and legal rights and remedies which it would have according to law.

14.8 Contract Integration and Non-Waiver

- A. The Contract Documents, any Contract Modifications and Change Orders, shall represent the entire and integrated agreement between Owner and Contractor regarding the subject matters hereof and thereof and shall constitute the exclusive statement of the terms of the parties' agreement. The Contract Documents, and any Contract Modifications and Change Orders, shall supersede any and all prior negotiations, representations or agreements, written or oral, express or implied, that relate in any way to the subject matter of the Contract Documents or written Modifications. Owner and Contractor represent and agree that, except as otherwise expressly provided in the Contract Documents, they are entering into the Contract Documents and any subsequent written Modification in sole reliance upon the information set forth or referenced in the

Contract Documents or Contract Modifications; the parties are not and will not rely on any other information, which shall be inadmissible in any proceeding to enforce these documents.

- B. Either party's waiver of any breach or failure to enforce any of the terms, covenants, conditions or other provisions of the Contract Documents at any time shall not in any way affect, limit, modify or waive that party's right thereafter to enforce or compel strict compliance with every term, covenant, condition or other provision hereof, any course of dealing or custom of the trade or oral representations notwithstanding.
- C. Neither acceptance of the whole or any part of Work by Owner nor any verbal statements on behalf of Owner or its authorized agents or representatives shall operate as a waiver or modification of any provision of the Contract Documents, or of any power reserved to Owner herein nor any right to damages provided in the Contract Documents.

14.9 Interpretation

- A. 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).
- B. Contract Documents shall not be construed to create a contractual relationship of any kind between (1) Project Manager or any Owner's representative and Contractor; (2) Owner and/or its Representatives and a Subcontractor, sub-Subcontractor, or supplier of any Project labor, materials, or equipment; or (3) between any persons or entities other than Owner and Contractor.

14.10 Patents

- A. Fees or claims for any patented invention, article or arrangement that may be used upon or in any manner connected with performance of the Work or any part thereof shall be included in the Bid price for doing the Work. Contractor shall defend, indemnify and hold harmless Owner and each of its officers, employees, consultants and agents, including, but not limited to, the Board and each Owner's Representative, from all damages, claims for damages, costs or expenses in law or equity, including attorney's fees, arising from or relating to any claim that any article supplied or to be supplied under the Contract Documents infringes on the patent rights, copyright, trade name, trademark, service mark, trade secret or other intellectual property right of any person or persons or that the person or entity supplying the article does not have a lawful right to sell the same. Such costs or expenses for which Contractor agrees to indemnify and hold harmless the above indemnities include but are not limited to any and all license fees, whether such fees are agreed by any indemnitee or ordered by a court or administrative body of any competent jurisdiction.

14.11 Substitution For Patented And Specified Articles

- A. Except as noted specifically in the instructions to Bidders or in Contract Documents, whenever in Specifications, material or process is designated by patent or proprietary name or by name of manufacturer, such designation shall be deemed to be used for purpose of facilitating description of material and process desired, and shall be deemed to be followed by the words "or Approved Equal" and Contractor may offer any substitute material or process that Contractor considers "equal" in every respect to that so designated and if material or process offered by Contractor is, in opinion of Owner, Equal in every respect to that so designated, its use will be approved. However, Contractor may utilize this right only by timely submitting Document 01 6000-A (Substitution Request Form) as provided in Document 00 2113 (Instructions to Bidders). A substitution will be approved only if it is a true "or equal" item in every aspect of its design and quality, including but not limited to its dimensions, weights, materials of construction, service

requirements, durability, functioning, impact on contiguous construction elements, overall schedule and design.

14.12 Interest Of Public Officers

- A. No representative, officer, or employee of Owner no member of the governing body of the locality in which the Project is situated, no member of the locality in which Owner 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.

14.13 Limit Of Liability

- A. OWNER, AND EACH OF ITS OFFICERS, BOARD MEMBERS, EMPLOYEES, CONSULTANTS AND AGENTS INCLUDING, BUT NOT LIMITED TO, PROJECT MANAGER AND EACH OTHER OWNER 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.

ARTICLE 15 - WORKING CONDITIONS AND PREVAILING WAGES

15.1 Use Of Site/Sanitary Rules

- A. All portions of the Work shall be maintained at all times in neat, clean and sanitary condition. Contractor shall furnish toilets for use of Contractor's and Subcontractors' employees on the Site where needed, and their use shall be strictly enforced. All toilets shall be properly secluded from public observation, and shall be located, constructed and maintained subject to Owner's approval.
- B. Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Site and land areas identified in and permitted by Contract Documents and other land and areas permitted by applicable laws and regulations, rights of way, permits and easements or as designated by Owner, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, any improvement located thereon, or to Owner or occupant thereof resulting from the performance of Work.
- C. During the progress of the Work, Contractor shall keep the Site and the Project free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, Contractor shall clean the site, remove all waste materials, rubbish and debris from and about the Site as well as all tools, appliances, construction equipment and machinery and surplus materials. Contractor shall leave the premises clean and ready for occupancy by Owner at Completion of Work. Contractor shall restore to original condition all property not designated for alteration by Contract Documents.
- D. Contractor shall not load nor permit any part of any structure or pavement to be loaded in any manner that will endanger the structure or pavement, nor shall Contractor subject any part of Work or adjacent property to stresses or pressures that will endanger it. Contractor shall conduct all necessary existing conditions investigation regarding structural, mechanical, electrical or any other system existing, shall perform Work consistent with such existing conditions, and shall have full responsibility for insufficiencies or damage resulting from insufficiencies of existing systems, equipment or structures to accommodate performing the Work.
- E. 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 Subsection 15.1(E) are for the sole purpose of preventing proselytizing and politicking while engaged in the performance of services under this Contract.

15.2 Protection Of Work, Persons, And Property

- A. Contractor shall be responsible for initiating, maintaining and supervising all safety and site security precautions and programs in connection with Work, and shall develop and implement a site security and safety plan throughout construction. Contractor shall comply with all safety requirements specified in any safety program established by Owner, or required by state, federal or local laws and ordinances. Contractor shall be responsible for remedying all theft or damage to Work, property or structures, and all injuries to persons, either on the Site or constituting the Work (e.g., materials in transit), arising from the performance of Work of the Contract Documents from a cause.
- B. Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owners of adjacent property and of Underground Facilities and utility Owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property.
- C. Contractor shall remedy all damage, injury or loss to any property referred to above in this Article, caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, supplier, or any other person or organization directly or indirectly employed by any of them to perform or furnish any Work or anyone for whose acts any of them may be liable. Contractor's duties and responsibility for safety and for protection of Work shall continue until such time as all the Work is completed and Final Acceptance of the Work. Owner and its agents do not assume any responsibility for collecting any indemnity from any person or persons causing damage to Contractor's Work.
- D. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- E. Owner may, at its option, retain such moneys due under the Contract Documents as Owner deems necessary until any and all suits or claims against Contractor for injury to persons or property shall be settled and Owner receives satisfactory evidence to that effect.
- F. Work within the right-of-way lines of the city and/or Owner and/or State shall be done in accordance with the standards and specifications of the controlling agency. Permit for such work shall be obtained and paid for by the Contractor before executing the work within such right-of-ways.

15.3 Responsibility For Safety And Health

- A. Contractor shall ensure that its and each tier of Subcontractors' employees, agents and invitees comply with applicable health and safety laws while at the Site. These laws include the Occupational Safety and Health Act of 1970 and rules and regulations issued pursuant thereto, and Owner's safety regulations as amended from time to time. Contractor shall comply with all Owner directions regarding protective clothing and gear.
- B. Contractor shall be fully responsible for the safety of its and its Subcontractors' employees, agents and invitees on the Site. Contractor shall notify Owner, in writing, of the existence of hazardous conditions, property or equipment at the Site that are not under Contractor's control. Contractor shall be responsible for taking all the necessary precautions against injury to persons or damage to the property of Contractor, Subcontractors or persons from recognized hazards until the responsible party corrects the hazard.
- C. Contractor shall confine all persons acting on its or its Subcontractors' behalf to that portion of the Site where Work under the Contract Documents is to be performed, Owner-designated routes for ingress and egress thereto, and any other Owner-designated area. Except those routes for ingress and egress over which Contractor has no right of control, within such areas, Contractor shall provide safe means of access to all places at which persons may at any time have occasion to be present.

15.4 Emergencies

In emergencies affecting the safety or protection of persons or Work or property at the Site or adjacent thereto, Contractor, without special instruction or authorization from Owner, is obligated to act to prevent threat and damage, injury or loss, until directed otherwise by Owner. Contractor shall give Owner prompt written notice of actions taken due to emergency.

15.5 Use Of Roadways And Walkways

- A. Contractor shall not unnecessarily interfere with use of any roadway, walkway or other facility for vehicular or pedestrian traffic. Before beginning any interference and only with Owner's prior concurrence, Contractor may provide detour or temporary bridge for traffic to pass around or over the interference, which Contractor shall maintain in satisfactory condition as long as interference continues. Unless otherwise provided in the Contract Documents, Contractor shall bear the cost of these temporary facilities.

15.6 Nondiscrimination

- A. No person or entity shall discriminate in the employment of persons upon public works because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sexual preference, or gender of such persons, except as provided in Section 12940 of the California Government Code. Every contractor for public works violating the provisions of Section 1735 of the California Labor Code is subject to all the penalties imposed for a violation of Chapter 1, Part 7, Division 2 of the California Labor Code.

15.7 Prevailing Wages And Working Hours

- A. 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 (1) work of a similar character in the locality in which the Work is performed and (2) 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 Owner 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. The Director's schedule of prevailing rates is on file and open for inspection at County of Kern, General Services Division of the County Administrative Office, 1115 Truxtun Avenue, Third Floor, Bakersfield, California 93301, and is incorporated herein by this reference.
- B. Contractor shall forfeit, as a penalty to Owner, Fifty Dollars (\$50.00) for each laborer, workman, 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, workman 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 California Labor Code. The sums and amounts which shall be forfeited pursuant to this Paragraph and the terms of the California Labor Code shall be withheld and retained from payments due to Contractor under the Contract Documents, pursuant to this Document 00 7200 and the California 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 Owner. The Labor Commissioner pursuant to California Labor Code §1775 shall determine the final amount of forfeiture.
- C. 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 California Labor Code.
- D. Contractor stipulates that it shall comply with all applicable wage and hour laws, including without limitation, California Labor Code §§ 1776 and 1810-1815. Failure to so comply shall constitute a default under this Contract.

- E. Contractor and its Subcontractors shall be responsible for compliance with Labor Code §§ 1810-1815.
1. Eight hours of labor performed in execution of the Contract constitutes a legal day's work. The time of service of any workman employed on the Project is limited and restricted to 8 hours during any one calendar day, and 40 hours during any one calendar week.
 2. 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 for inspection by Owner and the Division of Labor Standards Enforcement.
 3. Contractor or its Subcontractors shall, as a penalty to Owner, 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 §§ 1810-1815.
 4. 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.
- F. Contractor and its Subcontractors shall be responsible for compliance with Labor Code Section 1776.
1. Contractor and Subcontractors must keep accurate payroll records, showing the name, address, social security number, 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 Owner of the location of records enumerated above, including the street address, city and county, and shall, within five (5) Working Days, provide a notice of a change of location and address.
 - b. Contractor or Subcontractor has ten (10) Working 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 Owner on whose behalf the contract is made or awarded, forfeit \$25.00 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. Contractor shall also deliver certified payrolls to Owner with each Application for Payment as set forth above in this Document 00 7200 (General Conditions).
 4. This project may be subject to monitoring and enforcement by the Department of Industrial Relations (DIR), including the obligation to submit certified payroll records directly to the DIR Compliance Monitoring Unit (CMU) at least monthly in a format prescribed by the Labor Commissioner. The contractor must post job site notices as prescribed by DIR regulation.

15.8 Environmental Controls

- A. Contractor shall comply with all rules, regulations, ordinances, and statutes that apply to any Work performed under the Contract Documents including, without limitation, any toxic, water, stormwater management and soil pollution controls and air pollution controls specified in California Government Code §11017. Contractor shall be responsible for insuring that Contractor's Employees, Subcontractors, and the public are protected from exposure to airborne hazards or contaminated water, soil, or other toxic materials used during or generated by activities on the Site or associated with the Project.

15.9 Shoring Safety Plan

- A. Any conflict between this Paragraph and Division 2 of the Specifications shall be resolved in favor of the most stringent requirement.
- B. At least five (5) Working Days in advance of any excavation five feet or more in depth, Contractor shall submit to Owner a detailed plan showing the shoring, bracing and sloping design (including calculations) and other provisions to be made for worker protection from the hazard of caving ground during the excavation, as required by California Labor Code §6705. A civil or structural engineer registered in California shall prepare and sign any plan that varies from the shoring system standards established by the State Construction Safety Orders.
- C. During the course of Work, Contractor shall be responsible for determining where sloping, shoring, and/or bracing is necessary and the adequacy of the design, installation, and maintenance of all shoring and bracing for all excavation, including any excavation less than five feet in depth. Contractor will be solely responsible for any damage or injuries that may result from excavating or trenching. Owner's acceptance of any drawings showing the shoring or bracing design or Work schedule shall not relieve Contractor of its responsibilities under this Paragraph.
- D. Appoint a qualified supervisory employee who shall be responsible to determine the sloping or shoring system to be used depending on local soil type, water table, stratification, depth, etc.

15.10 Required Registration with the State of California Department of Industrial Relations

- A. Pursuant to California Labor Code 1725.5, all contractors and subcontractors must be registered with the Department of Industrial Relations (DIR) in order to be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any public work contract. Detailed information about contractor's responsibilities and online registration may be obtained on the State of California Department of Industrial Relations, Public Works website, <http://www.dir.ca.gov/Public-Works/PublicWorks.html>

END OF DOCUMENT

DOCUMENT 00 7280
APPRENTICESHIP PROGRAM

ARTICLE 1 - COMPLIANCE REQUIRED

- 1.01** Contractor and Subcontractors shall comply with the requirements of California Labor Code §§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.

ARTICLE 2 - CERTIFICATION OF APPROVAL

- 2.01** California Labor Code §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:
- A. When unemployment for the previous three month period in the area exceeds an average of 15 percent;
 - B. When the number of apprentices in training in the area exceeds a ratio of one to five;
 - C. 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
 - D. 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.

ARTICLE 3 - FUND CONTRIBUTIONS

- 3.01** 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.

ARTICLE 4 - APPRENTICESHIP STANDARDS

- 4.01** 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.

END OF DOCUMENT

DOCUMENT 00 7300
SUPPLEMENTARY CONDITIONS – INSURANCE AND INDEMNIFICATION

ARTICLE 1 - INSURANCE

1.01 At or before the date specified in Document 00 2113 (Instructions to Bidders), Contractor, in order to protect the County of Kern ("Owner") and its board members, officials, agents, officers, and employees against all claims and liability for death, injury, loss and damage as a result of Contractor's actions in connection with the performance of Contractor's obligations, as required in the Contract Documents, shall secure and maintain insurance as described below. Contractor shall not perform any work under the Contract Documents until Contractor has obtained all insurance required under this section and the required certificates of insurance and all required endorsements have been filed with Owner's authorized insurance representative, Insurance Tracking Services Inc. (ITS). Receipt of evidence of insurance that does not comply with all applicable insurance requirements shall not constitute a waiver of the insurance requirements set forth herein. The required documents must be signed by the authorized representative of the insurance company shown on the certificate. Upon request, Contractor shall supply proof that such person is an authorized representative thereof, and is authorized to bind the named underwriter(s) and their company to the coverage, limits and termination provisions shown thereon. Contractor shall promptly deliver to ITS a certificate of insurance, and all required endorsements, with respect to each renewal policy, as necessary to demonstrate the maintenance of the required insurance coverage for the term specified herein. Such certificates and endorsements shall be delivered to ITS prior to the expiration date of any policy and bear a notation evidencing payment of the premium thereof if so requested. Contractor shall immediately pay any deductibles and self-insured retentions under all required insurance policies upon the submission of any claim by Contractor or Owner as an additional insured.

- A. Workers' Compensation and Employers Liability Insurance Requirement -- In the event Contractor has employees who may perform any services pursuant to the Contract Documents, Contractor shall submit written proof that Contractor is insured against liability for workers' compensation in accordance with the provisions of section 3700 of the California Labor Code.

I signing the Agreement, Contractor makes the following certification, required by section 1861 of the Labor Code:

I am 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 I will comply with such provisions before commencing the performance of the work pursuant to the Contract Documents.

Contractor shall require any sub-contractors to provide workers' compensation for all of the subcontractors' employees, unless the sub-contractors' employees are covered by the insurance afforded by Contractor. If any class of employees engaged in work or services performed under this Agreement is not covered by California Labor Code section 3700, Contractor shall provide and/or require each sub-contractor to provide adequate insurance for the coverage of employees not otherwise covered.

Contractor shall also maintain employer's liability insurance with limits of one million dollars (\$1,000,000) for bodily injury or disease.

- B. General Liability Insurance Requirements – Contractor shall maintain in full force and effect, at all times during the term of the Agreement Commercial General Liability Insurance including, but not limited to, Contractual Liability Insurance (specifically concerning the indemnity provisions of the Contract Documents), Products-Completed Operations Hazard, Personal Injury (including bodily

injury and death), and Property Damage for liability arising out of Contractor's performance of work under the Agreement. Contractor shall maintain the Products-Completed Operations Hazard coverage for the longest period allowed by law following termination of the Agreement. The amount of said insurance coverage required by the Contract Documents shall be the policy limits, which shall be at least one million dollars (\$1,000,000) each occurrence and two million dollars (\$2,000,000) aggregate.

- C. Automobile Liability Insurance Requirements – Contractor shall maintain Automobile Liability Insurance against claims of Personal Injury (including bodily injury and death) and Property Damage covering any vehicle and/or all owned, leased, hired and non-owned vehicles used in the performance of services pursuant to the Contract Documents with coverage equal to the policy limits, which shall be at least one million dollars (\$1,000,000) each occurrence.
- 1.02** The Commercial General Liability and Automobile liability Insurance required in sub-paragraphs B. and C. above shall include an endorsement naming the County of Kern and County's board members, officials, officers, agents, employees and volunteers as additional insureds for liability arising out of the Agreement and any operations related thereto. Said endorsement shall be provided using one of the following three options: (i) on ISO form CG 20 10 11 85; or (ii) on ISO form CG 20 37 10 01 plus either ISO form CG 20 10 10 01 or CG 20 33 10 01; or (iii) on such other forms which provide coverage at least equal to or better than form CG 20 10 11 85.
- 1.03** Any self-insured retentions in excess of \$100,000 must be declared on the Certificate of Insurance or other documentation provided to Owner and must be approved by the Kern County Risk Manager.
- 1.04** If any of the insurance coverages required under the Contract Documents is written on a claims-made basis, Contractor, at Contractor's option, shall either (i) maintain said coverage for at least three (3) years following the termination of this Agreement with coverage extending back to the effective date of this Agreement; or (ii) purchase an extended reporting period of not less than three (3) years following the termination of the Agreement.
- 1.05** Cancellation of Insurance -- The above stated insurance coverages required to be maintained by Contractor shall be maintained until the completion of all of Contractor's obligations under the Contract Documents except as otherwise indicated herein. Each insurance policy supplied by Contractor shall not be suspended, voided, modified, canceled, or reduced in coverage or in limits except after ten (10) days notice by Contractor in the case of non-payment of premiums, or on thirty (30) days prior written notice in all other cases. This notice requirement does not waive the insurance requirements stated herein. Contractor shall immediately obtain replacement coverage for any insurance policy that is terminated, canceled, non-renewed, or whose policy limits have been exhausted or upon insolvency of the insurer that issued the policy.
- 1.06** All insurance 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 rating of A-; VII. Any exception to these requirements must be pre-approved by the County Risk Manager.
- 1.07** If Contractor is, or becomes during the term of the Agreement, self-insured or a member of a self-insurance pool, Contractor shall provide coverage equivalent to the insurance coverages and endorsements required above. Owner will not accept such coverage unless Owner determines, in its sole discretion and by written acceptance, that the coverage proposed to be provided by Contractor is equivalent to the above-required coverages.
- 1.08** All insurance afforded by Contractor pursuant to the Contract Documents shall be primary to and not contributing to any other insurance or self-insurance maintained by Owner. An endorsement shall be provided on all policies which shall waive any right of recovery (waiver of subrogation) against Owner. A waiver of right of recovery (waiver of subrogation) is only required when

Contractor's personnel deliver services or perform service for the County while on County property.

- 1.09** Insurance coverages in the minimum amounts set forth herein shall not be construed to relieve Contractor for any liability, whether within, outside, or in excess of such coverage, and regardless of solvency or insolvency of the insurer that issues the coverage; nor shall it preclude Owner from taking such other actions as are available to it under any other provision of the Contract Documents or otherwise in law.
- 1.10** Failure by Contractor to maintain all such insurance in effect at all times required by the Contract Documents shall be a material breach of the Contract by Contractor. Owner, at its sole option, may terminate the Contract and obtain damages from Contractor resulting from said breach. Alternatively, Owner may purchase such required insurance coverage, and without further notice to Contractor, Owner shall deduct from sums due to Contractor any premiums and associated costs advanced or paid by Owner for such insurance. If the balance of monies obligated to Contractor pursuant to the Contract are insufficient to reimburse Owner for the premiums and any associated costs, Contractor agrees to reimburse Owner for the premiums and pay for all costs associated with the purchase of said insurance. Any failure by Owner to take this alternative action shall not relieve Contractor of its obligation to obtain and maintain the insurance coverages required by the Contract Documents.
- 1.11** If injury occurs to any employee of Contractor, Subcontractor or sub-subcontractor for which the employee, or the employee's dependents in the event of employee's death, is entitled to compensation from Owner under provisions of the Workers' Compensation Insurance and Safety Act, as amended, or for which compensation is claimed from Owner, Owner may retain out of sums due Contractor under the Contract Documents, an amount sufficient to cover such compensation, as fixed by the Workers' Compensation Insurance and Safety Act, as amended, until such compensation is paid, or until it is determined that no compensation is due. If Owner is compelled to pay compensation, Owner may, in its discretion, either deduct and retain from the Contract Sum the amount so paid, or require Contractor to reimburse Owner.
- 1.12** 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.
- 1.13** All Subcontractors shall maintain the same insurance required to be maintained by Contractor with respect to their portions of the Work unless otherwise indicated in the Contract Documents, and Contractor shall cause the Subcontractors to furnish proof thereof to Owner within ten Days of Owner's request.

ARTICLE 2 - RESPONSIBILITY OF CONTRACTOR AND INDEMNIFICATION

- 2.01** Owner and each of its officers, employees, consultants and agents including, but not limited to, the Board, Project Manager and each Owner'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.
- 2.02** To the furthest extent permitted by law (including without limitation California Civil Code §2782), Contractor shall assume defense of, and indemnify and hold harmless, Owner and each of its officers, employees, consultants and agents, including but not limited to the Board, Project Manager and each Owner's Representative, from claims, suits, actions, losses and liability of every kind, nature and description, including but not limited to claims and fines of regulatory

agencies and attorney's fees of County Counsel and counsel retained by Owner, expert fees, costs of staff time, and investigation costs, directly or indirectly arising out of, connected with or resulting from performance of the Work, failure to perform the Work, or condition of the Work which is caused in whole or part by any act or omission of Contractor, Subcontractors, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, resulting from any cause whatsoever.

- 2.03** With respect to third-party claims against Contractor, Contractor waives any and all rights to any type of express or implied indemnity against Owner and each of its officers, employees, consultants and agents including, but not limited to Owner, the Board, Project Manager and each Owner's Representative. Owner shall provide timely notice to Contractor of any third-party claim relating to the Contract Documents, in accordance with Section 9201 of the California Public Contract Code.
- 2.04** 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.
- 2.05** To the furthest extent permitted by law (including, without limitation, Civil Code §2782), the indemnities, releases of liability and limitations of liability, claims procedures, and limitations of remedy expressed throughout the 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, Owner may in its discretion back charge Contractor for Owner's costs and damages resulting therefrom and withhold such sums from progress payments or other Contract moneys which may become due.
- 2.06** The indemnities in the Contract Documents shall not apply to any indemnified party to the extent of its sole negligence or willful misconduct; nor shall they apply to Owner or other indemnified party to the extent of its active negligence.

END OF DOCUMENT

LAMONT PARK BEAUTIFICATION PROJECT

PROJECT NO. 1650.7012.22

PRE-BID JOB WALK MEETING LOCATION



Bidders shall assemble on the South side of Lamont Park, on Segrue Rd.

**LAMONT PARK BEAUTIFICATION PROJECT
PROJECT NO. 1650.7012.22**

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SECTION 01 1000

SUMMARY OF WORK

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes Summary of Work and Work Restrictions including:
1. Work Covered By Contract Documents
 2. Base Bid, Alternates, and Allowances
 3. Work Under Other Contracts
 4. Future Work
 5. Work Sequence
 6. Work Days and Hours
 7. Shutdown for Discovery of Cultural Resources
 8. Cooperation of Contractor and Coordination with Other Work
 9. Partial Occupancy/Utilization Requirements
 10. Contractor Use of Site
 11. Air Quality Standards
 12. Construction Staking and Monument Protection
 13. Protection of Existing Structures and Underground Facilities
 14. Permits
 15. Owner-Furnished Products

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work comprises of the construction of the County of Kern's (hereinafter "Owner") **Lamont Park Beautification Project** located at 8304 Segreue Rd., CA 93241. The Work includes, without limitation, removing existing baseball field and placing a soccer field with goals, construction of splash pad, skate park, recreation structure with multi-courts, placement of exercise equipment with shade sails, inclusive play equipment with shade sails, enclosed multi-courts with LED lighting, restrooms and drinking fountains, outdoor pavilion with raised stage and canopy, resurface and expansion of basketball courts, covered family picnic shelter, barbeque grills and picnic tables throughout, accessible walking path expansion, landscape, trees, irrigation and controls upgrades, sprinkler modifications, grading, parking and sidewalk modifications, and signage. Refer to Construction Drawings for full scope and add alternate bid scope. Contract Documents fully describe the Work. Refer to Work Days and Hours of this Section for more information.
- B. The Work of this Contract comprises construction of all the Work indicated, described in the Specifications, or otherwise required by the Contract Documents. Unless provided otherwise in the Contract Documents, all risk of loss to Work covered by Contract Documents shall rest with Contractor until Final Acceptance of the Work. Cost of maintenance of systems and equipment prior to Final Acceptance will be considered as included in price Bid and no direct or additional payment will be made therefore.
- C. For all Bid items, furnish and install all Work, including connections to existing systems, indicated, and described in Specifications and all other Contract Documents. Work and requirements applicable to each individual Bid item, or unit of Work, shall be deemed incorporated into the description of each Bid item (whether Lump Sum or Unit Price). Any Bid item may be deleted from the Work and Contract Sum, in total or in part, prior to or after award of Contract without compensation in any form or adjustment of other Bid items or prices therefore.

1.03 BASE BID, ALTERNATES, AND ALLOWANCES

- A. Descriptions of Base Bid Item: Provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract and construction documents, in the manner and time therein prescribed, and according to the requirements as therein set forth.
- B. Bid ADD Alternates: None
- C. Allowances: None

1.04 WORK SEQUENCE

- A. pConstruct Work in stages and at times to accommodate Owner operation requirements during the construction period, coordinate construction schedule and operations with Owner/Architect.
- B. Special operational constraints include the following:
 - 1. Protect existing items to remain. Protect surrounding properties from damage. Notify Owner immediately of adjacent property damage.

1.05 WORKDAYS AND HOURS

- A. Workdays and hours: Monday-Friday inclusive, **7:00 a.m.-5:00 p.m.** local time.
- B. Work at the Site on holidays is not permitted, unless Contractor requests otherwise from Owner in writing at least 48 hours in advance and Owner approves in its sole discretion. Any work performed outside normal workdays and hours will cause the contractor to pay all overtime inspection and testing costs, as determined by the County.
- C. Work required to be completed on non-business hours only as requested by the Owner, will not cause the contractor to pay for overtime inspection.

1.06 SHUTDOWN FOR DISCOVERY OF CULTURAL RESOURCES

- A. If discovery is made of items of historical archaeological or paleontological interest, immediately cease all Work in the area of discovery. Archaeological indicators may include, but are not limited to, dwelling sites, locally darkened soils, stone implements or other artifacts, fragments of glass or ceramics, animal bones, human bones, and fossils. After cessation of excavation, immediately contact Owner. Do not resume Work until authorization is received from Owner. When resumed, excavation or other activities shall be as directed by Owner.

1.07 COOPERATION OF CONTRACTOR AND COORDINATION WITH OTHER WORK

- A. Coordinate with Owner and any Owner forces, or other contractors and forces, as required by 00 7200 (General Conditions).
- B. Contractor shall review Contract Documents, submittals, changes, and prepare overlay drawings as necessary to avoid conflicts, errors, omissions and untimely construction.

1.8 PARTIAL OCCUPANCY/UTILIZATION REQUIREMENTS

- A. Allow Owner to take possession of and use any completed or partially completed portion of the Work during the progress of the Work as soon as is possible without interference to the Work.
- B. Possession, use of Work, placement, and installation of equipment by Owner shall not in any way evidence the completion of the Work or any part of it.
- C. Contractor shall not be held responsible for damage to the occupied part of the Work resulting from Owner occupancy.
- D. Make available, in areas occupied, on a 24 hour per day and 7 day per week basis if required, any utility services, Heating, Ventilation, Air Conditioning (HVAC), fire and alarm systems to be put into operation at the time of occupancy.

1. Responsibility for operation and maintenance of said equipment shall remain with Contractor for the duration of the project.
 2. Make an itemized list of each piece of equipment so operated with the date operation commences for Owner certification.
 3. Itemized list noted above shall be basis for commencement of warranty period for equipment.
 4. Owner shall pay for utility cost arising out of occupancy by Owner during construction.
- E. Use and occupancy by Owner prior to acceptance of Work does not relieve Contractor of its responsibility to maintain insurance and bonds required under the Contract until entire Work is completed and accepted by Owner.
- F. Prior to date of recordation of the Notice of Completion, all necessary repairs or renewals in Work or part thereof so used, not due to ordinary wear and tear, but due to Defective materials or workmanship or to operations of Contractor, shall be made at expense of Contractor, as required in Document 00 7200 (General Conditions).
- G. Use by Owner of Work or part thereof as contemplated by this Section 01 1000 shall in no case be construed as constituting acceptance of Work or any part thereof. Such use shall neither relieve Contractor of any responsibilities under Contract, nor act as waiver by Owner of any of the conditions thereof.
- H. Owner may specify in the Contract Documents that portions of the Work, including electrical and mechanical systems or separate structures, shall be completed on dates described in this Section 01100, if any, prior to completion of all of the Work. Notify Owner in writing when Contractor considers any such part of the Work ready for its intended use and complete and request Owner to document completion for that part of the Work.

1.9 CONTRACTOR USE OF SITE

- A. Construction areas shall be as noted on the construction drawings.
- B. Confine operations at Site to areas permitted by Contract Documents, permits, ordinances, and laws. Do not unreasonably encumber Site with materials or equipment.
- C. Assume full responsibility for protection and safekeeping of products stored on premises. Move any stored products that interfere with operations of Owner or other contractor.
- D. Coordinate parking, storage, staging, and Work areas with Owner. Owner will designate a storage area for Contractor's equipment and materials. Do not store construction materials within the dripline of any tree.
- E. Prior to commencement of Work or excavation, Contractor and Owner shall jointly survey the area adjacent to the Project area making permanent note and record of such existing damage such as cracks, sags, depressions or other similar damage. Contractor shall supplement record with photographs indexed on a key map or drawing. This record and photographs shall serve as a basis for determination of subsequent damage to structures, conditions or other existing improvements due to Contractor's operations. All parties making the survey shall sign the official record of existing damage. Cracks, sags or damage of any nature to the adjacent Project area, not noted in the original survey but subsequently noted, shall be reported immediately to Owner.
- F. The Contractor shall follow all applicable County and local jurisdictional ordinances in force during the duration of this Contract.
- G. It is essential that the Contractor perform the Work with as little interference and disturbance as possible to the surrounding neighborhood.
- H. When suspect materials, outside the scope of Work, are encountered during the Work or restoration process, the Contractor shall immediately contact the Project Manager for evaluation and approval of the methods for dealing with the material.

1.10 AIR QUALITY STANDARDS

- A. Ensure that idling time for all heavy equipment is minimized to reduce on-Site emissions.
- B. Maintain equipment in good mechanical condition.
- C. Limit work generating dust emissions during periods of high winds (greater than 15 miles per hour).
- D. Replace ground cover in disturbed areas as soon as possible.
- E. Enclose, cover, water, or apply soil binders to exposed stockpiles.
- F. Remove earth tracked onto neighboring paved roads at least once daily.
- G. Limit equipment speed to 10 miles per hour in unpaved areas.
- H. Follow applicable air district requirements.

1.11 CONSTRUCTION STAKING AND MONUMENT PROTECTION

- A. Contractor shall provide engineering surveys to establish construction stakes that in Owner's judgment are necessary to enable Contractor to proceed with the Work.
- B. Contractor shall be responsible for laying out the Work, shall protect and preserve the established construction stakes and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Whenever Contractor knows or reasonably should know that any Work activity is likely to damage or destroy any construction stakes or property monuments, or require relocation because of necessary changes in grades or locations, provide at least 2 Business Days advance notice to Owner. In any event, notify Owner whenever any construction stakes or property monuments are lost or destroyed or require relocation because of necessary changes in grades or locations. Contractor shall employ a registered professional to replace or repair construction stakes or property monuments at Contractor's expense.
- C. Provide Owner with Contractor's survey staking information in writing within 3 Working Days after it becomes available to Contractor.

1.12 GEOTECHNICAL DATA AND EXISTING CONDITIONS

- A. Available Documentation: In accordance with, and subject to, the provisions of Document 00 3100 (Geotechnical Data and Existing Conditions), the following documentation is available for review. This information is not part of the Contract Documents and can be provided to contractor for reference only.

1.13 PROTECTION OF EXISTING STRUCTURES AND UNDERGROUND FACILITIES

- A. The Drawings may indicate existing above- and below-grade structures, drainage lines, storm drains, sewers, water lines, gas lines, electrical lines, hot water lines, and other similar items and Underground Facilities that are known to Owner. At least 2 Business Days, or as otherwise noted, prior to commencement of excavation, notify the owners of the following Underground Facilities in addition to contacting Underground Service Alert. Coordinate with Owner prior to proceeding with work.
- B. Attention is directed to power and telephone lines where overhead service to a structure, known to receive service, does not exist, then underground service shall be assumed to exist.
- C. Perform pot-holing by hand within 24 inches (in any direction) of the Underground Facilities. This may be done on an area-by-area basis, but shall be accomplished at least 7 Days in advance of the date of construction within such area.
- D. No attempt has been made to locate private utilities on private property such as sprinkler irrigation systems or electrical conduits. Verify with the facility operator prior to construction.
- E. In addition to reporting, if a utility is damaged, Contractor must take appropriate action as provided in Document 00 7200 (General Conditions).

- F. Additional compensation or extension of time on account of utilities not indicated or otherwise brought to Contractor's attention including reasonable action taken to protect or repair damage shall be determined as provided in 00 7200 (General Conditions).

1.14 PERMITS

- A. The Building Permit will be applied for or obtained by Owner. Contractor is responsible for all other permits.
- B. Permits, agreements, or written authorizations that may apply to this project include, but are not limited to the following:
 - 1. Renovation Permit from San Joaquin Valley Air Pollution Control District shall be responsibility of the Contractor after award of contract. Coordinate with Owner and air district for forms and fees.
 - 2. Cal/OSHA Permit. Contractor shall obtain and pay for, as applicable, all permit(s) as required by Cal/OSHA such as the following:
 - a. Construction of trenches or excavations that are five feet or more in depth and into which a person is required to descend.
 - b. Construction or demolition of any building, structure, or scaffolding for falsework more than three stories high, or the equivalent height (36 feet).
 - c. Erection or dismantling of vertical shoring systems more than three stories high, or the equivalent height (36 feet).
- C. All other permits that may be required, such as air district, city, encroachment, electrical, mechanical, fire prevention, irrigation, grading, slope protection, tree cutting, etc., have not been applied for and shall be obtained by Contractor. Applicable permit fees will be reimbursed to the extent specified in Document 00 7200 (General Conditions).

1.15 ACTUAL DAMAGES FOR PERMIT VIOLATIONS

- A. Contractor shall be liable for and shall pay Owner the amount of any actual losses due to permit violations, in addition to liquidated damages or other remedies provided by the Contract Documents.
- B. The amount of liquidated damages provided in Document 00 5200 (Agreement) and Document 00 7200 (General Conditions) is not intended to include, nor does the amount include, any damages incurred by Owner for reasons other than those listed in that paragraph. Any money due or to become due to Contractor may be retained by Owner to cover both the liquidated and the actual damages described above and, should such money not be sufficient to cover such damages, Owner shall have the right to recover the balance from Contractor or its sureties.

PART 2 – PRODUCTS

2.01 OWNER-FURNISHED PRODUCTS

- A. Owner-Furnished Products:
 - 1. None
- B. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner-reviewed Shop Drawings, Product Data, and Samples, to Contractor via electronic submittal.
 - 2. Arrange and pay for Owner-Furnished Products delivery to Site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, Defective, or deficient items.
 - 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:

1. Review Owner-reviewed Shop Drawings, and Product Data, and Samples.
2. Receive products at Site; inspect for completeness or damage jointly with Owner, Owner representatives.
3. Install and finish products per Contract Documents.
4. Repair or replace items damaged after receipt.
5. Complete installations and work per Contract Documents.

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01 2000

PRICE AND PAYMENT PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes description of requirements and procedures for determining amount of Work performed and for obtaining payment for Work performed.

1.02 REFERENCES

- A. A current version of the following shall be used:
 - 1. California Public Contract Code
 - 2. Code of Civil Procedures
 - 3. Government Code

1.03 COMPOSITION AND SCOPE OF CONTRACT SUM

A. Scope of Contract Sum

- 1. The Contract Sum for performance of the Work under Contract Documents, or under any Bid item, allowance, or Alternate, shall include full compensation for all Work required under the Contract Documents, including without limitation, all labor, materials, taxes, transport, handling, storage, supervision, administration, and all other items necessary for the satisfactory completion of the Work, whether or not expressly specified or indicated, incidental work and expenses, and all terms, conditions, requirements and limitations set forth in the Contract Documents.
- 2. Contract Sum may be expressed as lump sum, unit price, allowance, or combination thereof.

B. Unit Price items

- 1. Quantity of Work to be paid for under any item for which a unit price is fixed in Contract Documents shall be determined by Owner based on, so far as practicable, actual number of units satisfactorily completed, as certified by Contractor, and reviewed by Owner, within prescribed or ordered limits, and no payment will be made for Work unsatisfactorily performed or done outside of limits.

C. Lump Sum Items

- 1. When estimated quantity for specific portion of Work is not indicated and/or Work is designated as lump sum, payment will be on a lump sum basis for Work satisfactorily completed in accordance with Contract Documents.
- 2. Payment for lump sum Work, or items of Work subject to a lump sum (e.g. without limitation, change order work), shall be made on the basis of satisfactory completion of such Work or work item, earned in progressive stages in accordance with the Contract Documents, up to but not exceeding 95% of the Contractor's percentage completion of the Work or item.
- 3. Lump sum items shall be paid based upon the approved Schedule of Values, which shall be used to measure progressive payments based upon satisfactory progress towards completion of the item.

D. Allowance Items

- 1. Allowance Work will be authorized by Owner in writing, following change order procedures to determine cost, supporting documentation and authorization to proceed. Unused allowance amounts at Contract completion shall reduce the Contract price accordingly.

1.04 PAYMENT PROCEDURES

A. Schedule of Values:

1. Within ten Days from issuance of Notice of Award / Notice to Proceed and prior to the Contractor's first Application for Payment, Contractor shall submit a detailed breakdown of its Bid to the Owner / Project Manager by scheduled Work items and/or activities, in the accepted Owner format, including coordination responsibilities and Project Record / Closeout Documents responsibilities. Where more than one Subcontractor comprises the work of a Work item or activity, the Schedule of Values shall show a separate line item for each subcontract. Contractor shall furnish such breakdown of the total Contract Sum by assigning dollar values (cost estimates) to each applicable Progress Schedule network activity, which cumulative sum equals the total Contract Sum. This breakdown shall be referred to as the Schedule of Values.
2. Along with each applicable Progress Schedule network activities, General Conditions, scheduling, record documents and quality assurance control shall be separate line items in the Schedule of Values, which cumulative sum equals the total Contract value. Owner will review the breakdown in conjunction with the Progress Schedule to ensure that the dollar amounts of this Schedule of Values are, in fact, reasonable cost allocations for the Work items listed. Upon favorable review by Owner, Owner will accept this Schedule of Values for use. Owner shall be the sole judge of fair market cost allocations.
3. Owner will reject any attempt to increase the cost of early activities, i.e., "front loading," resulting in a complete reallocation of moneys until such "front loading" is corrected. Repeated attempts at "front loading" may result in suspension or termination of the Work for default, or refusal to process progress payments until such time as the Schedule of Values is acceptable to Owner.
4. Contractor shall provide Schedule of Values in electronic format as a submittal in Procore or similar format as approved by Project Manager.
5. The following are typical line items to be incorporated into the Schedule of Values document:

GENERAL REQUIREMENTS

Supervision/General Administration Expenses
Site survey Expense
Mobilization (Trailers/ Trash Bins/ Toilets)
Safety/ Photos/ Printing/ supplies/ Equipment Rental
SWPPP
Clean-up/Maintenance
Bonds
Insurance
Allowances
Temporary Utilities
Temporary Facilities

OFF-SITE ITEMS (if applicable)

AC Paving and Base
Formed Concrete (Curbs and Gutters)
Concrete Flatwork
Storm Drainage
Street Lighting
Utility Lines
Fire Hydrant
Landscaping
Irrigation
Signage

SITE ITEMS

Survey

Electric Service: (conduit & connectors from utility co. connection to meter plus meter installation).

Gas Service: (main supply line from utility co. connection to meter plus installation of all meters).

Water Lateral: (main supply & fire hydrant from utility co. connection to meter plus installation of all meters).

Sewer Lateral: (main sewage line from utility co. connection to first lateral or building).

Telephone Service: (conduit & conductors from utility co. connection to nearest building).

Demolition

Clearing

Plant and Tree Protection

Rough Grading

Soil Compaction

Erosions Control Devices (>2:1 slope banks over 6' high)

Termite Control

Finish Grading

Fire Lane Paving and Base

AC Paving and Base

Pavement Marking

Parking Bumpers

Formed Concrete (Street Walks/ Equipment Pads/ Ramps)

Concrete Flatwork

Water Distribution

Sanitary Sewer

Drainage & Storm Sewer

Septic System

Landscaping

Irrigation

Outdoor Facilities and Furniture

Chain Link Fences & Gates

Wrought Iron Fences and Gates

Masonry Walls

Waterproofing

Water Repellent/ Anti-Graffiti Sealer

Flagpole

Monument Signs

Exterior Signs

Site Fire System

Drinking Fountains

Site Lighting

TYPICAL BUILDING ITEMS (SUMMARY + INDIVIDUAL BUILDINGS)

Clearing and Grubbing

Excavation & Compaction

Footings & Foundations

Termite Control

Footing Excavation
Forming of Footings
Coarse Base/ Sand/ Membrane
Slab on Grade
Concrete and Masonry Reinforcement
Concrete Steps and Ramps
Concrete Columns
Special Finish Concrete
Concrete Sealer
Precast Concrete Panels
Cementitious Decks

Unit Masonry
Glass Unit Masonry
Stone Masonry
Simulated Stone

Structural Steel
Metal Joists
Metal Decking
Lightgage Metal Framing
Steel Connectors
Steel Stairs, Handrails & Railings
Ornamental Handrails & Railings
Metal Grates- Drainage/ Bollards
Expansion Control

Lumber
Rough Carpentry/Grout
Plywood Web Joists
Heavy Timber
Glulam Beams
Finish Carpentry / Millwork
Installation of Doors/Frames/Hardware
Architectural Woodwork
Plastic Fabrications

Waterproofing
Damp-proofing
Attic Insulation
Exterior Wall Insulation
Interior Wall Insulation
Acoustical Insulation
Fire Safing
Floor Insulation

Fiberglass Shingles
Wood Shingles
Roofing Tiles
Preformed Roofing/Siding
Built-up Roofing
Sheet Roofing
Opaque Insulated Panels

Flashing & Sheet Metal
Roof Accessories
Skylights
Hatches
Sealants

Steel Doors & Frames
Aluminum Doors & Frames
Wood & Plastic Doors
Access Doors
Four-Fold Doors
Bi-parting Teleslide Door
Overhead Coiling Doors
Entrances and Storefronts
Steel Windows
Aluminum Windows
Clad Wood Windows
Finish Hardware
Exterior Glass and Glazing
Interior glass and Glazing
Window/Curtain Walls

Gypsum Wallboard- Ceiling
Gypsum Wallboard- Wall
Ceramic Tile Walls
Ceramic Tile Floors
Quarry Tile Floors
Acoustical Ceilings- Glued
Acoustical Suspended Ceiling Panels
Acoustical Walls Panels
Ceiling Suspension Systems
Wood Flooring/Base
Resilient Flooring/Base
VCT Flooring
Carpet Tiles
Special Flooring (Rubber/ Stone/ Terrazzo)
Special Coatings
Exterior Painting
Interior Painting

Toilet Partitions (Steel/ Polymer)
Wall/ Corner Guards
Directories/Bulletin Boards
Specialty Signs
Detection Specialties
Metal Lockers
Car/ Walkway Shelter
Postal Specialties
Fire Extinguishers and Cabinets
Operable Partitions
Storage Shelving
Toilet Accessories
T.V. Monitor & brackets
Wire Mesh Storage Doors
Misc. Specialties

Safes
Stage Curtains
Projection Screens
Shop Equipment
Dock Bumpers
Food Service Equipment/Stainless Steel Tops
Residential Equipment/ Appliances
BBQ Patio Equipment
Laundry Equipment
Library Equipment
Photolab Equipment
Sports Equipment
Laboratory Equipment
Parking Equipment
Loading Dock Equipment
Detention Equipment
Theater/Stage Equipment

Artwork
Window Treatments
Furniture
Instrument Cabinets
Clocks
Accessories
Entry Mats
Auditorium Seating
Telescoping Bleachers

Instrumentation
Prefabricated Buildings
Special Purpose Rooms/Buildings

Dumbwaiters
Elevators
Hoists & Cranes
Lifts
Wheelchair Lifts
Pneumatic Tube Systems

Waste Water Treatment /Disposal
Fire Sprinkler Systems
Plumbing- Rough
Plumbing- Finish
HVAC- Rough
HVAC- Finish
HVAC- Balance
Energy Management System
Electrical Switchgear
Electrical Sub Panels
Electrical- Rough
Electrical- Finish Trim
Exterior Building Lighting
Interior Lighting
Fire Alarm
Data/ Communications/ Information Technology

B. Contractor's Requests for Progress Payments

1. If requested by Contractor, progress payments will be made monthly, under the following conditions:
2. On or before the 25th Day of each monthly billing cycle, Contractor shall submit to Owner an Application for Payment (Periodic Estimate for Partial Payment – form attached 01 2000A) for the cost of the Work put in place during the period from the last Day of the previous month to the end of the current month, along with one copy of an updated Progress Schedule. Such Applications for Payment shall be for the expected total value of activities completed or partially completed, based upon Schedule of Values prices (or Bid item prices if unit price) of all labor and materials incorporated in the Work up until midnight of the last Day of that one month period, less the aggregate of previous payments. Accumulated retainage shall be shown as separate item in payment summary. Owner and Contractor will reconcile any differences in the field, based on the reconciled monthly report sheets. Except as otherwise provided in a labor compliance program applicable to the Work (if any) or as otherwise required by Owner, concurrently with each Application for Payment, Contractor shall submit to the Owner the Contractor's and its Subcontractors' certified payroll records required to be maintained pursuant to Labor Code Section 1776 for all labor performed during pay periods ending during the period covered by the Application for Payment.
3. No progress payment will be processed prior to Owner receiving all requested, acceptable schedule update information, updated as-built drawings, and certified payrolls, and in Owner's sole and absolute discretion, Owner may deny the entire Application for Payment for noncompliance.
4. Each Application for Payment shall list each Change Order executed prior to date of submission, including the Change Order Number, and a description of the Work activities, consistent with the descriptions of original Work activities. Contractor shall submit a monthly Change Order status log to Owner.
5. If Owner requires substantiating data, Contractor shall submit information requested by Owner, with cover letter identifying Project, Application for Payment number and date, and detailed list of enclosures. Contractor shall submit one copy of substantiating data and cover letter for each copy of Application for Payment submitted.
6. If Contractor fails or refuses to participate in monthly Work reconciliations or other construction progress evaluation with Owner, Contractor shall not receive current payment until Contractor has participated fully in providing construction progress information and schedule update information to Owner.

C. Owner's Review of Progress Payment Applications

1. Owner will review Contractor's Application for Payment following receipt and during the Progress Schedule and Billing Meeting. If adjustments need to be made to percent of completion of each activity, Owner will make appropriate notations and return to Contractor. Contractor shall revise and resubmit. All parties shall update percentage of completion values in the same manner, i.e., express value of an accumulated percentage of completion to date.
2. If Owner determines that portions of the Application for Payment are not proper or not due under the Contract Documents, then Owner may approve the other portions of the Application for Payment, and in the case of disputed items or Defective Work not remedied, may withhold up to 150 percent of the disputed amount from the progress payment.
3. Pursuant to California Public Contract Code §20104.50, if Owner fails to make any progress payment within 30 Days after receipt of an undisputed and properly submitted Application for Payment from Contractor, Owner shall pay interest to the Contractor equivalent to the legal rates set forth in subdivision (a) of Section 685.010 of the California Code of Civil Procedure. The 30-Day period shall be reduced by the number of Days by which Owner exceeds the seven-Day return requirement set forth herein.
4. As soon as practicable after approval of each Application for Payment for progress

payments, Owner will pay to Contractor in manner provided by law, an amount equal to 95 percent of the amounts otherwise due as provided in the Contract Documents, or a lesser amount if so provided in Contract Documents and by law, provided that payments may at any time be withheld if, in judgment of Owner, Work is not proceeding in accordance with Contract, or Contractor is not complying with requirements of Contract, or to comply with stop notices or to offset liquidated damages accruing or expected.

5. Before any progress payment or final payment is due or made, Contractor shall submit satisfactory evidence that Contractor is not delinquent in payments to employees, Subcontractors, suppliers, or creditors for labor and materials incorporated into Work. This specifically includes, without limitation, conditional lien release forms for the current progress payment and unconditional release forms for past progress payments. This also includes copies of certified payroll from contractor and subcontractors for the current payment period.

D. Payment for Material and Equipment Not Yet Incorporated Into the Work

1. No payment shall be made for materials or equipment not yet incorporated into the Work, except as specified elsewhere in the Contract Documents or as may be agreed to by Owner in its sole discretion. Where Contractor requests payment on the basis of materials and equipment not incorporated in the Work, Contractor must satisfy the following conditions:
2. The materials and/or equipment shall be delivered and suitably stored at the Site or at another local location agreed to in writing, for example, a mutually acceptable bonded and insured warehouse.
3. Full title to the materials and/or equipment shall vest in Owner at the time of delivery to the Site, warehouse or other storage location. Obtain a negotiable warehouse receipt, endorsed over to Owner for materials and/or equipment stored in an off-site warehouse. No payment will be made until such endorsed receipts are delivered to Owner.
4. Stockpiled materials and/or equipment shall be available for Owner inspection, but Owner shall have no obligation to inspect them and its inspection or failure to inspect shall not relieve Contractor of any obligations under the Contract Documents. Materials and/or equipment shall be segregated and labeled or tagged to identify these specific Contract Documents.
5. After delivery of materials and/or equipment, if any inherent or acquired defects are discovered, defective materials and/or equipment shall be removed and replaced with suitable materials and/or equipment at Contractor's expense.
6. At Contractor's expense, insure the materials and/or equipment against theft, fire, flood, vandalism, and malicious mischief, as well as any other coverages required under the Contract Documents.
7. Contractor's Application for Payment shall be accompanied by a bill of sale, invoice or other documentation warranting that Owner has received the materials and equipment free and clear of all liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect Owner interest therein, all of which must be satisfactory to Owner. This documentation shall include, but not be limited to, conditional releases of mechanics' liens and stop notices from all those providing materials and equipment as to which the Application for Payment relates, as well as unconditional releases of the same from the same as to the previous Application for Payment for which they have not already been provided. Amounts previously paid for materials and equipment prior to incorporation into the Work shall be deducted from amounts otherwise due Contractor as they are incorporated.

1.05 FINAL PAYMENT

A. Final Payment

1. As soon as practicable after all required Work is completed in accordance with Contract Documents, including punchlist, testing, record documents / closeout documents and manuals and Contractor maintenance after Final Acceptance, Contractor shall submit its

Application for Final Payment or Retention Payment.

2. Provided Contractor has met all conditions required for Final payment, Owner will pay to Contractor, in manner provided by law, unpaid balance of Contract Sum of Work (including, without limitation, retentions), or whole Contract Sum of Work if no progress payment has been made, determined in accordance with terms of Contract Documents, less sums as may be lawfully retained under any provisions of Contract Documents or by law.

B. Final Accounting

1. Prior progress payments and change orders shall be subject to audit and correction in the final payment.
2. Contractor and each assignee under an assignment in effect at time of final payment shall execute and deliver at time of final payment, and as a condition precedent to final payment, Document 00590 (Agreement and Release of Claims).

1.06 SUBSTITUTION OF SECURITIES

- A. 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 Section 16430 of the Government Code, 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 Owner 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 Owner 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 Owner. Contractor shall then pay to each Subcontractor, not later than seven (7) 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.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

Attachment 01 2000-A
PERIODIC ESTIMATE FOR PARTIAL PAYMENT

PROJECT: Lamont Park Beautification Project Invoice or Estimate No. 01
 CONTRACTOR: _____
 PROJECT NO: 1650.7012.22 PERIOD: _____ TO: _____

ITEM NO.	DESCRIPTION	SCHEDULED VALUE	PREVIOUS ESTIMATE	COMPLETED THIS PERIOD	TOTAL TO DATE	%
1		0.00	0.00	0.00	0.00	
2		0.00	0.00	0.00	0.00	
3		0.00	0.00	0.00	0.00	
4		0.00	0.00	0.00	0.00	
5		0.00	0.00	0.00	0.00	
6		0.00	0.00	0.00	0.00	
7		0.00	0.00	0.00	0.00	
8		0.00	0.00	0.00	0.00	
9		0.00	0.00	0.00	0.00	
10		0.00	0.00	0.00	0.00	
11		0.00	0.00	0.00	0.00	
12		0.00	0.00	0.00	0.00	
13		0.00	0.00	0.00	0.00	
14		0.00	0.00	0.00	0.00	
15		0.00	0.00	0.00	0.00	
16		0.00	0.00	0.00	0.00	
17		0.00	0.00	0.00	0.00	
18		0.00	0.00	0.00	0.00	
19		0.00	0.00	0.00	0.00	
SUBTOTAL ORIGINAL CONTRACT		\$0.00	\$0.00	\$0.00	\$0.00	
CO1		0.00	0.00	0.00	0.00	
CO2		0.00	0.00	0.00	0.00	
CO3		0.00	0.00	0.00	0.00	
CO4		0.00	0.00	0.00	0.00	
TOTAL ADJUSTED CONTRACT		\$0.00	\$0.00	\$0.00	\$0.00	

A. Notice to Proceed Date (Enter as text, i.e.: January 1, 2024) _____
 B. Original Contract Time (Working Days) (Enter as number) _____ 320 Days
 C. Additional Contract Time due to Change Orders (Working Days) (Enter number) _____ Days
 D. Contract Completion Date _____ <Completion Date Calculated Here>

SUMMARY OF VALUE OF COMPLETED WORK

1.	Value of work completed to date	\$0.00
2.	Less: Retention - 5%	\$0.00
3.	Less: Deductions/Labor Non-Compliance	\$0.00
4.	Net amount payable on work performed to date	\$0.00
5.	Less: Amount of previous payment requests	\$0.00
6.	Amount due this payment	\$0.00

Approved by Contractor: _____ Date: _____

Approved by County Construction Project Inspector: _____ Date: _____

REQUEST FOR PAYMENT CERTIFICATION

1. CERTIFICATION BY CONTRACTOR:

According to the best of my knowledge and belief, I certify that all items and amounts shown on the attached Periodic Estimate for Partial Payment are correct; that all work has been performed in accordance with the terms and conditions of the contract between the County of Kern and _____, dated _____.

I further certify that all just and lawful bills against the undersigned have been paid, or will be paid from funds received from this payment, in full accordance with the terms and conditions of said contract.

By _____
Contractor (Name of Company)

By _____
Authorized Agent (Signature)

Date _____

Title _____

2. CERTIFICATION BY COUNTY:

I certify that I have reviewed the attached Periodic Estimate for Partial Payment No. _____ for the period ending _____; that to the best of my knowledge and belief it is a true statement of value of work performed to date and that such work has been performed in full accordance with Plans and Specifications and the terms and conditions of the construction contract. I further certify that all work included in the Periodic Estimate for Partial Payment has been inspected by a duly authorized representative and/or qualified County staff. I therefore approved the amount of \$_____ as the balance due this payment.

Kern County Construction Services

By: _____

Date _____

Title: Senior General Services Manager

THIS SECTION FOR USE WITH FEDERALLY FUNDED PROJECTS

3. CERTIFIED PAYROLL AUDIT CERTIFICATION

☐ I hereby certify that I have reviewed the weekly payroll forms and related material for this project and find them to be up-to-date, satisfactory and in compliance with the monitoring regulations included in OMB A-87, A-102 and CRF24.

☐ I hereby certify that I have reviewed the weekly payroll forms and related material for this project and find them to contain discrepancies. A sufficient amount has been withheld to cover any problems that may arise. In addition, the final retention will be held until all discrepancies are resolved.

☐ I hereby certify that weekly payroll forms for the subject project are not required to be submitted.

By: _____

Signature _____

Title: Fiscal Support Specialist

Date _____

SECTION 01 2050

MODIFICATION PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes requirements that supplement the paragraphs of Document 00 7200 (General Conditions).
- B. Description of procedures for modifying the Contract Documents and determining costs for changes in contract amounts.
- C. Contractor shall submit construction related documentation through Construction Management Software in accordance with Section 01 3216.

1.02 PROCEDURES FOR CONTRACTOR INITIATED CHANGES

- A. Contractor-Initiated Request for Information (“RFI”) Procedures, Requirements and Limitations:
 - 1. Contractor may submit RFIs for clarifications in Owner-prepared Contract Documents, which may result in a change in Work, Contract Price, or Contract Time.
 - 2. Whenever Contractor requires information regarding the Project or Owner-prepared Contract Documents, or receives a request for such information from a Subcontractor, Contractor may prepare and deliver an RFI to Owner. Contractor shall use the RFI format provided by Owner. Contractor shall not issue an RFI to Owner solely to clarify Contractor-prepared Construction Documents. Contractor must submit time critical RFIs at least 30 days before scheduled start date of the affected Work activity. Contractor shall reference each RFI to an activity of Progress Schedule and shall note time criticality of the RFI, indicating time within which a response is required. Contractor’s failure to reference RFI to an activity on the Progress Schedule and note time criticality on the RFI shall constitute Contractor’s waiver of any claim for time delay or interruption to the Work resulting from any delay in responding to the RFI.
 - 3. Contractor shall be responsible for its costs to implement and administer RFIs throughout the Contract duration. Regardless of the number of RFIs submitted, Contractor shall not be entitled to additional compensation for the effort required to submit the RFIs. Contractor shall be responsible for Owner’s administrative costs for answering RFIs where the answer could reasonably be found by reviewing the Contract Documents, as determined by Owner; at Owner’s discretion, such costs may be deducted from progress payments or final payment.
 - 4. Owner will provide a written response in the form of an Instruction Bulletin (“IB”) to Contractor within 14 working days from receipt of RFI. Contractor shall distribute the response to all appropriate Subcontractors.
 - 5. If Contractor is satisfied with the response and does not request a change in Contract Sum or Contract Time, then the response shall be executed without a change.
 - 6. If Contractor believes the response is incomplete, Contractor shall issue another RFI (with the same RFI number with the letter “A” indicating it is a follow-up RFI) to Owner clarifying original RFI. Contractor shall reference the IB issued by the Owner. Additionally, Owner may return the RFI requesting additional information if the original RFI is inadequate in describing the condition.
- B. Contractor Cost Proposal:
 - 1. Contractor may initiate changes by submitting a Cost Proposal (“CP”) in response to an Instruction Bulletin.
 - 2. Whenever Contractor elects or is entitled to submit a CP, Contractor shall prepare and submit to Owner for consideration a CP using the form included in this Project Manual. All CPs must contain a complete breakdown of costs or credits, deducts and extras; itemizing materials, labor, taxes, Markup and any requested changes to Contract Time. All

Subcontractor Work shall be so indicated. Individual entries on the CP form shall include applicable Schedule of Values code, with all amounts determined as provided herein. After receipt of a CP with a detailed breakdown, Owner will act promptly through issuance of an Instruction Bulletin.

3. If Owner accepts a CP, Owner will prepare a Change Order for Owner and Contractor signatures.
4. If CP is not acceptable to Owner because Owner does not agree with Contractor's proposed cost and/or time, Owner will provide comments. Contractor will then, within seven Days (except as otherwise provided herein), submit a revised CP.
5. The Contractor will forfeit compensation for costs and/or time for proceeding with changes to the Work without written authorization from the County. The Contractor shall notify the County in writing, and request an evaluation whenever it appears a change is necessary. The written notice shall be made within 24 hours of such discovery. If the County concurs with the Contractor's request for a change to the Work, the County will follow the procedures described above

C. Time Requirements:

1. If Contractor believes that an Owner response to an RFI, submittal, or other Owner direction, results in change in Contract Sum or Contract Time, Contractor shall notify Owner with the issuance of a preliminary Cost Proposal (CP) within seven working days after receiving Owner's response or direction, and in no event after starting the disputed work or later than the time allowed under **Article 12 of Document 00 7200** (General Conditions). If Contractor also requests a work time extension, or has issued a notice of delay or otherwise requests a time extension with a CP, then Contractor shall submit the TIE as described in **Section 01 3216 Construction and Progress Schedules** concurrently with the CP and in no event later than ten working days after providing the notice of delay.
2. If Contractor requires more time to accurately identify the required changes to the Contract Sum or Contract Time, Contractor may submit an updated and final CP and TIE within 14 working days of submitting the preliminary CP.
3. If Owner agrees with Contractor's CP and/or TIE, then Owner will prepare a Change Order. If Owner disagrees with Contractor, then Contractor may give notice of potential claim as provided in **Article 12 of Document 00 7200** (General Conditions), and proceed thereunder.
4. Contractor must submit CPs, notices of potential claim, or Claims within the required time periods. Any failure to do so waives Contractor's right to submit a CP or file a Claim.

D. Cost Estimate Information:

1. Contractor and subcontractors shall, upon Owner's request, permit inspection of the original unaltered cost estimates, subcontract agreements, purchase orders relating to the change, and documents substantiating all costs associated with its CP or Claims arising from changes in the Work.

1.03 PROCEDURES FOR OWNER INITIATED CHANGE ORDERS

A. Owner Initiated Changes

1. Owner may initiate changes in the Work or Contract Time by issuing an Instruction Bulletin (IB). Owner may issue an IB to Contractor. Any IB will detail all proposed changes in the Work and may request a quotation of changes in Contract Sum and Contract Time from Contractor.
2. In response to an IB, Contractor shall furnish a CP within 14 working days. For time sensitive changes and upon Owner's approval of CP, Owner may direct contractor to proceed with extra work via a Prior Approval Document. Upon approval of CP, Owner may issue an Instruction Bulletin directing Contractor to proceed with extra Work.
3. If the parties agree on price and time for the Work, the Owner will issue a Contract Change Order. If the parties do not agree on the price or time for a CP, Owner may either issue an

Instruction Bulletin, order the work done by force account or decide the issue per **Article 12 of Document 00 7200** (General Conditions). Contractor shall perform the changed Work notwithstanding any claims or disagreements of any nature.

B. Force Account

1. The Contractor, provided he received an order for force account work, shall proceed with the work on a force account basis as defined in Section 9 of the Standard Specifications and as modified by this Section 01 2050.
2. A daily time and material record of all force account work shall be kept by the Contractor, as directed by the Owner. The daily record shall be signed by the Contractor and submitted daily to the Owner / Construction Project Inspector / Architect.
3. In any case, the Owner shall certify to the amount, including markup, due to the Contractor and any subcontractor submitting for extra under the proposed change. For this purpose, markup shall include, but not be limited to overhead, profit, home office overhead, bonds, insurance, labor pool, remobilization, and escalation. In no instance shall mark up to Contractor be more than 15%. Pending final determination of value, payments on account of changes shall be made on the Contractor's estimate.

1.04 PROCEDURES THAT APPLY TO CONTRACTOR- AND OWNER-INITIATED CHANGES

A. Adjustment of Schedules to Reflect Change Orders:

1. Contractor shall revise Schedule of Values and Application for Payment forms to record each authorized Change Order ("CO") as a separate line item and adjust the Contract Sum as shown thereon prior to the next monthly pay period.
2. Contractor shall revise the Progress Construction Schedules prior to the next monthly pay period, to reflect CO adjustments.
3. Contractor shall enter changes in Project Record Documents prior to the next monthly pay period.

B. Required Documentation for Adjustments to Contract Amounts:

1. For all changes and cost adjustments requested, Contractor shall provide documentation of change in Contract Amounts asserted, with sufficient data to allow evaluation of the proposal.
2. In all requests for compensation, cost proposals, estimates, claims, and any other calculation of costs made under the Contract Documents, Contractor shall break out and quantify costs of labor, equipment and materials identified herein, for Contractor and subcontractors of any tier.
3. Contractor shall, on request, provide additional data to support computations for:
 - a. Quantities of products, materials, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Justification for any change in Contract Time and new Progress Construction Schedule showing revisions due, if any.
 - d. Credit for deletions from Contract, similarly documented.
4. Contractor shall support each claim or computation for additional cost, with additional information including:
 - a. Origin and date of claim or request for additional compensation.
 - b. Dates and times Work was performed and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, materials, equipment and subcontracts, similarly documented.
 - e. Credit for deletions from Contract, similarly documented.

C. Responses and Disputes:

1. For all responses for which the Contract Documents do not provide a specific time period, recipients shall respond within a reasonable time.
2. For all disputes arising from the procedures herein, Contractor shall follow Article 12 of Document 00 7200 (General Conditions).

1.05 COST DETERMINATION FOR CHANGES IN CONTRACT AMOUNTS

A. Calculation of Total Cost of Extra Work:

1. Total cost of changed Work, extra Work, or of Work omitted shall be the sum of three components defined immediately below as: Component 1 (Direct Cost(s)); Component 2 (Markup); and, Component 3 (bonds, insurance, taxes)
2. Component 1: Direct Cost(s) of labor, equipment and materials, is calculated based upon actually incurred (or omitted) labor costs, material costs and equipment rental costs, as defined herein;
3. Component 2: Markup on such actually incurred Direct Costs, is applied in the percentages identified below; and
4. Component 3: Actual additional costs for any additionally required insurance, bonds, and/or taxes, defined herein, is calculated without Markup.

1.06 MEASUREMENT OF DIRECT COST OF CONSTRUCTION (COST COMPONENT NO. 1)

A. Composition of Component 1 (Direct Cost of Construction):

1. Component 1 has four subcomponents, also referred to as “**LEMS**”:
 - a. Labor (Component 1A)
 - b. Equipment (Component 1B)
 - c. Materials (Component 1C)
 - d. Subcontractors (Component 1D)

B. Measurement of Cost of Labor (Component 1A):

1. Cost of Labor shall be calculated as: Cost of labor for workers (including forepersons when authorized by Owner) used in actual and direct performance of the subject work, whether employer is Contractor, Subcontractor, or other forces, in the sum of the following:
 - a. Actual Wages: Actual wages paid shall include any employer payments to or on behalf of workers for health and welfare, pension, vacation, and similar purposes.
 - b. Labor surcharge: Payments imposed by local, county, state, and federal laws and ordinances, and other payments made to, or on behalf of, workers, other than actual wages as defined, such as worker's compensation insurance. Such labor surcharge shall not exceed generally accepted standards in the State for labor rates in effect on date upon which extra Work is accomplished.
 - c. Cost of Labor shall include no other costs, fees or charges.
2. Labor cost for operators of equipment owned and operated by Contractor or any Subcontractor, shall be no more than rates of such labor established by collective bargaining agreements for type of worker and location of Work, whether or not owner-operator (i.e., Contractor or Subcontractor) is actually covered by such an agreement.
3. Cost of Labor shall be recorded and documented in certified payroll records, maintained in the form customary and/or required in the State, delivered to Owner weekly.

C. Measurement of Cost of Equipment (Component 1B):

1. Measurement of Component 1B (Cost of Equipment). Cost of Equipment shall be calculated as: Cost of Equipment used in actual and direct performance of the subject Work, whether by Contractor, Subcontractor, or other forces. Cost of Equipment shall be calculated as herein described.
2. For rented equipment, cost will be based on actual rental invoices, appropriate for the use and duration of the Work. Equipment used on extra Work shall be of proper size and type. If, however, equipment of unwarranted size or type and cost is used, cost of use of

- equipment shall be calculated at rental rate for equipment of proper size and type, as determined by Owner.
3. Equipment rental cost for Contractor or Subcontractor-owned equipment, shall be determined by reference to, and not in excess of, the generally accepted standards in the State for equipment rental rates in effect on the date upon which extra Work is accomplished. If there is no applicable rate for an item of equipment, then payment shall be made for Contractor- or Subcontractor-owned equipment at the rental rate listed in the most recent edition of the CalTrans Standard Schedules and Specifications, and absent a rental rate therein, then the Association of Equipment Distributors (AED) book.
 4. In all cases, rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.
 5. Unless otherwise specified, manufacturer's ratings, and manufacturer-approved modifications, shall be used to classify equipment for determination of applicable rental rates. Individual pieces of equipment or tools not listed in said publication and having a replacement value of \$100 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor as payment is included in payment for labor. Rental time will not be allowed while equipment is inoperative due to breakdowns.
 6. For equipment on Site, rental time to be paid for equipment shall be the time that equipment is in operation on extra Work being performed or on standby as approved by Owner. The following shall be used in computing rental time of equipment:
 - a. When hourly rates are listed, less than 30 minutes of operation shall be considered to be ½ hour of operation.
 - b. When daily rates are listed, less than four hours of operation shall be considered to be ½ Day of operation.
 - c. Rates shall correspond to actual rates paid by Contractor, i.e., if Contractor pays lower weekly or monthly rates, then same shall be charged to Owner.
 7. For equipment that must be brought to Site to be used exclusively on extra Work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:
 - a. Owner will pay for costs of loading and unloading equipment.
 - b. Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.
 - c. Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission or appropriate State Dept. of Transportation.
 - d. Owner will not make any payment for transporting and loading and unloading equipment if equipment is used on Work in any other way than upon extra Work.
 - e. Rental period may begin at time equipment is unloaded at Site of extra Work and terminate at end of the performance of the extra Work or Day on which Owner directs Contractor to discontinue use of equipment, whichever first occurs. Excluding Saturdays, Sundays, and Owner legal holidays, unless equipment is used to perform extra Work on such Days, rental time to be paid per Day shall be four hours for zero hours of operation, six hours for four hours of operation and eight hours for eight hours of operation, time being prorated between these parameters. Hours to be paid for equipment that is operated less than eight hours due to breakdowns, shall not exceed eight less number of hours equipment is inoperative due to breakdowns.
 8. Employee vehicles are not part of Component 1A, rather, are included within Component 2 (Markup).
 9. Equipment costs shall include no other costs, fees, or charges.
- D. Measurement of Cost of Material (Component 1C):

1. Cost of material shall be calculated as herein described. Cost of such materials will be cost to purchaser (Contractor, Subcontractor, or other forces) from supplier thereof, except as the following are applicable:
2. If cash or trade discount by actual supplier is offered or available to purchaser, it shall be credited to Owner notwithstanding fact that such discount may not have been taken.
3. For materials salvaged upon completion of Work, salvage value of materials shall be deducted from cost, less discounts, of materials.
4. If cost of a material is, in opinion of Owner, excessive, then cost of material shall be deemed to be lowest current wholesale price at which the material is available in quantities concerned delivered to Site, less any discounts as provided in **this Paragraph 1.06**.
5. Material costs shall include no other costs, fees, or charges.

E. Measurement of Cost of Subcontractors (Component 1D):

1. Where reimbursed or calculated per the terms of the Contract Documents, Change Order, cost of Subcontractors shall be calculated as amounts earned by Subcontractors procured in compliance with the Contract Documents and approved by the Owner, provided such subcontractor-earned amounts meet the following requirements:
 - a. Such amounts are earned under the terms of the Subcontracts and the Work complies with the terms of the Contract Documents;
 - b. Such amounts are properly requested, documented, and permitted under the terms of the Subcontract(s) and the Contract Documents.
 - c. Total cost to Owner of Direct Costs of Construction (labor, equipment, materials), Markup, and costs of bonds, insurance, and taxes, conform to contract limitations (i.e., totals paid by Owner do not exceed the 20% Markup limitation.).

1.07 MEASUREMENT AND PAYMENT OF MARKUP (COST COMPONENT 2)

A. Markup Percentages for Changed Work (Component 2):

1. Markup on Direct Cost of labor and materials for extra Work shall be 15%. Markup on Direct Cost of equipment for extra Work shall be 15%.
2. When extra Work is performed by Subcontractors, regardless of the number of tiers, total Markup on "Component 1" Direct Costs shall not exceed 20%. Contractor and its Subcontractors shall divide the 20% as they may agree.
3. Under no circumstances shall the total Markup on any extra Work exceed 20 percent, stated as a percent of the Direct Cost of labor, equipment, and materials. This limitation shall apply regardless of the actual number of subcontract tiers.
4. On proposals covering both increases and decreases in Contract Sum, Markup shall be allowed on the net increase only as determined above. When the net difference is a deletion, no percentage for Markup shall be allowed, but rather an appropriate percentage deduction shall be issued in the amount of the net difference.

B. Measurement and Payment of Markup (Component 2):

1. Mark Up (Component 2) provides complete compensation to Contractor for:
 - a. All Contractor profit;
 - b. All Contractor home-office overhead;
 - c. All Contractor assumption of risk assigned to Contractor under the Contract Documents;
 - d. Subject to the qualifications below regarding self-performed work, all General Conditions and General Requirements.
2. Profit. Compensation for profit included within Component 2 (Mark Up), includes without limitation: Fees of all types, nature and description; and Profit and margins of all types, nature and description.
3. Home Office Expenses. Compensation for home office expenses included within Component 2 (Mark Up), includes without limitation: Salaries and other compensation of any type of Contractor's personnel (management, administrative, and clerical), and all

direct and indirect operating, travel, payroll, safety, storage, quality control, maintenance, and overhead costs of any nature whatsoever, incurred by Contractor at any location other than the Project-specific site office, including without limitation, Contractor's principal or branch offices; insurance premiums other than those for Project-specific insurance directed by the Owner in a change order; all hardware, software, supplies and support personnel necessary or convenient for Contractor's capture, documentation and maintenance of its costs and cost accounting data and cost accounting and control systems and work progress reporting.

4. Assumption of Risk. Compensation for Contractor's assumption of risk under the Contract Documents, included within Component 2 (Mark Up), includes without limitation loss, cost, damage, expense, or liability resulting directly or indirectly from any of the following causes ("**Unallowable Costs**"), for Contractor and subcontractors of any tier: noncompliance with the Contract Documents, fault or negligence, defective or non-conforming Work, by Contractor or any Subcontractor or Vendor of any tier or anyone directly or indirectly employed by any of them, or for whose acts or omissions any of them are responsible or liable at law or under the Contract Documents; cost overruns of any type; costs in excess of any lump sum, not to exceed amount or Guaranteed Maximum Price (GMP); costs resulting from bid or "buy out" errors, unallocated scope, or incomplete transfer of scope or contract terms to subcontractors; any costs incurred by Contractor relating to a Change in the Work without a Change Order in accordance with the Contract Documents; costs for work or materials for which no price is fixed in the Contract Documents, unless it is expressly specified that such work or material is to be paid for as extra Work.
5. General Conditions and Division 01 General Requirements. Compensation for Contractor's General Conditions and General Requirements Costs included within Component 2 (Mark Up), includes compensation to Contractor for: Contractor's direct costs, without overhead or profit, for salaries and related forms of compensation and employer's costs for labor and personnel costs, of Contractor's employees and Subconsultant's employees (if any), while and only to the extent they are performing Work at the Project Site. Personnel and Work compensated by this Component include without limitation: All required Project management responsibilities; all on-site services; monthly reporting and scheduling; routine field inspection of Work; general superintendence; general administration and preparation of cost proposals, schedule analysis, change orders and other supporting documentation as necessary; salaries of project superintendent, project engineers, project managers, safety manager, other manager, timekeeper, and secretaries; all cost estimates and updates; development, validation, and updates to the project schedule; surveying; and estimating. Compensation for Contractor's General Requirements Costs included within Component 2 (Mark Up), compensates Contractor for its "General Requirements" Costs, including without limitation: all scheduling hardware, software, licenses, equipment, materials, and supplies; purchase, lease or rental, build out, procurement, supporting equipment and maintenance of temporary on-Site facilities, Project field and office trailers and other temporary facilities, office equipment and supporting utilities; platforms, fencing, cleanup and jobsite security; temporary roads, parking areas, temporary security or safety fencing and barricades; all Contractor's motor vehicles used by any Contractor's personnel, and all costs thereof; all health and safety requirements, required by law or Owner procedures; all surveying; all protection of Work; handling and disposal fees; final cleanup; repair or maintenance; other incidental Work; all items, activities and function similar to any of those described above; all travel, entertainment, lodging, board.
6. Personnel compensated by the Markup Component do not include workers of foreman level or below in the case of self-performed work; rather, such personnel shall be treated as a Direct Cost of Construction. Costs compensated by the Markup component do not include temporary measures specifically required by the changed work, not otherwise required or ongoing in the prosecution of the Work, that commence specifically to support the changed work and conclude with the completion of the changed work. Such costs shall be treated as Direct Costs of Construction. Examples of General Requirements costs that this component may not cover are the following: temporary barricades or fencing of specific

areas required specifically for the changed work; cranes required specifically for the changed work; extra security required specifically for the changed work.

1.08 MEASUREMENT AND PAYMENT OF BONDS INSURANCE TAXES (COMPONENT 3)

- A. Measurement of Bonds, Insurance, Taxes (Component 3):
1. Component 3 (Bonds, Insurance, Taxes) consists of the cost of bonds, insurance and taxes, also referred to as “**BIT**”. All State sales and use taxes, applicable County and applicable City sales taxes, shall be included. Federal and Excise tax shall not be included.
 2. There is no mark up on BIT.

1.09 EFFECT OF PAYMENT

- A. Change Order Compensation is All Inclusive.
1. Except as provided expressly below regarding changes that extend the Contract Time, payment of calculated cost of extra work constitutes full and complete compensation for costs or expense arising from the extra Work, and is intended to be all inclusive.
 2. Payment for Direct Cost of Construction (Component 1 or LEMS) is intended to be all-inclusive. Any costs or risks not delineated within cost of labor, equipment, or materials herein, shall be deemed to be within the costs and risks encompassed by the applicable Markups and unallowable in any separate amount.
 3. Payment of Markup (Component 2) is intended to be all-inclusive. Contractor waives claims for any further or different payment of cost and risk items delineated herein, other than the allowable percentage markup on costs set forth in the Contract Documents; such separate, further or different cost or risk items shall be unallowable, waived and liquidated within the allowable percentage markup.
 4. Contractor shall recover no other costs or markups on extra work of any type, nature or description.
- B. Exception for Changes Extending the Contract Time.
1. Where a change in the Work extends the Contract Time, Contractor may request and recover additional, actual direct costs, provided Contractor can demonstrate such additional costs are (i.) actually incurred performing the Work, (ii.) not compensated by the Markup allowed, and (iii) directly result from the extended Contract Time. Contractor shall make such request and provide such documentation following all required procedures, documentation and time requirements in the Contract Documents, and subject to all contract limitations of liability. Contractor may not seek or recover such costs using formulas (e.g., Eichleay).
- C. Limits of Liability / Accord and Satisfaction.
1. The foregoing limits of compensation apply in all cases of claims for changed Work, whether calculating Cost Proposals or Change Orders, or calculating claims and/or damages of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including strict liability or negligence. Contractor may recover no other costs arising out of or connected with the performance of extra Work, of any nature.
 2. Under no circumstances may Contractor claim or recover special, incidental, or consequential damages against Owner, its representatives or agents, whether arising from breach of contract, negligence, strict liability or other tort or legal theory, unless specifically and expressly authorized in the Contract Documents.
 3. No change in Work shall be considered a waiver of any other condition of Contract Documents. No claim shall be made for anticipated profit, for loss of profit, for damages, or for extra payment whatever, except as expressly provided for in Contract Documents.
 4. Accord and Satisfaction: Every Change Order and accepted CP shall constitute a full accord and satisfaction, and release, of all Contractor (and if applicable, Subcontractor) claims for additional time, money or other relief arising from or relating to the subject matter of the change including, without limitation, impacts of all types, cumulative impacts, inefficiency, overtime, delay and any other type of claim. Contractor may elect to reserve

its rights to disputed claims arising from or relating to the changed Work at the time it signs a Change Order or approves a CP, but must do so expressly in a writing delivered concurrently with the executed Change Order or approved CP, and must also submit a Claim for the reserved disputed items pursuant to Article 12 of **Document 00 7200** (General Conditions) no later than 30 working days after Contractor's first written notice of its intent to reserve rights. Execution of any Change Order or CP shall constitute Contractor's representation of its agreement with this provision.

1.010 MISCELLANEOUS REQUIREMENTS

A. Owner-Furnished Materials.

1. Owner reserves right to furnish materials as it deems advisable, and Contractor shall have no claims for costs and Markup on such materials.

B. Records And Certification.

1. All charges shall be recorded daily and summarized in Cost Proposal form attached hereto. Contractor or authorized representative shall complete and sign form each day. Contractor shall also provide with the form: the names and classifications of workers and hours worked by each; an itemization of all materials used; and a list by size type and identification number of equipment and hours operated.
2. Owner shall have the right to audit all records in possession of Contractor relating to activities covered by Contractor's claims for modification of Contract, including CP Work. This right shall be specifically enforceable, and any failure of Contractor to voluntarily comply shall be deemed an irrevocable waiver and release of all claims then pending that were or could have been subject to Article 12 of **Document 00 7200** (General Conditions).

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

COST PROPOSAL AND RFI FORMS INCLUDED ON FOLLOWING PAGES
(Electronic forms are available upon request)

COST PROPOSAL (CP)

County of Kern
Contract Number _____

CP Number: _____
Date: _____
In Response To _____
IB#, etc.

To: County of Kern

Attention: [_____]

General Services Division

County Administrative Office, Third Floor, Plans and Specifications Counter

1115 Truxtun Avenue

Bakersfield, California 93301-4639

Phone: (661) 868-3091

Email: mendozav@kerncounty.com

From: [Insert Contractor's Name/Address]

This Cost Proposal is in response to the above-referenced _____ **[Insert RFP, etc. as applicable]**.

Brief description of change(s): _____

ITEM DESCRIPTION	PRIME CONTRACTOR	SUB 1	SUB 2	SUB 3	SUB 4	TOTAL
LABOR						
EQUIPMENT						
MATERIAL						
Other (Specify)						
TOTAL COST						
Subcontractor's Overhead & Profit 15 percent max.						
Contractor's Overhead & Profit 15 percent max.						
Overhead & Profit to Contractor for Subcontractor's Work						
(percent of Total Cost above not including any Overhead & Profit – may not exceed 20%)						
GRAND TOTAL						
REQUESTED CHANGE IN CONTRACT TIME (DAYS) (Time Impact Evaluation Enclosed)						

By Contractor:

Signature:

Date:

REQUEST FOR INFORMATION (RFI)

PROJECT: Lamont Park Beautification Project **RFI NO.:**

OWNER: County of Kern **DATE:**
1115 Truxtun Avenue, 3rd Floor
Bakersfield, CA 93301

CONTRACTOR:

PROJECT NO.: 1650.7012.22

Send all RFI's to County Project Manager

DRAWING	SPECIFICATION
REFERENCE:	REFERENCE:

BRIEF TITLE:

DESCRIPTION OF CLARIFICATION REQUIRED (attach sheets as necessary):

CONTRACTOR'S PROPOSED SOLUTION:

INITIATOR:	SIGNATURE:
-------------------	-------------------

**DATE RESPONSE
REQUIRED:**

**COUNTY
ACTIONS
RECEIVED ON:** _____

FORWARDED TO:	DATE:
RESPONSE:	

REFER TO INSTRUCTION BULLETIN NO. _____ **ATTACHED.**

SECTION 01 3000

ADMINISTRATIVE REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes description of requirements and procedures for the use of the County's construction management software, submittals and project meetings.

1.02 CONSTRUCTION MANAGEMENT SOFTWARE

- A. Contractor shall utilize County-provided software (Procore) for all construction related communication including, but not limited to, submittals, requests for information, emails, construction photographs, Progress Construction Schedules, Master Schedules, Submittal Logs, and other documents. County will provide Contractor needed access to comply with this requirement at no cost to Contractor.

1.03 SUBMITTALS

A. Schedule of Submittals.

1. Owner will prepare a schedule of submittals (also referred to as a submittal register) required to complete the Work through Construction Management Software. Schedule of submittals will include, for each submittal: the specification or drawing reference requiring the submittal, if applicable; the material, item, or process for which the submittal is required; the submittal number and identifying title of the submittal; and a preliminary submission schedule.
2. The technical specifications may list several individual items required to be submitted for Owner review. The Schedule of Submittals will list each individual item required to be submitted so that all required submittals can be tracked by Contractor and Owner.
3. Preparation by Owner of schedule of submittals does not excuse Contractor of obligation to supply, schedule and coordinate all submittals required by the Contract Documents.

B. Contractor to Submit Shop Drawings, Product Data and Submittals

1. Contractor shall review for compliance with Contract Documents, approve and submit to Owner Shop Drawings, Product Data, Samples and similar submittals required by Contract Documents. Contractor shall provide documents electronically, by providing an electronic copy in portable document format (pdf) for Owner for review, unless otherwise directed by Owner. Samples submitted for Owner's consideration shall be delivered to Owner in accordance with the individual Technical Specifications. Submittals and re-submittals shall be transmitted via electronic mail, unless otherwise directed by Owner.
2. Contractor's approval shall be indicated by a stamp or written statement on the cover sheet of the submittal with submittal identifying number clearly labeled: "This submittal is approved by <Contractor's Name> for conformance with the contract requirements for <project name>". Approval shall be signed and dated by Contractor's representative.
3. Contractor shall schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Contractor shall include certifications to be submitted with the pertinent drawings and product information at the same time.
4. Contractor shall coordinate scheduling, sequencing, preparing, and processing of all submittals with performance of work so that work will not be delayed by submittal processing.

5. Submittals shall specifically identify any work depicted that does not conform to the Contract Documents with an explanation for the deviation on a separate sheet entitled "Submittal Exceptions to Contract Documents."

C. Owner Review of Shop Drawings, Product Data and Submittals

1. Schedule submittals at least three (3) weeks before dates reviewed submittals will be needed. Except as may be provided in other specification sections, a submittal will be returned in no more than twenty-one (21) calendar days, as each is accepted or not accepted. When a submittal cannot be returned within that period, Owner will, within a reasonable time after receipt of submittal, give notice of the date by which that submittal will be returned.
2. After review by Owner of each submittal, Owner will return an electronic scan in portable document format (pdf) of the reviewed submittal via electronic mail to Contractor with actions defined as follows:
 - a. NO EXCEPTIONS TAKEN - Accepted subject to its compatibility with general design concept of the Work, future Submittals and additional partial Submittals for any portions of the Work not covered in this Submittal. Does not constitute acceptance or deletion of specified or required items not shown on the Submittal.
 - b. MAKE CORRECTIONS NOTED (NO RESUBMISSIONS REQUIRED) - Same as item (a) above, except that minor corrections as noted shall be made by Contractor.
 - c. REVISE AS NOTED AND RESUBMIT - Rejected because of major inconsistencies or errors that shall be resolved or corrected by Contractor prior to subsequent review by Owner.
 - d. REJECTED - RESUBMIT - Submitted material does not conform to drawings and/or specifications in major respect, i.e.: wrong size, model, capacity, or material.

Contractor shall print out and distribute reviewed submittals at his discretion. Contractor shall also provide a hard copy of submittals designated "NO EXCEPTIONS TAKEN" and "MAKE CORRECTIONS NOTED" to Inspector at the project site for reference.

3. Favorable review will not constitute acceptance by Owner of any responsibility for the accuracy, coordination, or completeness of the Submittals. Accuracy, coordination, and completeness of Submittals shall be sole responsibility of Contractor, including responsibility to back-check comments, corrections, and modifications from Owner's review before fabrication. Contractor, subcontractors, or suppliers may prepare submittals, but Contractor shall ascertain that submittals meet requirements of Contract Documents, while conforming to structural space and access conditions at point of installation. Owner's review will be only to assess if the items covered by the Submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed project as indicated by the Contract Documents. Favorable review of Submittal, method of work, or information regarding materials and equipment Contractor proposes to furnish shall not relieve Contractor of responsibility for errors therein and shall not be regarded as assumption of risks or liability by Owner, or any officer or employee thereof, and Contractor shall have no claim under Contract Documents on account of failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Favorable review shall be considered to mean merely that Owner has no objection to Contractor using, upon Contractor's own full responsibility, plan or method of work proposed, or furnishing materials and equipment proposed.
4. Unless otherwise specified, Owner's review will not extend to the means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

5. Contractor shall perform no portion of the Work for which the Contract Documents require Submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been favorably reviewed by the Owner; otherwise, any such work is at Contractor's sole risk."

1.04 PROJECT MEETINGS

- A. Preconstruction Conference. Owner will call for and administer Preconstruction Conference at time and place to be announced (usually the week of the Notice to Proceed). Contractor shall attend Preconstruction Conference and shall invite Subcontractor's at Contractor's discretion. Agenda may include, but not be limited to, the following items:
 1. Schedules
 2. Personnel and vehicle permit procedures
 3. Use of premises
 4. Location of the Contractor's on-Site facilities
 5. Security
 6. Housekeeping
 7. Submittal and RFI procedures
 8. Inspection and testing procedures, on-Site and off-Site
 9. Utility shutdown procedures
 10. Control and reference point survey procedures
 11. Injury and Illness Prevention Program
 12. Contractor's Initial Progress Schedule
 13. Contractor's Schedule of Values
 14. Contractor's Schedule of Submittals
 15. Jurisdictional agency requirements
 16. Owner will distribute copies of minutes to attendees. Attendees shall have 7 Days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of Preconstruction Conference.
- B. Biweekly Project Meetings. Contractor shall coordinate and administer biweekly progress meetings throughout duration of Work unless otherwise directed by Owner. Meetings may be tracked through Construction Management Software at Owner's requirement. Meetings shall be held at the project site, unless otherwise specified in Contract Documents.
 1. Contractor shall prepare agenda and distribute it four (4) Working Days in advance of meeting to Owner and anticipated meeting participants.
 2. Participants with agenda items shall present them.
 3. The Architect/Engineer and other responsible entities shall attend meetings unless otherwise specified in Contract Documents or provided by Owner.
 4. Contractor shall record and distribute the meeting minutes. Minutes shall be distributed by the Contractor to the Owner and attendees within three (3) Working Days after the meeting. Contractor shall distribute the minutes to those affected by decisions made at meeting. Attendees shall have five (5) Working Days to submit comments or additions to the minutes.
 5. Progress meetings shall be attended by Contractor's personnel, Owner, and others as appropriate to agenda topics for each meeting.
 6. Agenda may contain, but not be limited to the following items, as appropriate:
 - a. Review, revise as necessary, and approve previous meeting minutes
 - b. Review of Work progress since last meeting
 - c. Status of Progress Construction Schedule, delivery schedules, adjustments
 - d. Submittal, RFI, Instruction Bulletin and Change Order status
 - e. Review of the Contractor's safety program activities and results, including report on all serious injury and/or damage accidents
 - f. Other items affecting progress of Work

C. Progress Schedule And Billing Meetings

1. A meeting will be held on approximately the 20th of each month to review the schedule, update submittals and progress payment application.
2. At this meeting, at a minimum, the following items will be reviewed:
 - a. Percent complete of each activity;
 - b. Time impact evaluations for Change Orders and Time Extension Request;
 - c. Actual and anticipated activity sequence changes;
 - d. Actual and anticipated duration changes; and
 - e. Actual and anticipated Contractor delays.
3. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, Contractor's General Superintendent and Scheduler shall attend these meetings.

D. Pre-Installation Conferences

1. When required by a Technical Specification Section, schedule an on-site meeting prior to the actual installation. Attending shall be the Contractor, Installers and others whose Work may be affected by the installation. The Owner will schedule attendees as appropriate.
2. Notify Owner at least four (4) Working Days in advance of meeting date.
3. Contractor shall prepare the agenda and conduct the meeting to cover the following topics:
 - a. Review in detail manufacturer's requirements, Specifications, Drawings, installation details, relationships with other components, and other related Work. Anticipated or discovered conflicts, incompatibilities, and inadequacies shall be reviewed and resolved at the meeting.
 - b. Review in detail job conditions, environmental requirements, schedule, construction sequence, coordination with other Work, requirements for installation and quality of completed Work, and protection of adjacent Work and property
 - c. Review in detail the means of protecting the completed Work during the remainder of the construction period
4. The Contractor shall take meeting notes and distribute them within two (2) Working Days after the pre-installation conference to participants, with three (3) copies to the Owner, conference attendees and those affected by decisions made. Attendees taking exception to anything in the meeting notes shall state it in writing to Contractor within five (5) Working Days following receipt of meeting notes.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01 3216

CONSTRUCTION AND PROGRESS SCHEDULES

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes description of requirements and procedures for submitting Critical Path Method (“CPM”) progress schedules.
- B. Contractor shall follow the requirements of Section 8 of the Standard Specifications.

1.02 CONTRACTOR TO SUBMIT PROGRESS SCHEDULES

- A. Contractor shall submit proposed Baseline Progress Schedule within fourteen (14) calendar days after execution of the Agreement. Within twenty-eight (28) calendar days after execution of the Agreement Contractor shall submit Baseline Progress Schedule addressing Owner provided comments.
- B. Baseline Progress Schedule shall show Contractor’s construction and procurement activities, including but not limited to, equipment procurement and delivery (Contractor and Owner supplied), activities with Subcontractors and suppliers, major submittal reviews, commissioning of systems, use of major equipment on site, and necessary interface with Owner and third parties required to complete the Work in a timely manner and in accordance with Contract Time.

1.03 SCHEDULE REQUIREMENTS.

- A. Unless Owner agrees in writing otherwise, progress schedule shall be produced with software allowing import into Procore, or as Owner may specify, which Contractor shall prepare and supply to Owner, with all datapoint entries completed for start dates, necessary work activities, durations (not longer than 21 calendar days), and logic ties. There shall be no activities without predecessors, successors, and logic ties other than start of construction and completion.
- B. Contractor’s progress schedule shall be in the form of a CPM Gantt diagram or, if Owner, in its sole discretion, agrees in writing, an arrow diagram. The hard copies of the schedule supplied to Owner shall indicate the critical path of the Work in red and shall show a logical progression of the Work through completion within Contract Time.
- C. Unless Owner agrees in writing otherwise, progress schedule shall also show early and late start and finish dates and total available float (float to the successor activity’s late start date) for each activity. The contract completion date shall be shown as the final completion date on the Contractor’s CPM schedule. Owner has no obligation to accept an early completion schedule.

1.04 MONTHLY UPDATES

- A. Contractor’s progress schedule shall be updated monthly to reflect actual progress. The schedule shall be subject to Owner’s review and acceptance for use in monitoring Contractor’s Work and evaluating Applications for Payment.
- B. Contractor shall supply Owner with an electronic copy of the updated progress schedule with each monthly payment application. Contractor shall provide Owner with two-week lookahead schedules weekly, showing in detail any activities and resources scheduled for the immediate two-week period.

1.05 RECOVERY SCHEDULE

- A. Owner may request a recovery schedule if Contractor falls fourteen (14) or more Working Days behind any schedule Milestone. The recovery schedule shall show Contractor’s plan and resources committed to retain Contract completion dates.
- B. The recovery schedule shall show the intended critical path. If Owner requests, Contractor shall also:
 - 1. Secure and demonstrate appropriate Subcontractor and supplier consent to the recovery schedule.

- C. Submit a narrative explaining trade flow and construction flow changes and man-hour loading assumptions for major Work activities and/or Subcontractors. All costs associated with development and implementation of the recovery schedule, including inspection outside of normal working hours, shall be at the Contractor's expense.

1.06 TIME IMPACT EVALUATION ("TIE") FOR CHANGE ORDERS, TIME EXTENSIONS AND DELAYS:

- A. Contractor is responsible for maintaining Work on schedule and tracking milestones. Contractor shall notify Owner of delays and missed milestones in a timely manner and make request for a contract duration adjustments.
- B. When Contractor requests a time extension for any reason, Contractor shall submit a TIE that includes both a written narrative and a schedule diagram depicting how the changed Work or other impact affects other schedule activities. The schedule diagram shall show how the Contractor proposes to incorporate the changed Work or other impact in the schedule and how it impacts the current Schedule update critical path or otherwise. Contractor is also responsible for requesting time extensions based on the TIE's impact on the critical path. The diagram shall be tied to the main sequence of scheduled activities to enable Owner to evaluate the impact of changed Work to the scheduled critical path.
- C. Contractor is responsible for all costs associated with the preparation of TIEs, and the process of incorporating TIEs into the current schedule update. Contractor shall provide Owner with four copies of each TIE.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section describes Testing and Inspecting to be provided by the Contractor, plus cooperation required from the Contractor with the County's selected testing agency and others responsible for testing and inspecting the Work.

1.02 SECTION INCLUDES

- A. Related documents.
- B. Quality Assurance.
- C. Related Work.
- D. References.
- E. Samples.
- F. Mock-up.
- G. Selection of testing laboratory.
- H. Contractor's convenience testing.
- I. Code compliance testing.
- J. Manufacturers' field services and reports.
- K. Submittals.
- L. Air Balance Contractor.
- M. Tests and Inspections.

1.03 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 00 and Division 01 Specification Sections, apply to Work of this Section.

1.04 QUALITY ASSURANCE – CONTROL OF INSTALLATION

- A. Contractor shall be present at the Project Site at all times during the execution of the Work.
- B. Contractor shall monitor the quality of Work performed by his own forces and subcontractors and shall monitor suppliers, manufacturers, products, services, and site conditions to produce Work of specified quality in accordance with the requirements of the Contract Documents.
- C. Work shall be performed by qualified, skilled, and experienced workers.

- D. Contractor shall be responsible for the coordination of the Work for all trades under this Contract and with other Contractors.
- E. Inspection: Inspect each item(s) of materials or equipment immediately prior to installation. Reject damaged and defective items.
- F. Dimensions: Recheck measurements and dimensions of the Work, as an integral step of starting each installation.
- G. Manufacturers' Instructions: Unless specified otherwise, comply fully with Manufacturers' printed instructions, following each requirement and step in proper sequence. Do not omit any preparatory steps or installation procedures unless specifically modified or exempted in writing. Should manufacturer's instructions conflict with Contract Documents, request written interpretation of requirements from the Architect/Engineer before proceeding.
- H. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- I. Secure products in place with position anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.05 RELATED WORK

- A. Requirements for testing may be described in various Sections of these Specifications.
- B. Where no testing requirements are described, but the County decides that testing is required, the County may require such testing to be performed under current pertinent standards for testing. Payment for such testing will be made as described in this Section.

1.06 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the Reference Standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to the latest edition of Reference Standards as specified in the individual Specification Sections, except where a specific date is established by codes.
- C. Obtain copies of Reference Standards where required by product Specification Sections.
- D. No Contractual relationship, duty, or responsibility of the parties in Contract, nor those of the Architect/Engineer, shall be altered from the Contract Documents by mention or inference otherwise in any reference documents.

1.07 SAMPLES

- A. Take field Samples at the site as required by individual Specifications Sections for review.
- B. Acceptable Samples represent a quality level for the Work.
- C. Where field Samples are specified in individual Sections to be removed, clear area after field Sample has been accepted by Architect/Engineer.
- D. Report samples taken but not tested and special sampling operations as required.

1.08 MOCK-UP

- A. Schedule construction and review of the Mock-ups, submittals, approvals etc. so as not to delay the progress of the Work.
- B. Materials and finish shall be as specified in appropriate Sections and Divisions.
- C. Test will be performed under provisions identified in this Section and identified in the respective product Specification Section.
- D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- E. Accepted Mock-ups are representative of the quality required for the Work.
- F. Where Mock-up has been accepted by the Architect/Engineer and is specified in product Specification Sections to be removed; remove mock-up and clear area when directed to do so.
- G. Protect and maintain Mock-ups in clean, undamaged condition until such time as it is incorporated in the Work or removed from the Site.

1.09 SELECTION OF TESTING LABORATORY

- A. County will appoint, employ and pay for specified initial services of an independent firm to perform inspecting and testing on earthwork, concrete, steel, welding, grout, anchors, bolts and any other items as deemed necessary by the construction documents.
- B. The independent firm will perform inspections, tests and other services specified in individual Specification Sections and as required by Architect/Engineer or the County.
- C. Inspecting, testing, and source quality control may occur on or off the project site. Perform off-site inspecting or testing as required by the Architect/Engineer or the County. Any off-site testing performed outside normal business hours, Saturday, Sunday or County Holidays (unless specified) will cause the Contractor to pay all overtime inspection and testing costs, as determined by the County.
- D. Reports will be submitted by the independent firm to the Architect/Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- E. Cooperate with independent firm; furnish samples of materials, concrete design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
 - 3. Provide access to the Work at all times and at all locations where the Work is in progress.
 - 4. Provide facilities for access to enable the laboratory to perform its functions properly.
- F. Testing or inspecting does not relieve the Contractor of the responsibility to perform the Work to Contract requirements.
- G. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for retesting will be charged to Contractor by deducting inspecting or testing charges from the Contract Sum/Price.

- H. Unnecessary tests and inspections costs due to Contractor's poor scheduling will be deducted by the County from the Contract Sum.
- I. The County and Architect/Engineer reserve the right to demand for tests, or special examination, any material, item or workmanship or part thereof to assure compliance with specifications and my reject for satisfactory replacement any material, Work or part judged defective or nonconforming as a result thereof. If such tests or examinations indicate the Work does not comply, then the cost of these tests and examinations shall be paid by the Contractor.
- J. Limitations of authority of testing laboratory; Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
 - 2. Approve or accept any portion of Work.
 - 3. Perform any duties of Contractor.

1.10 CONTRACTOR'S CONVENIENCE TESTING

- A. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.11 CODE COMPLIANCE TESTING

- A. Inspections and tests required by codes or ordinances and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

1.12 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual Specification Sections, require material or product suppliers of manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up equipment, test, and adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of Observer to the Architect/Engineer 15 days in advance of required observation. Observer is subject to approval of the Architect/Engineer.
- C. Report observations and site decisions or instructions given to applications or installers that are supplemental or contrary to manufacturers written instructions.
- D. Submit report in duplicate within 30 days of observation to the Architect/Engineer for information.

1.13 SUBMITTALS

- A. Furnish copies of licensed Civil Engineer signed test reports to Architect/Engineer, Contractor and County Inspector, indicating sampling and testing in accordance with Title 24 and stipulating whether results comply or do not comply with Contract Documents, noting actual results compared to specified design strength.
- B. Each testing agency shall submit to the Architect/Engineer a report in duplicate covering all tests required by that agency during the project. Report each time Work is suspended, covering tests up to that time, and at the completion of the project, covering all tests.
- C. Test Report Content:
 - 1. Date of issue.
 - 2. Project title and project number.

3. Name, address and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making the inspection or test.
6. Designation of the Work and test method.
7. Identification of product and Specification Section.
8. Complete inspection or test data.
9. Test results and interpretations of test results.
10. Ambient conditions at the time of sample taking and testing
11. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements and the requirements CCR.T24.
12. Name and signature of laboratory Inspector
13. Recommendations on testing.

1.14 AIR BALANCE CONTRACTOR

- A. An air balance-testing agency acceptable to the Architect/Engineer on this project shall be hired by the Contractor to conduct air balance testing on the complete Work of the Contractor. Provide information to Architect/Engineer for his review concerning air balance testing agency credentials.
- B. HVAC Subcontractor on this project shall not perform or select that Air Balancing testing Contractor or be associated financially with Air Balance Contractor.

1.15 TEST AND INSPECTIONS

- A. Provide all tests and inspections required by government agencies having jurisdiction, required by provisions of the Contract Documents, and such other tests and inspections as are directed by the Architect/Engineer.
- B. Reports: Shall be executed immediately upon conclusion of each procedure and forwarded to Owner/Architect, Project Construction Inspector, Contractor, Sub-Contractors, and Governing Agencies as required.

PART 2 – PRODUCTS

(Not applicable)

PART 3 – EXECUTION

3.01 INSPECTION

- A. The Work of construction in all stages of progress shall be subject to the personal observation of the County Inspector. The County Inspector shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the County Inspector reasonable facilities for obtaining such information as may be necessary to keep the County Inspector fully informed respecting the progress and manner of the Work and the character of the material. County Inspection of the Work shall not relieve the Contractor from any obligations to fulfill this Contract.

3.02 TESTING

- A. Cooperation with Testing Laboratory: Representatives of the Testing Laboratory shall have access to the Work at all times. Provide facilities for such access in order that the laboratory may properly perform its functions.
- B. Perform Moisture Testing: at existing concrete slab, test a minimum of three areas within the building to test moisture levels. Provide Owner a report of test results and coordinate with flooring manufacturer and installers to place flooring per manufacturer instructions.

C. Schedules for Testing:

1. Establishing schedule:

- a. By advance discussion with Testing Laboratory selected by County, determine the time required for the laboratory to perform its tests and to issue each of its findings.
- b. Provide all required time within the Construction schedule.

1. Revising Schedule: When changes to construction schedule are necessary during construction, coordinate all changes of schedule with Testing Laboratory as required.

2. Adherence to Schedule: When the Testing Laboratory is ready to test according to the incompleteness of the Work, all extra costs for testing attributable to the delay will be deducted by County from the Contract Sum.

C. Taking Specimens: All specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the Testing Laboratory or the County.

D. Testing at the Source of Supply:

1. Contractor shall notify the County/Owner a sufficient time in advance of the manufacture of material to be supplied by the Contractor under the Contract Documents, which by terms of Contract must be tested, so County may arrange for testing material at source of supply.

2. Any material shipped by Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in the job or construction.

3.03 SOIL INSPECTING AND TESTING

A. Make required inspections and test include, but are not necessarily limited to:

1. Visually inspect on-site and imported fill and backfill, making such tests and retests as necessary to determine compliance Contract requirement compliance and suitability.
2. Make field density tests on samples from in-place material as required.
3. Inspect and test the scarifying and recompacting of cleaned subgrade; inspect the progress of excavating, filling, and grading; make density tests and backfills; and verify compliance with provisions of the Contract Documents and governmental agencies having jurisdiction.

B. Make and distribute necessary reports and certificates to Owner/Architect or agency requesting reports.

3.04 CONCRETE INSPECTING AND TESTING

A. Portland cement:

1. Secure from cement manufacturer Certificates of Compliance delivered to testing lab
2. Require Certificates of Compliance to positively identify cement as to production lot, bin or silo number, dating and routing of shipment, and compliance with specified standards.
3. If so required by the Architect/Engineer, promptly provide such other specific physical and chemical data as requested.

B. Aggregate:

1. Provide one test unless character of material changes, material is substituted, or additional test is requested by the Architect/Engineer.

2. Sample from conveyor belts and batching gates at the ready-mix plant:
 - a. Sieve analysis to determine compliance with specified standards and grading;
 - b. Specific gravity test for compliance with specified standards.
- C. Laboratory design mix:
 1. After approval of aggregate, and whenever character or source of materials is changed, provide mix design in accordance with ACI 613.
 2. Provide designs for all mixes prepared by a licensed Civil Engineer.
- D. Molded concrete cylinders:
 1. Provide 3 test cylinders for each 50 cu. yds, or fraction thereof, of each class of concrete of each day's placement.
 2. Test 1 cylinder at 7 days, 1 at 28 days, and 1 when so directed.
 3. Report the mix, slump, gage, location of concrete in the structure, and test results.
 4. Take specimens and make tests in accordance with the applicable ASTM Standard Specifications.
- E. Core Tests:
 1. Provide only when specifically so directed by the Architect/Engineer because of low cylinder test results, per Section 2-2604, (d), Title 24.
 2. Cut from locations directed by the Architect/Engineer, securing in accordance with ASTM C42, and prepare and test in accordance with ASTM C39.
- F. Placement Inspections:
 1. On concrete over 2000 psi, provide continuous or other inspection as required by governmental agencies having jurisdiction.
 2. Throughout progress of concrete placements, make slump tests to verify conformance with specified slump.
 3. Using all required personnel and equipment, throughout progress of concrete placement verify that finished concrete surfaces will have the level of slope that is required by the Contract Documents.

3.05 CONCRETE REINFORCEMENT INSPECTING AND TESTING

- A. Prior to use, test all reinforcement steel bars for compliance with Specific Standards.
 1. Material identified by mill test report, and certified by the testing laboratory, does not require additional testing. Require the supplier to furnish mill test reports to the testing laboratory for certification.
 2. Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as unidentified steel.
- B. Unidentified Steel:
 1. Testing laboratory shall select two samples, each 18 in. long of each size.
 2. Testing laboratory shall make one tensile test and one bend test for each 2-1/2 tons or fraction thereof of each size of unidentified steel.
- C. Provide continuous inspection for all welding of reinforcement steel.

3.06 STRUCTURAL STEEL INSPECTING AND TESTING

- A. Prior to use, test all structural steel for compliance with the specified standards.
 - 1. Material identified by mill test reports, and certified by the testing laboratory, does not require additional testing. Require the supplier to furnish mill test reports to the laboratory for certification.
 - 2. Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as unidentified steel.
- B. Unidentified steel:
 - 1. The testing laboratory shall make one tensile test and one bend test for each 5 tons of fraction thereof of each shape and size of unidentified structural steel.
- C. Shop Welding:
 - 1. Provide qualified testing laboratory inspector approved by County.
 - 2. On single pass welds, inspect after completion of welding and prior to painting.
 - 3. On multiple pass welds, and on butt welds with cover pass on the back side, provide continuous inspection.
- D. Field Welding: Provide continuous inspection by a qualified testing laboratory inspector approved by County.

3.07 POWDER DRIVEN CONCRETE FASTENERS

- A. Use of Powder Driven Concrete Fasteners for tension loads is limited is limited to support of minor loads like acoustical ceilings, duct work, conduit.
- B. Allowable loads:
 - 1. In general, loads should be limited to less than 100 pounds. Greater loads may be permitted for special cases when approved by the checking supervisor or field engineer.
- C. Testing:
 - 1. The operator, tool, and fastener shall be pre-qualified by the Project Inspector, who shall observe the testing of the first 10 fastener installations. A test "pull-out" load of not less than twice the design load, or 200 pounds, whichever is greater, shall be applied to the pin in such a manner as not to resist the spalling tendency of the concrete surrounding the pin. Thereafter, random test under the Project Inspectors supervision shall be made of approximately 1 in 10 pins, except that when the design load exceeds 100 pounds, one half of the pins shall be tested. Should failure occur on any pin tested, all installations must be tested and any pins failing shall be replaced and retested.

3.08 REJECTED WORK

- A. The County and its representatives shall at all times have access for the purpose of inspection to all parts of the Work and the shops wherein the Work is in preparation.
- B. The County and its representatives shall have the right to reject materials and workmanship which are defective or to require their correction.
- C. The County and its representatives, at any time prior to final acceptance of the entire Work, may make an examination of completed Work by requesting the Contractor to furnish all necessary facilities, labor and materials to remove or tear out completed Work.

- D. Work found meeting the requirements of the Contract after removal or tearing out, shall result in additional costs for labor and material being paid by the County.
- E. Rejected workmanship shall be removed for the project, without charge to the County, for examination, reconstruction, and removal.
- F. Rejected workmanship not corrected by the Contractor within a reasonable time, fixed by written notice, may be corrected by County and expense will be deducted by the County from the Contract Sum.

3.09 REPAIR AND PROTECTION

- A. Comply with requirements of Section 01705 Cutting and Patching.
- B. Upon completion of inspection, testing, sample-taking and similar services repair damaged construction and restore substrates and finishes to eliminate deficiencies.
- C. Protect repaired construction and Work exposed by or for quality control service activities.
- D. Repair and protection is the Contractors responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.
- E. Work performed by the Contractor which is not in accordance with the Contract Documents, and which requires remedial action or changing of the final locations of parts of the Work shall require the following action steps:
 - 1. Contractor confirms finding of County within seven days after receipt of County's notice.
 - 2. Contractor hires an independent Consultant to review the construction problem and propose an alternated solution within 14 calendar days after step number 1.
 - 3. Contractor agrees to compensate the County for any expense the County incurs to evaluate the proposed solution.
 - 4. Contractor makes the correction or accepts a negotiated reduction in the Contract sum upon County's approval of non-conforming Work.

3.10 UNCOVERING AND CORRECTION OF WORK

- A. If a portion of the Work is covered contrary to the Architect/Engineer's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect/Engineer, be uncovered for the Architect/Engineer's observation and be replaced at the Contractor's expense without change in the Contract sum or time.
- B. Contractor shall promptly correct Work rejected by the Architect/Engineer and bear costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect/Engineer's services and expenses made necessary due to the correction.

END OF SECTION

SECTION 01 4100

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes:

1. Regulatory requirements applicable to Contract Documents
2. Required provisions under Local Agency Disputes Act
3. Required references under federal law

1.02 GENERAL

A. Compliance with Laws

1. Conform to all applicable codes, Laws, ordinances, rules, and regulations, which shall have full force and effect as though printed in full in these Specifications. Codes, laws, rules, regulations, and ordinances ("**Regulatory Requirements**") are not furnished to Contractor, because Contractor is assumed to be familiar with these requirements.
2. Any listing of Regulatory Requirements for Work in the Contract Documents is supplied to Contractor as a courtesy and shall not limit Contractor's responsibility for complying with all applicable Regulatory Requirements having application to the Work. Where conflict among the Regulatory Requirements or with these Specifications occurs, the most stringent requirements shall be used.
3. Specific reference in the Specifications to applicable Laws and Regulatory Requirements shall mean the latest adopted edition by the regulatory agency in effect at the time of the opening of Bids, except as may be otherwise specifically stated in the Contract Documents.

B. Precedence

1. Where specified requirements differ from Regulatory Requirements, the more stringent requirements shall take precedence. Where Drawings or Specifications require or describe products or execution of better quality, higher standard, or greater size than required by Regulatory Requirements, then Drawings and Specifications shall take precedence so long as such increase is in compliance with Laws and Regulatory Requirements. Where no requirements are identified on Drawings or in Specifications, Contractor shall comply with all Regulatory Requirements of governing authorities having jurisdiction.
2. Should any conditions develop not covered by the Contract Documents wherein the finished Work will not comply with current codes, a Change Order detailing and specifying the required Work shall be submitted to and approved by Owner before proceeding with the Work.

1.03 REGULATORY REQUIREMENTS

A. Applicable Codes

1. Codes that apply to Contract Documents include all current Codes adopted by the County of Kern Building Inspection Department or authority having jurisdiction, applicable to construction, including, but not limited to, the following:
 - a. California Building Code (as amended by applicable local ordinances for all construction work.
 - b. California Green Building Standards Code as amended by applicable local ordinances for all construction work.
 - c. California Electrical Code as amended by applicable local ordinances for all construction work.

- d. California Plumbing Code as amended by applicable local ordinances for plumbing, sewage disposal, and health requirements.
- e. California Mechanical Code as amended by applicable local ordinances for all construction work.
- f. International Fire Code as amended by applicable local ordinances for all construction work.
- g. California Administrative Code Titles 15, 19 and 24 (with California amendments), and Americans with Disabilities Act (ADA) accessibility guidelines, whichever is more stringent.
- h. All State laws and City and County Ordinances, rules of the State or City or County Health Departments, rules of the National Board of Fire Underwriters and National Fire Protection Associations, and local utility company regulations for mechanical and electrical work.

B. Applicable Laws, Statutes, Ordinances, Rules, And Regulations

- 1. During prosecution of Work to be done under Contract Documents, Contractor shall comply with applicable codes, laws, orders, ordinances, rules, and regulations, including, but not limited to, the following:

- a. Federal:

- 1) Americans With Disabilities Act of 1990
- 2) 29 CFR, Section 1910.1001, Asbestos
- 3) 40 CFR, Subpart M, National Emission Standards for Asbestos
- 4) Executive Order 11246
- 5) Federal Endangered Species Act
- 6) Clean Water Act

- b. State of California:

- 1) California Code of Regulations, Titles 5, 8, 17, 19, 21, 22, 24 and 25
- 2) California Public Contract Code
- 3) California Health and Safety Code
- 4) California Government Code
- 5) California Labor Code
- 6) California Civil Code
- 7) California Code of Civil Procedure
- 8) CPUC General Order 95, Rules for Overhead Electric Line Construction
- 9) CPUC General Order 128, Rules for Construction of Underground Electric Supply and Communications Systems
- 10) Cal/OSHA
- 11) OSHA: Hazard Communications Standards
- 12) California Endangered Species Act
- 13) Water Code
- 14) Fish and Game Code

- c. State of California Agencies:

- 1) Regulatory Requirements of State and Consumer Services Agency
- 2) Regulatory Requirements of Office of the State Fire Marshall
- 3) Regulatory Requirements of Office of Statewide Health Planning and Development
- 4) Regulatory Requirements of Department of Fish and Game
- 5) Regulatory Requirements of all Air Quality Management Districts with jurisdiction
- 6) Regulatory Requirements of Department of Water Resources (SWPPP)
- 7) Regulatory Requirements of all Regional Water Quality Control Boards with jurisdiction

- 8) Regulatory Requirements of the Division of the State Architect (if having jurisdiction)
- d. Regulatory Requirements of all Local Agencies with jurisdiction (including, without limitation, cities, counties, and fire departments)

C. Change Orders and Claims:

1. The California Public Contract Code, including but not limited to Section 7105(d)(2), and the California Government Code section 930.2 et seq., apply to all contract procedures for changes, time extensions, change orders (time or compensation), and claims. Federal law (*U.S. v. Holpuch* 326 U.S. 234) shall supplement California law on the enforceability of these requirements.
2. Any change, waiver, or omission to implement contract change order and claim procedures shall have no legal effect unless expressly permitted in a fully executed change order approved by Contractor and Owner and approved as to form by their respective legal counsel.

D. Required Provisions On Contract Claim Resolution

1. The California Public Contract Code specifies required provisions on resolving contract claims less than \$375,000, which are set forth below, and constitute a part of this Contract.
2. For the purposes of this Section 01410, “**Claim**” means a separate demand by Contractor of \$375,000 or less 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 Owner. In order to qualify as a Claim, the written demand must state that it is a Claim submitted under paragraph 12 of Document 00 7200 (General Conditions) and be submitted in compliance with all requirements of Document 00 7200 (General Conditions), paragraph 12. Separate Claims which total more than \$375,000 do not qualify as a “separate demand of \$375,000 or less,” as referenced above, and are not subject to this Section 01410.
3. A voucher, invoice, payment application, or other routine or authorized form of request for payment is not a Claim for purposes of this Section 01410. 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 01410, by submitting a separate Claim in compliance with Contract Documents claim submission requirements.
4. Caution. This Section 01410, does not apply to tort claims and nothing in this Section 01410, 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. Procedure:
 - a. The Claim must be in writing, submitted in compliance with all requirements of Document 00 7200 (General Conditions), paragraph 12, including, but not limited to, the time prescribed by and including the documents necessary to substantiate the Claim, pursuant to Document 00 7200 (General Conditions), paragraph 12.3. Claims must be filed on or before the day of final payment. Nothing in this Section 01410, is intended to extend the time limit or supersede notice requirements for the filing of claims as set forth in Document 00 7200 (General Conditions), paragraph 12 or elsewhere in the Contract Documents.
 - b. For Claims of \$50,000 or less, Owner shall respond in writing within 45 days of receipt of the Claim, or Owner may request in writing within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to any defenses or claims Owner may have against claimant. If additional information is thereafter required, it shall be requested and provided in accordance with this Section 01410, upon mutual agreement of Owner and claimant. Owner’s written response to the Claim, as further documented, shall be submitted to claimant within 15 days after receipt of further documentation or within a period of time no greater

- than taken by claimant in producing the additional information, whichever is greater.
- c. For Claims over \$50,000 and less than or equal to \$375,000: Owner shall respond in writing within 60 days of receipt of the Claim, or Owner may request in writing within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to any defenses or claims Owner may have against claimant. If additional information is thereafter required, it shall be requested and provided in accordance with this Section 01410, upon mutual agreement of Owner and claimant; Owner's written response to the Claim, as further documented, shall be submitted to claimant within 30 days after receipt of further documentation or within a period of time no greater than taken by claimant in producing the additional information, whichever is greater.
 - d. Meet and Confer: If claimant disputes Owner's written response, or Owner fails to respond within the time prescribed above, claimant shall notify Owner, in writing, either within 15 days of receipt of Owner's response or within 15 days of Owner's failure to timely respond, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon demand Owner will schedule a meet and confer conference within 30 days for settlement of the dispute.
 - e. Following the meet and confer conference, if 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 Claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

E. Compliance With Americans With Disabilities Act

1. Contractor acknowledges that, pursuant to the Americans with Disabilities Act ("**ADA**"), programs, services and other activities provided by a public entity to the public, whether directly or through a Contractor, must be accessible to the disabled public. Contractor shall provide the services specified in the Contract Documents in a manner that complies with the ADA and any and all other applicable federal, state, and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits, or activities provided under the Contract Documents and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents, or assigns shall constitute a material breach of the Contract Documents.

F. Compliance With IRCA

1. Contractor acknowledges that Contractor, and all subcontractors hired by Contractor to perform services under this Agreement, are aware of and understand the immigration Reform and Control Act ("**IRCA**"). Contractor is and shall remain in compliance with the IRCA and shall ensure that any subcontractors hired by Contractor to perform services under this Agreement are in compliance with the IRCA. In addition, Contractor agrees to indemnify, defend, and hold harmless Owner, its agents, officers and employees, from any liability, damages, or causes of action arising out of or relating to any claims that Contractor's employees, or employees of any subcontractor hired by Contractor, are not authorized to work in the United States for Contractor or its subcontractor and/or any other claims based upon alleged IRCA violations committed by Contractor or Contractor's subcontractors.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01 4216

DEFINITIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Reference standards, abbreviations, symbols, and definitions used in Contract Documents.
2. Full titles are given in this Section for standards cited in other Sections of Specifications.

1.02 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES; REPORTING AND RESOLVING DISCREPANCIES

A. References

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code, or laws or regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated in the Contract Documents.
2. If during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual, or code or of any instruction of any supplier, Contractor shall report it in writing at once to Owner's Representative and Architect/Engineer, and Contractor shall not proceed with the Work affected thereby until consent to do so is given by Owner.

B. Precedence

1. Except as otherwise specifically stated in the Contract Documents or as may be provided by Change Order or Instruction Bulletin, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. The provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. The provisions of any such laws or regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such law or regulation).
2. No provision of any standard, specification, manual, code, or instruction shall be effective to change the duties and responsibilities of Owner, Owner's Representative, Architect/Engineer or Contractor, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to Owner, Architect/Engineer, or any of their consultants, agents, representatives, or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

C. Referenced Grades, Classes, and Types:

1. Where an alternative or optional grade, class, or type of product or execution is included in a reference but is not identified in Drawings or in Specifications, Contractor shall provide the highest, best, and greatest of the alternatives or options for the intended use and prevailing conditions.

D. Edition Date of References:

1. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of opening Bids.
2. All amendments, changes, errata and supplements as of the effective date shall be included.

E. ASTM and ANSI References: Specifications and Standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision, or amendment. It is presumed that Contractor is familiar with and has access to these nationally- and industry-recognized specifications and standards.

1.03 DEFINITIONS

A. Meaning of Words and Phrases

Wherever any of the words or phrases defined below, or a pronoun used in place thereof, is used in any part of the Contract Documents, it shall have the meaning here set forth. Where abbreviations and symbols are used, such abbreviations and symbols shall be given their common meaning in the construction industry. In the Contract Documents, the neuter gender includes the feminine and masculine, and the singular number includes the plural.

While Owner has made an effort to identify all defined terms with initial caps, the following definitions shall apply regardless of case unless the context otherwise requires:

1. Addenda: Written or graphic instruments issued prior to the opening of Bids, which clarify, correct, or change the bidding requirements or the Contract Documents. Addenda shall not include the minutes of the Pre-Bid Conference and/or Site Visit.
2. Agreement (Document 00 5200): Agreement is the basic Contract Document that binds the parties to construction Work. Agreement defines relationships and obligations between Owner and Contractor and by reference incorporates Conditions of Contract, Drawings, and Specifications and contains Addenda and all Modifications subsequent to execution of Contract Documents.
3. Alternate: Work added to or deducted from the base Bid, if accepted by Owner.
4. Application for Payment: Written application for monthly or periodic progress or final payment made by Contractor complying with the Contract Documents.
5. Approved Equal: Approved in writing by Owner as being of equivalent quality, utility and appearance.
6. Architect/Engineer: If used elsewhere in the Contract Documents, "Architect/Engineer" shall mean a person (or that person's firm) holding a valid California State Architect's or Engineer's license representing the Owner in the administration of the Contract Documents. Architect/Engineer may be an employee of or an independent consultant to Owner. When Architect/Engineer is referred to within the Contract Documents and not an employee of Owner, Architect/Engineer shall be construed to include employees of Architect/Engineer and/or employees that Architect/Engineer supervises. When the designated Architect/Engineer is an employee of Owner, his or her authorized representatives on the Project will be included under the term Architect/Engineer. If Architect/Engineer is an employee of Owner, Architect/Engineer is the beneficiary of all Contractor obligations to Owner, including without limitation, all releases and indemnities. Architect/Engineer may also be referred to as Architect or Engineer.
7. Asbestos: Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by OSHA or Cal/OSHA.
8. As-Built/s: Construction Drawings and/or Record Drawings revised during the course construction to show changes to construction, materials, locations, type and size of items installed, deviations from original drawings and design, typically noted by the contractor on

- the permit set, mark-up set of drawings provided by the contractor or Architect. Refer to Project Record Documents.
9. Bid: The offer or proposal of the Bidder submitted on the prescribed form(s) setting forth the prices for the Work to be performed.
 10. Bidder: One who submits a Bid.
 11. Bidding Documents: All documents comprising the Project Manual (including all documents and Specification Sections listed in the Table of Contents), including documents supplied for bidding purposes only and Contract Documents.
 12. BIT – Component 3 of a Cost Proposal addressing Measurement and Payment of Bonds, Insurance and Taxes. See Document 01205 Modification Procedures.
 13. BMP (Best Management Practices) – Related to implementation of a SWPPP, the measures and methods undertaken to implement a Stormwater Pollution and Prevention Plan on a project site.
 14. Board: The governing body of the Owner.
 15. Business or Working (Work) Day: Any Day other than Saturday, Sunday, and the following days that have been designated as holidays by Owner. If a holiday falls on a Saturday, the preceding Friday will be the holiday. If a holiday falls on a Sunday, the following Monday will be the holiday.
 - a. New Year's Day, January 1;
 - b. Martin Luther King Jr.'s Birthday, third Monday in January;
 - c. Lincoln's Birthday, February 12;
 - d. Presidents' Day, third Monday in February;
 - e. Cesar Chavez Day, March 31;
 - f. Memorial Day, last Monday in May;
 - g. Independence Day, July 4;
 - h. Labor Day, first Monday in September;
 - i. Columbus Day, second Monday in October;
 - j. Veterans' Day, November 11;
 - k. Thanksgiving Day, as designated by the President;
 - l. The Day following Thanksgiving Day;
 - m. Christmas Day, December 25; and
 - n. Each day appointed by the Governor of California and formally recognized by the Governing Board as a day of mourning, thanksgiving, or special observance.
 16. By Others: Work that is outside scope of Work to be performed by Contractor under this Contract, which will be performed by Owner, other contractors, or other means.
 17. By Owner: Work that will be performed by Owner or its agents at the Owner's expense.
 18. Change Order ("CO"): A written instrument prepared by Owner and signed by Owner and Contractor, stating their agreement upon all of the following:
 - a. a change in the Work;
 - b. the amount of the adjustment in the Contract Sum, if any; and
 - c. the amount of the adjustment in the Contract Time, if any.
 19. Closeout Documents: submitted documents or product data with one hard copy and electronic copy included but not limited to Warranty Forms, Air Balance Reports, Outstanding Submittals, Operation and Maintenance Manuals, Start Up attendance sheets, shop drawings, as-builts and other pertinent project documents. Refer to Contract Closeout section and Project Record Documents for additional information.
 20. Code: All Codes specified by law or applicable governing agency.
 21. Code Inspector: A local or state agency responsible for the enforcement of applicable codes and regulations.
 22. Concealed: Work not exposed to view in the finished Work, including within or behind various construction elements.

23. Contract Amount: a change order price, line item price, Contract Sum, or other price assigned to a scope of work.
24. Contract Conditions or Conditions of the Contract: Consists of two parts: General Conditions and Supplementary Conditions.
 - a. General Conditions are general clauses that are common to the Owner Contracts, including **Document 00 7200** (General Conditions).
 - b. Supplementary Conditions modify or supplement General Conditions to meet specific requirements for Contract Documents.
25. Contract Documents and Contract: Contract Documents and Contract shall consist of the documents identified as the Contract Documents in **Document 00 5200** (Agreement), Plans and Specifications, plus all changes, Addenda, and modifications thereto.
26. Contract Modification: Either:
 - a. a written amendment to Contract signed by Contractor and Owner; or
 - b. a Change Order; or
 - c. a written directive for a minor change in the Work issued by Owner.
27. Contract Sum: The sum stated in the Agreement and, including authorized adjustments, the total amount payable by Owner to Contractor for performance of the Work and the Contract Documents. The Contract Sum is also sometimes referred to as the Contract Price or the Contract Amount.
28. Contract Time: The number or numbers of Days or the dates stated in the Agreement to achieve Final Completion of the Work or designated Milestones; and/or to achieve Final Completion of the Work so that it is ready for final payment and is accepted.
29. Contractor: The person or entity identified as such in the Agreement and referred to throughout the Contract Documents as if singular in number and neutral in gender. The term "Contractor" means the Contractor or its authorized representative.
30. Contractor's Employees: Persons engaged in execution of Work under Contract as direct employees of Contractor, as Subcontractors, or as employees of Subcontractors.
31. Cost Proposal: A cost estimate for an increase or decrease in Contract Sum relative to a Contract Modification. All cost proposals shall be submitted on the form included in Document 01205 Modifications Procedures.
32. Day: One calendar day of 24 hours measured from midnight to the next midnight, unless the word "day" is specifically modified to the contrary.
33. Defective: An adjective which, when modifying the word "Work," refers to Work that is unsatisfactory or unsuited for the use intended, faulty, or deficient, that does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents (including but not limited to approval of Samples and "or equal" items), or has been damaged prior to final payment (unless responsibility for the protection thereof has been assumed by Owner). Unapproved substitutions are defective. Owner is the judge of whether Work is Defective.
34. Division of State Architect: A division of the State of California providing, design and construction oversight for K-12 schools and community colleges, and developing and maintaining accessibility standards and codes utilized in public and private buildings throughout the State of California.
35. Drawings: The graphic and pictorial portions of Contract Documents, wherever located and whenever issued, showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.
36. Equal: Equal in opinion of Owner. Burden of proof of equality is responsibility of Contractor.
37. Exposed: Work exposed to view in the finished Work, including behind louvers, grilles, registers and various other construction elements.

38. Final Acceptance or Final Completion: Owner's acceptance of the Work as satisfactorily completed in accordance with Contract Documents. Requirements for Final Acceptance/Final Completion include, but are not limited to:
- a. Final cleaning is completed.
 - b. All systems having been tested and accepted as having met requirements of Contract Documents.
 - c. All required instructions and training sessions having been given by Contractor.
 - d. All Project Record Documents having been submitted by Contractor, reviewed by Owner, and accepted by Owner.
 - e. All punch list Work, as directed by Owner, having been completed by Contractor.
 - f. Generally, all Work, except Contractor maintenance after Final Acceptance/Final Completion, having been completed to satisfaction of Owner.
39. Force Account: Work directed to be performed without prior agreement as to lump sum or unit price cost thereof, and which is to be billed at cost for labor, materials, equipment, taxes, and other costs, plus a specified percentage for overhead and profit.
40. Furnish: Supply only, do not install.
41. Indicated: Shown or noted on the Drawings.
42. Install: Install or apply only, do not furnish.
43. Instruction Bulletin ("IB"): A document consisting of supplementary details, instructions, or information issued by Owner that clarifies or supplements Contract Documents, and with which Contractor shall comply. Instruction Bulletins may also order alterations or Modifications that do not result in change in Contract Sum or Contract Time, and do not substantially change Drawings or Specifications. Instruction Bulletins do not constitute changes in Contract Sum or Contract Time except as otherwise agreed in writing by Owner.
44. Latent: Not apparent by reasonable inspection, including but not limited to, the inspections and research required as a condition to bidding under **Document 00 7200** (General Conditions).
45. Law: Unless otherwise limited, all applicable laws including without limitation all federal, state, and local laws, statutes, standards, rules, regulations, ordinances, and judicial and administrative decisions.
46. LEMS: Component 1 of a Cost Proposal addressing Measurement and Payment of Labor, Equipment, Material and Subcontractors. See Document 01205 Modification Procedures.
47. Material: This word shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise), and any other classes of material to be furnished in connection with Contract, except where a more limited meaning is indicated by context.
48. Milestone: A principal event specified in Contract Documents relating to an intermediate completion date or time prior to Final Completion of all Work.
49. Modification: Same as Contract Modification.
50. Not in Contract or "NIC": Work that is outside the scope of Work to be performed by Contractor under Contract Documents.
51. Notice of Completion: Shall have the meaning provided in California Civil Code §3093, and any successor statute.
52. Off Site: Outside geographical location of the Project.
53. Owner: Owner is defined in **Document 00 5200** (Agreement).
54. Owner-Furnished, Contractor Installed: Items furnished by Owner at its cost for installation by Contractor at its cost under Contract Documents.
55. Owner's Representative(s): **See Document 00 5200** (Agreement).
56. Partial Utilization: Use by Owner of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Final Completion of all of the Work.

- 57. PCBs: Polychlorinated biphenyls.
- 58. Phase: A specified portion of the Work (if any) specifically identified as a Phase in **Document 00 5200** (Agreement) or **Document 01100** (Summary of Work).
- 59. Product Data: That information (brochures, catalog sheets, manufacturer's cut sheets, etc.) supplied by vendors having technical and commercial characteristics of the supplied equipment or materials and accompanying commercial terms such as warranties, instructions, and manuals.
- 60. Progress Report: A periodic report submitted by Contractor to Owner with progress payment invoices accompanying progress schedule. See **Document 00 7200** (General Conditions).
- 61. Progress Schedule (Schedule):
 - a. Baseline Progress Schedule: The first progress schedule submittal from the Contractor and reviewed by Owner, with no exceptions taken.
 - b. Progress Schedule: All subsequent schedule submissions after the Baseline Progress Schedule showing proposed and actual times or durations from start to completion of various work and milestones or elements of installation on the project.
- 62. Project: Total construction of which Work performed under Contract Documents may be whole or part.
- 63. Project Manager: If used elsewhere in the Contract Documents, "Project Manager" shall mean a person representing the Owner in the administration of the Contract Documents. Project Manager may be an employee of or an independent consultant to Owner. When Project Manager is referred to within the Contract Documents and no Project Manager has in fact been designated, then the matter shall be referred to Owner. The term Project Manager shall be construed to include employees of Project Manager and/or employees that Project Manager supervises. When the designated Project Manager is an employee of Owner, his or her authorized representatives on the Project will be included under the term Project Manager. If Project Manager is an employee of Owner, Project Manager is the beneficiary of all Contractor obligations to Owner, including without limitation, all releases and indemnities.
- 64. Project Manual: Project Manual consists of Bidding Requirements, Agreement, Bonds, Certificates, Contract Conditions, Drawings, and Specifications.
- 65. Project Record Documents: All Project deliverables required under the Contract Documents, including without limitation, as-built drawings; Installation, Operation, and Maintenance Manuals, Machine Inventory Sheets, finalized Job Card, Title 24 documents, Warranty forms, Certificate of Occupancy, Fire Inspection forms, air Balance Reports, and Equipment Start up Forms from manufacturers.
- 66. Provide: Furnish and install.
- 67. Request for Information ("RFI"): A document prepared by Contractor requesting information regarding the Project or Contract Documents. The RFI system is also a means for Owner to submit Contract Document clarifications or supplements to Contractor.
- 68. Samples: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
- 69. Shop Drawings: All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
- 70. Shown: As indicated on Drawings.
- 71. Site: The particular geographical location of Work performed pursuant to the Contract Documents.
- 72. Specifications: The written portion of the Contract Documents consisting of requirements for materials, equipment, construction systems, standards, and workmanship for the Work; performance of related services.
- 73. Specified: As written in Specifications.

74. Standard Specifications: The most recent edition of the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, insofar as the same may apply and in accordance with the Specifications.
75. Subcontractor: A person or entity that has a direct contract with Contractor to perform a portion of the Work at the Site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and neutral in gender and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.
76. Submittal/s: Documentation, physical or electronic, correspondence submitted by the contractor/builder to the Architect/Engineer for consideration, decision, review, and/or approval of information, product data, drawings, samples etc.
77. SWPPP (Storm Water Pollution and Prevention Plan) – Plan to mitigate storm water quality and discharges from the construction site.
78. Testing and special inspection agency: An independent entity engaged to inspect and/or test the workmanship, materials, or manner of construction of buildings or portions of buildings, to determine if such construction complies with the Contract Documents and applicable codes.
79. Time Impact Evaluation ("TIE"): An evaluation of the impact of an issue to the project schedule.
80. 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.
81. Unit Price Work: Shall be the portions of the Work for which a unit price is provided in **Document 00 5200 (Agreement)** or **Section 01100 (Summary of Work)**.
82. Work: The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents within the Contract Time. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents including everything shown in the Drawings and set forth in the Specifications. Wherever the word "work" is used, rather than the word "Work," it shall be understood to have its ordinary and customary meaning.

B. Other Defined Terms

The following terms are not necessarily identified with initial caps; however, they shall have the meaning set forth below:

1. Wherever words "as directed," "as required," "as permitted," or words of like effect are used, it shall be understood that direction, requirements, or permission of Owner is intended. Words "sufficient," "necessary," "proper," and the like shall mean sufficient, necessary, or proper in judgment of Owner. Words "approved," "acceptable," "satisfactory," "favorably reviewed," or words of like import, shall mean approved by, or acceptable to, or satisfactory to, or favorably reviewed by Owner.
2. Wherever the word "may" or "ought" is used, the action to which it refers is discretionary. Wherever the word "shall" or "will" is used, the action to which it refers is mandatory.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 014524
SPECIAL INSPECTION, SPECIAL TESTS, AND STRUCTURAL OBSERVATION

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES: THIS SECTION DESCRIBES THE REQUIREMENTS FOR PROVIDING SPECIAL INSPECTION, SPECIAL TESTS, AND STRUCTURAL OBSERVATION.
- B. RELATED SECTIONS:
 - 1. SECTION 014000 – QUALITY REQUIREMENTS.
 - 2. SECTION 018102 - SEISMIC DESIGN CRITERIA.

1.02 REFERENCES

- A. AMERICAN CONCRETE INSTITUTE (ACI):
 - 1. ACI 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE.
 - 2. ACI 530 - BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES.
 - 3. ACI 530.1 - SPECIFICATION FOR MASONRY STRUCTURES.
- B. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
 - 1. AISC 360 - SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.
- C. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE):
 - 1. ASCE 7 - MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.
- D. AMERICAN WELDING SOCIETY (AWS):
 - 1. AWS D1.1 - STRUCTURAL WELDING CODE - STEEL.
 - 2. AWS D1.3 - STRUCTURAL WELDING CODE - SHEET STEEL.
 - 3. AWS D1.4 - STRUCTURAL WELDING CODE - REINFORCING STEEL.
- E. ASTM INTERNATIONAL (ASTM):
 - 1. C 31 - STANDARD PRACTICE FOR MAKING AND CURING CONCRETE TEST SPECIMENS IN THE FIELD.
 - 2. C 140 - STANDARD TEST METHODS FOR SAMPLING AND TESTING CONCRETE MASONRY UNITS AND RELATED UNITS.
 - 3. C 172 - STANDARD PRACTICE FOR SAMPLING FRESHLY MIXED CONCRETE.
 - 4. C 270 - STANDARD SPECIFICATION FOR MORTAR FOR UNIT MASONRY.
 - 5. C 780 - STANDARD TEST METHOD FOR PRECONSTRUCTION AND CONSTRUCTION EVALUATION OF MORTARS FOR PLAIN AND REINFORCED UNIT MASONRY.
 - 6. C 1019 - STANDARD TEST METHOD FOR SAMPLING AND TESTING GROUT.
 - 7. C 1314 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF MASONRY PRISMS.

1.03 DEFINITIONS

- A. SPECIAL INSPECTION: INSPECTION OF THE MATERIALS, INSTALLATION, FABRICATION, ERECTION, OR PLACEMENT OF COMPONENTS AND CONNECTIONS REQUIRING SPECIAL EXPERTISE TO ENSURE COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS AND REFERENCED STANDARDS.
- B. SPECIAL INSPECTION, CONTINUOUS: THE FULL-TIME OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION BY AN APPROVED SPECIAL INSPECTOR WHO IS PRESENT IN THE AREA WHERE THE WORK IS BEING PERFORMED.
- C. SPECIAL INSPECTION, PERIODIC: THE PART-TIME OR INTERMITTENT OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION BY AN APPROVED SPECIAL INSPECTOR WHO IS PRESENT IN THE AREA WHERE THE WORK IS BEING PERFORMED AND AT THE COMPLETION OF THE WORK.
- D. STRUCTURAL OBSERVATION: THE VISUAL OBSERVATION OF THE STRUCTURAL SYSTEM BY A REGISTERED DESIGN PROFESSIONAL FOR GENERAL CONFORMANCE TO THE APPROVED CONSTRUCTION DOCUMENTS AT SIGNIFICANT CONSTRUCTION STAGES AND AT COMPLETION OF THE STRUCTURAL SYSTEM.

1.04 DESCRIPTION

- A. THIS SECTION DESCRIBES SPECIAL TESTS, SPECIAL INSPECTIONS, AND STRUCTURAL OBSERVATION OF STRUCTURAL ASSEMBLIES AND COMPONENTS TO BE PERFORMED IN COMPLIANCE WITH THE 2022 CALIFORNIA BUILDING CODE.
- B. THESE SPECIAL TESTS, SPECIAL INSPECTIONS, AND STRUCTURAL OBSERVATIONS ARE IN ADDITION TO THE REQUIREMENTS SPECIFIED IN SECTION 014517, AND BY THE INDIVIDUAL SECTIONS.

1.05 SPECIAL INSPECTION

- A. THE OWNER WILL EMPLOY ONE OR MORE SPECIAL INSPECTORS WHO WILL PROVIDE SPECIAL INSPECTIONS DURING CONSTRUCTION.
 - 1. SPECIAL INSPECTORS SHALL BE QUALIFIED FOR INSPECTION OF THE PARTICULAR TYPE OF MATERIALS OR OPERATIONS REQUIRING SPECIAL INSPECTION.
- B. DUTIES OF SPECIAL INSPECTOR:
 - 1. GENERAL: REQUIRED DUTIES OF THE SPECIAL INSPECTOR SHALL BE AS DESCRIBED IN CHAPTER 17 OF THE 2022 CALIFORNIA BUILDING CODE AND AS DESCRIBED IN THIS SECTION.
 - 2. REPORTING: SPECIAL INSPECTOR SHALL PROVIDE REPORTS OF EACH INSPECTION TO THE CONSTRUCTION MANAGER. CONSTRUCTION MANAGER SHALL DISTRIBUTE COPIES OF INSPECTION REPORTS TO THE OWNER.
 - a. REPORTS SHALL, AT A MINIMUM, INDICATE THE FOLLOWING ITEMS:
 - 1) DATE AND TIME OF INSPECTION, AND NAME(S) OF INDIVIDUAL(S) PERFORMING THE INSPECTION.
 - 2) STRUCTURES AND AREAS OF THE STRUCTURE WHERE WORK OR TESTING WAS OBSERVED.
 - 3) DISCREPANCIES BETWEEN THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND THE WORK OR TESTING OBSERVED.
 - 4) OTHER AREAS OF DEFICIENCY IN THE WORK.
- C. SPECIAL INSPECTIONS SHALL NOT BE CONSTRUED AS FULFILLING THE REQUIREMENTS FOR STRUCTURAL OBSERVATION.

1.06 TESTING

- A. TESTING LABORATORY: SPECIAL TESTS WILL BE PERFORMED BY THE OWNER'S TESTING LABORATORY AS SPECIFIED IN SECTION 014517.
- B. SELECTION OF THE MATERIAL TO BE TESTED SHALL BE BY THE ENGINEER AND/OR CONSTRUCTION MANAGER OR BY THE OWNER'S TESTING LABORATORY, AND NOT BY THE CONTRACTOR.

1.07 STRUCTURAL OBSERVATION

- A. THE OWNER WILL EMPLOY 1 OR MORE REGISTERED DESIGN PROFESSIONALS WHO WILL PROVIDE STRUCTURAL OBSERVATION DURING CONSTRUCTION.
 - 1. THE REGISTERED DESIGN PROFESSIONAL SHALL BE A CIVIL OR STRUCTURAL ENGINEER CURRENTLY LICENSED AS SUCH IN THE STATE OF CALIFORNIA AND REGULARLY ENGAGED IN THE STRUCTURAL DESIGN OF STRUCTURES EQUIVALENT OR SIMILAR TO THOSE SHOWN ON THE DRAWINGS.
- B. STRUCTURAL OBSERVATIONS SHALL NOT BE CONSTRUED AS FULFILLING THE REQUIREMENTS FOR SPECIAL INSPECTIONS.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SPECIAL TESTING AND INSPECTIONS

- A. THE FOLLOWING TYPES OF WORK REQUIRE SPECIAL INSPECTION AS DESCRIBED IN SECTION 1705 OF THE 2022 CALIFORNIA BUILDING CODE AND SHALL BE PROVIDED WHEREVER SUCH WORK OCCURS UNLESS OTHERWISE SPECIFIED. REFER TO THE FOLLOWING SCHEDULES:
 - 1. APPENDIX A, CONCRETE SPECIAL INSPECTION SCHEDULE.
 - 2. APPENDIX B, ESSENTIAL ARCHITECTURAL, MECHANICAL, AND ELECTRICAL SPECIAL INSPECTION SCHEDULE.
 - 3. APPENDIX C, LEVEL B MASONRY SPECIAL INSPECTION SCHEDULE.
 - a. PROVIDE FOR ALL MASONRY CONSTRUCTION, UNLESS OTHERWISE SPECIFIED.
 - 4. APPENDIX D, LEVEL C, MASONRY SPECIAL INSPECTION SCHEDULE.
 - a. PROVIDE FOR ALL RISK CATEGORY IV STRUCTURES WHERE MASONRY CONSTRUCTION OCCURS. REFER TO SECTION 018102 FOR RISK CATEGORY CLASSIFICATION OF STRUCTURES/FACILITIES.
 - 5. APPENDIX E, SOILS VERIFICATION AND INSPECTION SCHEDULE.
 - 6. APPENDIX F, STRUCTURAL STEEL WELDING SPECIAL INSPECTION SCHEDULE.
 - 7. APPENDIX G, STRUCTURAL STEEL BOLTING SPECIAL INSPECTION SCHEDULE.
 - 8. APPENDIX H. STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL SPECIAL INSPECTION SCHEDULES.
- B. TESTING AND QUALIFICATION FOR SEISMIC RESISTANCE (SECTION 1705.12 OF THE REGULATORY BUILDING CODE):
 - 1. THE FOLLOWING DESIGNATED SYSTEMS SHALL BE SUBJECT TO THE TESTING AND QUALIFICATION REQUIREMENTS OF SECTION 1705.12.3 OF THE REGULATORY BUILDING CODE AND SHALL REQUIRE SPECIAL CERTIFICATION AS SET FORTH IN ASCE 7, SECTION 13.2:
 - a. MECHANICAL EQUIPMENT WITH AN IMPORTANCE FACTOR OF 1.50 PER SECTION 018102.

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- b. ALL ELECTRICAL EQUIPMENT.
- 2. SEISMIC CERTIFICATION REQUIREMENTS FOR DESIGNATED SYSTEMS:
 - a. SUBMITTALS FOR MECHANICAL AND ELECTRICAL EQUIPMENT IDENTIFIED HEREIN AS DESIGNATED SYSTEMS SHALL INCLUDE CERTIFICATION THAT THE EQUIPMENT IS SEISMICALLY QUALIFIED. CERTIFICATIONS SHALL BE SUBJECT TO REVIEW AND ACCEPTANCE BY THE CONSTRUCTION MANAGER.
 - 1) CERTIFICATIONS MAY BE AT LEAST ONE OF THE FOLLOWING PER ASCE 7, SECTION 13.2:
 - a) ANALYSIS.
 - b) TESTING.
 - c) EXPERIENCE DATA.
 - b. THE SPECIAL INSPECTOR SHALL EXAMINE THE DESIGNATED SEISMIC SYSTEM AND DETERMINE WHETHER THE DESIGNATED SYSTEM COMPONENTS, INCLUDING ANCHORAGE, CONFORM TO THE EVIDENCE OF COMPLIANCE SUBMITTED.

3.02 STRUCTURAL OBSERVATION

- A. THE FOLLOWING WORK REQUIRES STRUCTURAL OBSERVATION IN ACCORDANCE WITH SECTION 1704.5 OF THE REGULATORY BUILDING CODE:
 - 1. ALL STRUCTURES IN ALL AREAS:
 - a. BUILDING FOUNDATIONS.
 - b. BUILDING WALLS AND COLUMNS.
 - c. BUILDING ROOF FRAMING AND DIAPHRAGMS.

3.03 OTHER SPECIFIC TESTS

- A. MASONRY SHALL BE TESTED IN ACCORDANCE WITH THE REGULATORY BUILDING CODE.
 - 1. MINIMUM STRENGTH OF UNITS SHALL BE TESTED IN ACCORDANCE WITH ASTM C 140.
 - 2. MINIMUM STRENGTH OF GROUT SHALL BE TESTED IN ACCORDANCE WITH ASTM C 1019.
 - 3. PRIOR TO CONSTRUCTION, OBTAIN SAMPLES OF THE AGGREGATES, ADDITIVES, AND WATER; MIX AND TEST IN LABORATORY IN ACCORDANCE WITH ASTM C 270.
 - 4. DURING CONSTRUCTION, SAMPLE AND TEST MASONRY FOR CONSISTENCY PRIOR TO USE ON EACH STRUCTURE IN ACCORDANCE WITH ASTM C 780.
 - 5. WHEN APPROVED BY THE BUILDING OFFICIAL, IF INSTALLED MASONRY DOES NOT MEET REQUIREMENTS, CONDUCT PRISM TESTS IN ACCORDANCE WITH ASTM C 1314.
- B. PLASTIC SKYLIGHT ASSEMBLIES AND OTHER UNUSUAL MATERIALS THAT ARE EXPECTED TO SUPPORT DESIGN LIVE LOADS.

3.04 SCHEDULE

- A. THE CONTRACTOR SHALL ALLOW TIME NECESSARY FOR SPECIAL INSPECTIONS AS LISTED ABOVE.
- B. SUFFICIENT NOTICE SHALL BE GIVEN SO THAT THE SPECIAL INSPECTIONS CAN BE PERFORMED. THIS INCLUDES TIME FOR OFF-SITE SPECIAL INSPECTORS TO PLAN THE INSPECTION AND TRAVEL TO SITE.

3.05 PROCEDURE

- A. THE SPECIAL INSPECTOR WILL IMMEDIATELY NOTIFY THE ENGINEER OF ANY CORRECTIONS

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REQUIRED AND FOLLOW NOTIFICATION WITH APPROPRIATE DOCUMENTATION.

- B. THE CONTRACTOR SHALL NOT PROCEED UNTIL THE WORK IS SATISFACTORY TO THE ENGINEER.

END OF SECTION

APPENDIX A

CONCRETE SPECIAL INSPECTION SCHEDULE

Type	Reference Standard	Frequency of Inspection ⁽¹⁾	
		Continuous Special Inspection	Periodic Special Inspection
1. Inspection of reinforcing steel, including prestressing tendons, and placement.	ACI 318: Ch. 20, 25.2, 25.3, 26.5-1-26.5.3		X
2. Reinforcing bar welding: a. Verify weldability of reinforcing bars other than ASTM A706; b. Inspect single-pass fillet welds, maximum 5/16"; c. Inspect all other welds.	AWS D1.4 ACI 318 26.5.4	 X	X X
3. Inspect anchors cast in concrete.	ACI 318: 17.8.2		X
4. Inspect anchors post-installed in hardened concrete members. a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads. b. Mechanical anchors and adhesive anchors not defined in 4a.	ACI 318: 17.8.2.4 ICC-ES Report(s) ACI 318: 17.8.2 ICC-ES Report(s)	X 	 X
5. Verifying use of required design mix.	ACI 318: Ch. 19, 26.4.3, 26.4.4		X
6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	ASTM C 172 ASTM C 31 ACI 318: 26.4.5, 26.12	X	
7. Inspect concrete and shotcrete placement for proper application techniques.	ACI 318: 26.4.5	X	
8. Verify maintenance of specified curing temperature and techniques.	ACI 318: 26.4.7-26.4.9		X
9. Inspect prestressed concrete for: a. Application of prestressing forces; and b. Grouting of bonded prestressing tendons.	ACI 318: 26.9.2.1 ACI 318: 26.9.2.3	X	

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10. Inspect erection of precast concrete members.	ACI 318: Ch 26.8		X
11. Verify in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	ACI 318: 26.10.2		X
12. Inspect formwork for shape, location, and dimensions of the concrete member being formed.	ACI 318: 26.10.1(b)		X

(1) The "X" represents a required inspection activity for the project where it occurs.

APPENDIX B

ESSENTIAL ARCHITECTURAL, MECHANICAL, AND ELECTRICAL

SPECIAL INSPECTION SCHEDULE

Type	Reference Standard	Frequency of Inspection ⁽¹⁾	
		Continuous Special Inspection	Periodic Special Inspection
1. Suspended ceiling system including anchorage.			
2. Anchorage of all electrical equipment. X			X
3. Anchorage of other electrical or mechanical equipment over 400 lb. on floors or roofs.			X
4. Anchorage of ducts greater than 6 s.f. in cross-section.			X
5. Installation and anchorage of pipelines greater than 8 inches in diameter.			X
6. Installation and anchorage of pipelines carrying hazardous chemicals and their associated mechanical units/pumps.			X
7. Installation and anchorage of ductwork designed to carry hazardous materials.			
8. Elevator installation.			
9 Wall cladding/veneer for wind and seismic resistance.			

(1) The "X" represents a required inspection activity for the project where it occurs.

APPENDIX C

LEVEL B - MASONRY SPECIAL INSPECTION SCHEDULE

Type	Reference Standard	Frequency of Inspection	
		Continuous Special Inspection	Periodic Special Inspection
1. Verify compliance with the approved submittals.	ACI 530.1: Art. 1.5		X
2. As masonry construction begins, verify that the following are in compliance:			
a. Proportions of site-prepared mortar.	ACI 530.1: Art. 2.1, 2.6A		X
b. Construction of mortar joints.	ACI 530.1: Art. 3.3B		X
c. Grade and size of prestressing tendons and anchorage.	ACI 530.1: Art. 2.4B, 2.4H		
d. Location of reinforcement, connectors, and prestressing tendons and anchorages.	ACI 530.1: Art. 3.4, 3.6A		X
e. Prestressing technique.	ACI 530.1: Art. 3.6B		
f. Properties of thin-bed mortar for AAC masonry.	ACI 530.1: Art. 2.1C		
3. Prior to grouting, verify that the following are in compliance:			
a. Grout space.	ACI 530.1: Art. 3.2D, 3.2F		X
b. Grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages.	ACI 530.1: Art. 2.4, 3.4, ACI 530: Sec. 1.16		X
c. Placement of reinforcement, connectors, and prestressing tendons and anchorages.	ACI 530.1: Art. 3.2E, 3.4, 3.6A ACI 530: Sec. 1.16		X
d. Proportions of site-prepared grout and prestressing grout for bonded tendons.	ACI 530.1: Art. 2.6B, 2.4G.1.b	X	
e. Construction of mortar joints.	ACI 530.1: Art. 3.3B		X
4. Verify during construction:			
a. Size and location of structural elements:	ACI 530.1: Art. 3.3F		X
b. Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.	ACI 530: Sec. 1.16.4.3, 1.17.1		X
c. Welding of reinforcement.	ACI 530: Sec. 2.1.7.7.2, 3.3.3.4(c), 8.3.3.4(b)	X	
d. Preparation, construction, and protection of masonry during cold weather (temperature below 40 degrees F) or hot weather (temperature above 90 degrees F).	ACI 530.1: Art. 1.8C, 1.8D		X
e. Application and measurement of prestressing force.	ACI 530.1: Art. 3.6B		
f. Placement of grout and prestressing grout for bonded tendons is in compliance.	ACI 530.1: Art. 3.5, 3.6C	X	
g. Placement of AAC masonry units and construction of thin-bed mortar joints.	ACI 530.1: Art. 3.3 B.8		
5. Observe preparation of grout specimens, mortar specimens, and/or prisms.	ACI 530.1: Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4		X

(1) The "X" represents a required inspection activity for the project where it occurs.

APPENDIX D

LEVEL C - MASONRY SPECIAL INSPECTION SCHEDULE

Type	Reference Standard	Frequency of Inspection	
		Continuous Special Inspection	Periodic Special Inspection
1. Verify compliance with the approved submittals.	ACI 530.1: Art. 1.5		X
2. Verify that the following are in compliance:			
a. Proportions of site-mixed mortar, grout and prestressing grout for bonded tendons.	ACI 530.1: Art. 2.1, 2.6A, 2.6B, 2.6C, 2.4 G.1.b		X
b. Grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages.	ACI 530.1: Art. 2.4, 3.4 ACI 530: Sec. 1.16		X
c. Placement of masonry units and construction of mortar joints.	ACI 530.1: Art. 3.3B		X
d. Placement of reinforcement, connectors, and prestressing tendons and anchorages.	ACI 530.1: Art. 3.2E, 3.4, 3.6A ACI 530: Sec. 1.16	X	
e. Grout space prior to grouting.	ACI 530.1: Art. 3.2D, 3.2F	X	
f. Placement of grout and prestressing grout for bonded tendons.	ACI 530.1: Art. 3.5, 3.6C	X	
g. Size and location of structural elements.	ACI 530.1: Art. 3.3F		X
h. Type, size, and location of anchors including other details of anchorage of masonry to structural members, frames, or other construction.	ACI 530: Sec. 1.16.4.3, 1.17.1	X	
i. Welding of reinforcement.	ACI 530: Sec. 2.1.7.7.2, 3.3.3.4(c), 8.3.3.4(b)	X	
j. Preparation, construction, and protection of masonry during cold weather (temperature below 40 degrees F) or hot weather (temperature above 90 degrees F).	ACI 530.1: Art. 1.8C, 1.8D		X
k. Application and measurement of prestressing force.	ACI 530.1: Art. 3.6B		
l. Placement of AAC masonry units and construction of thin-bed mortar joints. ACI 530.1: Art. 3.3 B.8 m. Properties of thin-bed mortar for AAC masonry.	ACI 530.1: Art. 2.1 C.1		
3. Observe preparation of grout specimens, mortar specimens, and/or prisms.	ACI 530.1: Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4	X	

(1) The "X" represents a required inspection activity for the project where it occurs.

APPENDIX E

SOILS VERIFICATION AND INSPECTION SCHEDULE

Type	Reference Standard	Frequency of Inspection	
		Continuous Special Inspection	Periodic Special Inspection
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.			X
2. Verify excavations are extended to proper depth/extent and have reached proper material.			X
3. Perform classification and testing of compacted fill materials.			X
4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of compacted fill.		X	
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.			X

(1) The "X" represents a required inspection activity for the project where it occurs.

APPENDIX F

STRUCTURAL STEEL WELDING SPECIAL INSPECTION SCHEDULE

Type	Reference Standard	Frequency of Inspection	
		Continuous Special Inspection	Periodic Special Inspection
Inspection Tasks Prior to Welding	AISC 360, Table N5.4-1		
1. Welding procedure specifications (WPSs) available.		X	
2. Manufacturer certifications for welding consumables available.		X	
3. Material identification (type/grade).			X
4. Welder identification system.			X
5. Fit-up groove welds (including joint geometry): Joint preparation. Dimensions (alignment, root opening, root face, bevel). Cleanliness (condition of steel surfaces). Tacking (tack weld quality and location). Backing type and fit (if applicable).			X
6. Configuration and finish of access holes.			X
7. Fit-up of fillet welds: Dimensions (alignment, gaps at root). Cleanliness (condition of steel surfaces). Tacking (tack weld quality and location).			X
8. Check welding equipment.			X
Inspection Tasks During Welding	AISC 360, Table N5.4-2		
9. Use of qualified welders. X			X
10 Control and handling of welding consumables: Packaging. Exposure control.			X
11. No welding over cracked tack welds.			X
12. Environmental conditions: Wind speed within limits. Precipitation and temperature.			X
13. WPS followed: Settings on welding equipment. Travel speed. Selected welding materials.			X

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Shielding gas type/flow rate. Preheat applied. Interpass temperature maintained (min/max). Proper position (F, V, H, OH).			
14. Welding techniques: Interpass and final cleaning. Each pass within profile limitations. Each pass meets quality requirements.			X
Inspection Tasks After Welding	AISC 360, Table N5.4-3		
15. Welds cleaned.			X
16. Size, length, and location of welds.		X	
17. Welds meet visual acceptance criteria: Crack prohibition. Weld/base-metal fusion. Crater cross section. Weld profiles. Weld size. Undercut. Porosity.		X	
18. Arc strikes.		X	
19. k-area.		X	
20. Backing removed and weld tabs removed (if required).		X	
21. Repair activities.		X	
22. Document acceptance or rejection of welded joint or member.		X	

(1) The "X" represents a required inspection activity for the project where it occurs.

APPENDIX G

STRUCTURAL STEEL BOLTING SPECIAL INSPECTION SCHEDULE

Type	Reference Standard	Frequency of Inspection	
		Continuous Special Inspection	Periodic Special Inspection
Inspection Tasks Prior to Bolting	AISC 360, Table N5.6-1		
1. Manufacturer's certifications available for fastener materials.		X	
2. Fasteners marked in accordance with ASTM requirements.			X
3. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane).			X
4. Proper bolting procedure selected for joint detail.			X
5. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements.			X
6. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used.			X
7. Proper storage provided for bolts, nuts, washers and other fastener components.			X
Inspection Tasks During Bolting	AISC 360, Table N5.6-2		
8. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required.			X
9. Joint brought to the snug-tight condition prior to the pretensioning operation.			X
10. Fastener component not turned by the wrench prevented from rotating.			X
11. Fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges.			X
Inspection Tasks After Bolting	AISC 360, Table N5.6-3		
12. Document acceptance or rejection of bolted connections.		X	

(1) The "X" represents a required inspection activity for the project where it occurs.

APPENDIX H

STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

Type	Reference Standard	Frequency of Inspection	
		Continuous Special Inspection	Periodic Special Inspection
1. Material verification of cold-formed steel deck:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	Applicable ASTM material standards		X
b. Manufacturer's certified test reports.			X
2. Inspection of welding:			
a. Cold-formed steel deck:			
1) Floor and roof deck welds.	AWS D1.3		X
b. Reinforcing steel:			
1) Verification of weldability of reinforcing steel other than ASTM A 706.	AWS D1.4, ACI 318: 3.5.2		X
2) Reinforcing steel-resisting flexural and axial forces in boundary elements of special structural walls and shear reinforcement.		X	
3) Shear reinforcement.		X	
4) "Form Saver" (reinforcing couplers).		X	

(1) The "X" represents a required inspection activity for the project where it occurs.

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. Product requirements, transportation and handling of products, storage and protection of products, product options, and substitutions procedures.

1.2 SECTION INCLUDES

- A. Definitions.
- B. Products.
- C. Transportation and handling.
- D. Storage and protection.
- E. Product options.
- F. Substitutions.

1.3 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 00 and Division 01 Specification Sections, apply to Work of this Section.

1.4 DEFINITIONS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Named products: Items identified by manufacturer's product name, including make and model as identified in published product literature current as of Contract Document date.
- C. Materials: Products substantially shaped, cut or worked or otherwise fabricated, processed, or installed to form a part of the Work.
- D. Equipment: Product with operational parts, motorized or manual, that requires service connections.

1.5 PRODUCTS

- A. New and in a condition acceptable to the County and the Architect/Engineer. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- B. In conformance with EPA Codes and Regulations.
- C. Install Specified products. Follow Substitution Requirements as required.
- D. Provide interchangeable components of the same manufacture, for components being replaced.

- E. No material shall contain asbestos or polychlorinated biphenals (PCBs).
- F. No materials or products shall contain formaldehyde in excess of the amount recommended by OSHA Regulations (Standards -29 CFR).
- G. No lead containing powder driven anchors are permitted. Wherever powder driven anchors are Indicated or Specified, provide equivalent strength non-lead containing powder driven anchors.
- H. Pursuant to the Resource Conservation & Recovery Act (RCRA) 6002 and to the extent that new recyclable material may be utilized for construction of the building expansion with the approval of Architect/Engineer.

1.6 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Deliver manufactured products in the manufacturer's original, unbroken containers or packaging, with identifying labels intact and legible.
- C. Immediately on delivery, inspect shipments to assure compliance with the requirements of the Contract Documents and accepted Submittals, quantities are correct and to verify that products are properly protected and undamaged.
- D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damaging the product and their packaging.
- E. Promptly remove damaged and defective products from the Site and replace at no increase in Contract Sum.
- F. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.
- G. Protect finished surfaces, including jambs and soffits and openings used as passageways, through which equipment and material are handled.
- H. Schedule delivery to minimize long term storage at the site and to prevent overcrowding of construction storage space.
- I. Coordinate delivery with installation time to minimize holding time for flammable, hazardous, easily damaged, or other losses.
- J. Inspect products upon delivery to ensure compliance with Contract Documents, products are not damaged, and they are properly protected.

1.7 STORAGE AND PROTECTION

- A. Except as otherwise approved by the Architect/Engineer, store and protect products in accordance with manufacturers' instructions, with seals and labels intact and legible.
- B. Store products that are subject to damage by the elements, under cover in weather-tight, climate-controlled enclosures.
- C. Maintain temperature and humidity within the ranges required by manufacturers. Coordinate with Owner for temperature accommodations within facility to achieve manufacturer requirements.
- D. For exterior storage of fabricated products, place on sloped supports, above ground, to prevent soiling and staining.

- E. Provide off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product. Allow materials to acclimate per manufacturer.
- G. Store less granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect products to ensure that products are maintained under specified condition and free from damaged and deterioration.
- J. In event of damage to the product, promptly replace to the approval of the Architect/Engineer and at no additional cost to the County.
- K. Additional time required to secure replacements will not be considered by the Architect/Engineer for any extension in the contract time of completion.
- L. Protection after Installation:
 - 1. Provide substantial coverings as necessary to protect installed products from damage from traffic and construction operations. Remove coverings when no longer needed.
 - 2. Maintain temperature and humidity conditions for interior equipment and finish products in accordance with the manufacturers' printed instructions.

1.8 PRODUCT OPTIONS

- A. For products Indicated or Specified by Reference Standards or by descriptive requirements only, select any product by any manufacturer meeting description and that is recommended by manufacturer for the application Indicated.
- B. For products Indicated or Specified by Performance Requirements only, select any product by any manufacturer meeting requirements and that is recommended by manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application. Manufacturer's recommendations may be contained in published literature or by manufacturer's written certification of performance.
- C. For products Indicated or Specified by Naming One Product and Manufacturer: Products of manufacture named and meeting specifications, no options or substitution are allowed. This option shall only apply to products matching others in use on a particular public improvement either completed or in the course of completion.
- D. For products indicated or specified by naming several products or manufactures select, any one of the products or manufacturers named which complies with the Specified requirements. When the naming of one or more products is followed by "or accepted equal", a substitute product may be offered for consideration. Submit a request for substitution for any manufacturer not named in accordance with the following articles.

1.9 SUBSTITUTIONS

- A. Refer to Section 02113 (Instruction to Bidders), Article 6, Paragraph 6.07.

END OF SECTION

DOCUMENT 01 6000-A

SUBSTITUTION REQUEST FORM

To: **The County of Kern, Owner**
(661) 868-3000

PROJECT: Lamont Park Beautification Project Owner Project No: 1650.7012.22	Contractor:
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Substitution Request By:	Firm:
---------------------------------	--------------

Transmittal Record	Attn:	Firm:	Date Sent:	Date Rec'd:	Date Due:
Contractor to Owner					
Contractor to Architect					
Owner / Architect to Consultant					
Architect to Owner Representative					
Owner Representative to Contractor					

We hereby submit for your consideration the following product instead of the specified item for the Project:

Section / Drawing	Article	Specified Item
Proposed Substitution:		

We have (a) attached manufacturer's literature, including complete technical data and laboratory test results, if applicable, (b) attached an explanation of why proposed substitution is a true equivalent to specified item, (c) included complete information on changes to Contract Documents that the proposed substitution will require for its proper installation, and (d) filled in the blanks below:

Contractor to complete questions that follow and certifies to the accuracy of all answers:

A.	Does the substitution affect dimensions shown on Drawings? Yes ___ / No ___. If Yes, please explain proposed mitigation and why substitution is equivalent to originally specified item:
B.	Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes ___ / No ___. If No, please state reasons explain why substitution is equivalent to originally specified item:
C.	What effect does the substitution have on other trades? No effect: ___ / Some effect ___. If substitution will affect other trades, please explain the effect and why substitution is equivalent to originally specified item:
D.	Will substitution cause change to Project Schedule, or to critical delivery dates? Add? Shorten? If the substitution will add to schedule dates or affect critical activities, please explain why substitution is equivalent to originally specified item:
E.	Please describe differences between proposed substitution and specified item? Please explain and identify any and all differences, and please explain why substitution is equivalent to originally specified item:
F.	What is the Cost Differential to Contractor in original specified item and proposed substitution including all mark-ups? [If substitution requested during bid period, skip this question.]
G.	Are Manufacturer's guarantees for the proposed item the same as for item specified? Yes ____; No _____. If No, please explain why substitution is equivalent to originally specified item:

H.	Contractor accepts full responsibility for delays caused by redesign of other items of the Work necessitated by substitution? Yes ___ / No ___. If No, please state reasons and explain why substitution is equivalent to originally specified item:
I.	Contractor states that the function, appearance and quality are equivalent or superior to the specified item? Yes ___ / No ___. If No, please explain why substitution is equivalent to originally specified item:

We certify that the function, appearance, and quality of the proposed substitution are equivalent or superior to those of the specified item, except as we may specifically state otherwise in this request.

Contractor:

Submitted by: _____ Signature: _____

Firm: _____ Date: _____

Address: _____ Phone/ Fax: _____

Remarks: _____

Proposed Substitution Manufacturer

Submitted by: _____ Signature: _____

Firm: _____ Date: _____

Address: _____ Phone/ Fax: _____

Remarks: _____

<div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 10px;"> <p>Consultant Response:</p> <p><input type="radio"/> Accepted</p> <p><input type="radio"/> Not Accepted</p> <p><input type="radio"/> Accepted As Noted</p> <p><input type="radio"/> Received Too Late</p> </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 10px;"> <p>Owner Representative Response:</p> <p><input type="radio"/> Accepted</p> <p><input type="radio"/> Not Accepted</p> <p><input type="radio"/> Accepted As Noted</p> <p><input type="radio"/> Received Too Late</p> </div>
<p>Remarks: _____</p> <p>_____</p>	<p>Remarks: _____</p> <p>_____</p>
<p>By: _____</p>	<p>By: _____</p>

END OF DOCUMENT

SECTION 01 7000

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY

A. Section describes requirements and procedures for:

1. Preparation for Contract Closeout
2. Punch List Development.
3. Final Completion
4. Warranties

1.02 PREPARATION FOR CONTRACT CLOSEOUT

A. Removal of Temporary Construction Facilities and Project Cleaning.

1. Prior to closeout procedures: remove temporary materials, equipment, services, and construction; clean all areas affected by the Work; clean and repair damage caused by installation or use of temporary facilities; restore permanent facilities used during construction to specified condition.

B. Equipment and Systems.

1. Prior to closeout procedures, Contractor shall start up, run for periods prescribed by Owner, operate, adjust and balance all manufactured equipment and Project systems, including but not limited to, mechanical, electrical, safety, fire, and controls.
2. Contractor shall perform all required scheduled maintenance throughout the duration of the Project.
3. Demonstrate that such equipment and systems conform to contract standards and manufacturer's guarantees. Where applicable, use testing protocols specified, and if the contract is silent, then consistent with manufacturer's recommendations and industry standards.
4. Where required by the technical specifications, provide training of Owner's personnel using Operation and Maintenance Manuals as described in Paragraph 1.02.C.

C. Operation and Maintenance Manuals.

1. Provide Operation and Maintenance manuals for all equipment in accordance with Section 01 3000.
2. Submit two (2) sets of fully reviewed operating/maintenance manuals prior to requesting the Final Walk, bound in 8-1/2 x 11 inch three ringside binders with durable plastic covers with identification on, or readable through, front cover stating general nature of manual.
3. Provide separate volume for each system, with table of contents and index tabs for each volume; all material neatly typewritten with each volume containing the following:
 - a. Part 1: Directory, listing names, addresses and telephone numbers of County Project Manager, County Construction Inspector, Contractor and, as appropriate, Subcontractor and/or Equipment Supplier.
 - b. Part 2: Completed Preventative Maintenance and Operating Requirement Sheets, a blank and sample of which are included at the end of this Section for each piece of equipment in the system. The following information shall also be included, as appropriate:
 - 1) Appropriate Design Criteria
 - 2) List of equipment
 - 3) Parts list; including complete nomenclature, current costs, and names and addresses of nearest parts vendor.

- 4) Detailed operating instructions
 - 5) Detailed maintenance instructions
 - 6) Shop drawings and product data, including changes made during construction.
 - 7) Copies of Guaranties/Warranties
4. Final versions of Operation and Maintenance manuals shall be provided in electronic format and submitted with Project Record Documents as described in Paragraph 1.04.B.2 of this Specification Section.

D. Permitting and Reporting.

1. Prior to closeout procedures, Contractor shall demonstrate or provide evidence that all outstanding permit requirements have been met, including reporting, certifications, and commissioning. Where Owner is required to certify to any permit compliance, Contractor shall prepare such certification documents for Owner execution.
2. Contractor shall schedule all necessary site visits from all authorities having jurisdiction to meet permit compliance.
3. Contractor shall provide all required commissioning documents and reports as required by Laws and Regulatory Requirements.

1.03 PUNCH LIST DEVELOPMENT

A. Punch List Readiness Determination.

1. When Contractor considers Work or designated portion of the Work as ready for punch list review, Contractor shall submit written notice to the Owner to review Project readiness with Inspector. Contractor and Inspector shall review the Work and, if Inspector identifies items needing correction prior to punch list review, Contractor shall make such corrections prior to scheduling the punch list walk.

B. Punch List Walk and Corrections.

1. When Contractor considers Work or designated portion of the Work as ready for punch list walk, submit written notice to Owner. Within reasonable time, Owner will schedule the punch list walk to determine status of completion. The attendees for the punch list walk will include the Architect/Engineer, Inspector, Owner, and Owner's Representatives. Consultant disciplines may schedule individual punch list walks as necessary. Contractor shall attend the punch list walk with personnel he deems necessary to accomplish Final Completion.
2. Should Owner determine that status of Work does not meet the Contract requirements for Final Completion, Owner will promptly notify Contractor in writing, listing all defects and omissions (the "**Punch List**").
3. Contractor shall be aware that the generation of a Punch List does not limit the Owner's ability to identify other deficiencies not previously identified on the Punch List and that the Contractor is responsible for all corrections required to meet the Contract requirements.
4. Contractor shall remedy deficiencies to the satisfaction of the Owner. Contractor shall provide Project Record Documents and evidence that all permit requirements have been satisfied.

C. Final Walk.

1. After Contractor performs all corrections identified on the Punch List, performs corrections of subsequent items added after the punch list walk and provides Project Record Documents and evidence of permit compliance, Contractor shall submit written notice to Owner. Within a reasonable time, Owner will schedule the final walk to determine status of completion. Owner's attendees will be personnel involved in Punch List generation. Contractor shall provide all personnel he deems necessary to accomplish Project Completion.
2. The Punch List examination will be performed at the final walk. One follow-up review of Punch List items for each discipline will be provided. If further site visits are required to

review Punch List items due to incompleteness of the Work by Contractor, Contractor will reimburse Owner for costs associated with these visits.

3. If Owner deems work has been completed in accordance with the Contract requirements, or in Owner's judgment minor corrections may be completed which do not hinder Final Completion, Contractor shall prepare for Final Completion.

1.04 FINAL COMPLETION

A. Requirements

1. Final Completion occurs when Work meets requirements for Owner's Final Acceptance.

B. Procedure

1. When Contractor and Owner consider Work to be Complete, Contractor shall submit written certification that:
 - a. Contractor has inspected Work for compliance with Contract Documents, and all Punch List requirements have been met.
 - b. Except for Contractor maintenance after Final Acceptance, Work has been completed in accordance with Contract Documents and deficiencies listed in the Punch List have been corrected. Equipment and systems have been tested in the presence of Owner, and are operative.
2. Project Record Documents are completed and turned over to Owner, Work is complete and certificate of occupancy is obtained. (3) copies of Project Record Documents shall be provided in PDF format on electronic media to the County.
3. In addition to submittals required by Contract Documents, provide submittals required by governing authorities and submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.
4. Upon Contractor completion of all closeout procedures and Owner's Final Acceptance, Owner will file the Notice of Completion.

C. Final Adjustments of Accounts:

1. Submit a final statement of accounting to Owner, showing all adjustments to the Contract Sum and complete and execute Document 00 5200 (Agreement and Release of Claims).
2. If so required, Owner shall prepare a final Change Order for submittal to Contractor, showing adjustments to the Contract Sum that were not previously made into a Contract Modification.

- D. **Turn-In.** Contract Documents will not be closed out and final payment will not be made until all keys issued to Contractor during prosecution of Work and letters from property owners, pursuant to Contract Documents, are turned in to Owner.

- E. **Release of Claims.** Contract Documents will not be closed out and final payment will not be due or made until Document 00 5200 (Agreement and Release of Claims) is completed and executed by Contractor and Owner.

- F. **Fire Inspection Coordination.** Coordinate fire inspection and secure sufficient notice to Owner to permit convenient scheduling (if applicable).

- G. **Building Inspection Coordination.** Coordinate with Owner a final inspection for the purpose of obtaining an occupancy certificate (if applicable).

1.05 WARRANTIES

A. Warranty Documents

1. Contractors shall assemble and provide warranty documents, executed or supplied by Subcontractors, suppliers, and manufacturers. Provide table of contents and assemble in 8½ inches by 11 inches three-ring binder with durable plastic cover, appropriately

- separated and organized. Assemble in specification section order. Additionally, Contractor shall provide to Owner all documents in the warranty document package in an electronic file, portable document format (pdf). Provide one copy on four individual flash drives.
2. Submit warranty documents in accordance with Document 01 3000 (Administrative Requirements) and prior to final Application for Payment. For equipment put into use with Owner's permission during construction, submit warranty documents within 14 Days after first operation. For items of Work delayed materially beyond the date of Final Completion, provide updated warranty documents within 14 Days after acceptance, listing date of acceptance as start of warranty period.
 3. Warranty Forms: Submit drafts to Owner for review prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents. Warranty shall be countersigned by manufacturers. Where specified, warranty shall be countersigned by Subcontractors and installers.
 4. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties that detract from or confuse requirements or interpretations of Contract Documents.
 5. Term of Warranties: For materials, equipment, systems, and workmanship, warranty period shall be one year minimum from date of Final Completion of entire Work except where:
 - a. Detailed Specifications for certain materials, equipment or systems require longer warranty periods.
 - b. Materials, equipment or systems are put into beneficial use of Owner prior to Final Completion as agreed to in writing by Owner.
 - c. Materials, equipment, or systems delayed from beneficial use of Owner as of the date of Notice of Completion, as agreed to in writing by Owner.

B. Warranty of Title:

1. No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all Work to deliver premises, together with improvements and appurtenances constructed or placed thereon by Contractor, to Owner free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any materials or labor for any Work covered by Contract shall have right to lien upon premises or improvement or appurtenances thereon. Nothing contained in this paragraph, however, shall defeat or impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of Owner.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name:	Size:	
Serial No.:	Model:	
Vendor:		
Vendor Address:	Type:	
	Mfr.:	
Vendor Rep:	Voltage:	Amps:
Phone:	Phase:	rpm:
Maintenance Work to be Done		Frequency*
OPERATING REQUIREMENTS AND REFERENCE		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

SAMPLE

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name: Influent Pump No. 1 Tag No.: P01-1	Size: 15 hp	
Serial No.: 123456ABC	Model: 140T Frame Serial No. 987654ZY Class F Insulation W/Space Heater	
Vendor: ABC Pump Co.		
Vendor Address: 1111 Pump Circle Newport Beach, CA 92663	Type:	
	Mfr.: DEF Motors, Inc.	
Vendor Rep: XYZ Equipment, Inc.	Voltage: 460	Amps: 20
Phone: 714/752-0505	Phase: 3	rpm: 1,800
Maintenance Work to be Done		Frequency*
1. Operate all valves and check such things as a) bearing temperature, b) changes in running sound, c) suction and discharge gauge readings, d) pump discharge rate, and e) general condition of the drive equipment.		D
2. Check packing.		D
3. Checking pumping unit for any dust, dirt, or debris.		W
(Continued on attached sheet)		
OPERATING REQUIREMENTS AND REFERENCE		
For manufacturer's instructions regarding installation, operation, maintenance, and trouble shooting of this equipment, see Volume _____, Section _____.		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

SAMPLE

Preventive Maintenance and Operating Requirement Sheets

Preventive Maintenance Program	Equipment Record Number	
EQUIPMENT DESCRIPTION	ELECTRICAL OR MECHANICAL DATA	
Name:	Size:	
Serial No.:	Model:	
Vendor:		
Vendor Address:	Type:	
	Mfr.:	
Vendor Rep:	Voltage:	Amps:
Phone:	Phase:	rpm:
Maintenance Work to be Done		Frequency*
4. Lubricate bearing frame and motor bearings (consult manufacturer's instructions for type of grease or oil).	Q	
5. Disassemble and change or repair the following: a) impeller, b) shafts, c) shaft sleeve, d) rotary seals, and e) sleeve bearings.	A	
OPERATING REQUIREMENTS AND REFERENCE		

*D - Daily; W - Weekly; B - Biweekly; M - Monthly; Q - Quarterly;
S - Semiannually; A - Annually.

SECTION 01705

CUTTING AND PATCHING

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section establishes General Requirements pertaining to cutting (including excavating), fitting, and patching of the Work required to:
 - 1. Make the several parts fit properly.
 - 2. Uncover Work to provide for installing, inspection, or both, of ill-timed Work.
 - 3. Remove and replace Work not conforming to requirements of the Contract Documents.
 - 4. Remove and replace defective Work.
- B. Requirements and limitations for cutting and patching of Work.

1.02 RELATED DOCUMENTS

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 0 and Division 1 Specification Sections, apply to Work of this Section.

1.03 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural Work in a manner that would result in a reduction of load carrying capacity or of load deflection ration. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
 - 1. Foundation construction.
 - 2. Structural concrete.
 - 3. Stair systems.
 - 4. Miscellaneous structural metals.
 - 5. Exterior curtain wall construction.
 - 6. Equipment supports.
 - 7. Piping, ductwork, vessels and equipment.
- B. Operational and Safety Limitations: Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of their capacity to perform in the manner intended, to increase maintenance, or to decrease operational like or safety.
- C. Visual Requirements:
 - 1. Do not cut and patch construction exposed on the exterior or in its occupied spaces, without consulting the Engineer/Architect.
 - 2. Remove and replace Work cut and patched in a visually unsatisfactorily manner.
- D. Employ skilled workers for cutting and patching. Wherever practicable, employ original installer or fabricator providing Work under this Contract to perform cutting and patching for new:
 - 1. Weather-exposed and moisture-resistant products.
 - 2. Fireproofing.
 - 3. Finished surfaces exposed to view.
- E. Individual Product Specification Sections:

1. Cutting and patching incidental to Work of the Section.
2. Advance notification to other Sections of openings required in Work of those Sections.
3. Limitations on cutting structural members.

1.04 SUBMITTALS

A. Submit written request in advance of cutting or alteration which affects:

1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of County or separate contractor.
6. Cost estimate and type of reimbursement review by Architect/Engineer. Review does not waive Architect/Engineer's right to later require complete removal and replacement of any part of Work found to be unsatisfactory.

B. Include in Request:

1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work, entities to perform Work, products to be used, dates when Work is to be performed.
5. Alternatives to cutting and patching.
6. Effect on Work of County or separate Contractor.
7. Written permission of affected separate Contractor.
8. Describe anticipated results in terms of changes to existing construction.
9. List utilities to be disturbed or relocated or temporarily out of service. Indicate length of service disruption.
10. Where Work involves addition of reinforcement to structural elements, submit details and engineering calculations showing how new reinforcement integrates with original structure.
11. Date and time Work will be executed, to provide for Engineering/Architect observation.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Primary Products: Those required for original installation.
- B. Product Substitution: Refer to Section 00 2113 (Instruction to Bidders), **Article 6, Paragraph 6.07**.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting, excavating, patching and backfilling.
- B. After uncovering the Work, inspect conditions affecting of new Work.
- C. If uncovered conditions are not as anticipated, immediately notify the Architect/Engineer and secure needed directions.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Provide required temporary supports including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
- B. Prior to cutting, employ a competent private utility locating service capable of locating positions and depths of underground and concealed structural reinforcements and utilities including, but not limited to electrical conduits, plumbing lines, and other utilities in the vicinity of the construction to be cut.
- C. Perform cutting and patching using methods so as not to void existing warranties.
- D. Provide protection from elements for areas which may be exposed by uncovering Work.
- E. Maintain excavations free of water.

3.03 CUTTING

- A. Perform required cutting and fitting to complete the Work under pertinent other Sections of these Specifications.
- B. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.
- C. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new Work.
- D. Do not cut or alter structural members without prior consultation with the Engineer/Architect unless specifically indicated. Do not damage reinforcing or structural steel to remain.
- E. Do not damage electrical conduits, plumbing lines, and other utilities to remain.
- F. Cut existing construction to provide for installation of Work. Make new openings neat, as close as possible to profiles indicated and only to extent necessary for new Work.
- G. Uncover Work to install improperly sequenced Work.
- H. Remove and replace defective or non-conforming Work.
- I. Remove samples of installed Work for testing when requested.
- J. Provide openings in the Work for penetration of mechanical and electrical Work.
- K. At concrete, masonry, paving, and other materials where edges of cuts and holes will remain exposed in the completed Work, make cuts using power-sawing and power-coring equipment; do not overcut at corners of cut openings. Saw overruns shall not be permitted. Pneumatic tools not allowed without prior approval.
- L. Upon completion of cutting and coring, clean remaining surfaces of loose particles and dust.

3.04 PATCHING

- A. Execute patching to complement adjacent Work.

- B. Patch existing construction by filling repairing, refinishing, closing up and similar operations. Patching includes the insertion of projection of other products in or from a surface.
- C. Perform fitting and adjusting of products together to integrate with other Work with the specified tolerance and finishes.
- D. Perform Work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- E. Restore Work with new Products in accordance with requirements of Contract Documents.
- F. Fit Work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. Patch weather-exposed components in a manner that restores them to a weathertight condition.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
- I. Finish or refinish, as required, cut and patched surfaces to provide an even surface of uniform finish, color, texture, and appearance, matching existing adjacent. Finish complete surface plane, unless otherwise indicated. Over patched wall or ceiling surfaces, finish to nearest cutoff line for entire surface, such as intersection with adjacent wall or ceiling, beam, pilasters or to nearest opening frame, unless otherwise indicated. Finished surfaces shall not present a spotty, touched-up appearance. For an assembly, refinish entire unit.

3.05 PERFORMANCE

- A. Execute Work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- B. Employ original subcontractor to perform cutting and patching for weather exposed and moisture resistant elements.
- C. Cut materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- D. Restore Work with new products in accordance with requirements of Contract Documents.
- E. Fit Work tightly to pipes, sleeves, ducts, conduit, and other penetrations through surfaces, caulking where necessary to create water and air resistive barriers.
- F. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Division 07 of these Specifications to full thickness of the penetrated element. Comply with CFC latest edition.
- G. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

3.06 PAYMENT FOR COSTS

- A. In accordance with Section 00 7200 (General Conditions) and Section 01 2050 Modification Procedures.

END OF SECTION

SECTION 018101
PROJECT DESIGN CRITERIA

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES: PROJECT DESIGN CRITERIA SUCH AS TEMPERATURE AND SITE ELEVATION.

1.02 PROJECT DESIGN CRITERIA

- A. ALL EQUIPMENT AND MATERIALS FOR THE PROJECT ARE TO BE SUITABLE FOR PERFORMANCE IN DOMESTIC WATER PUMP STATION ENVIRONMENT AND UNDER FOLLOWING CONDITIONS:
1. DESIGN TEMPERATURES ARE:
 - a. OUTDOOR TEMPERATURES: 120 TO 20 DEGREES FAHRENHEIT.
 2. INDOOR TEMPERATURES SET POINT FOR THE BUILDING:
 - a. 72 DEGREES FAHRENHEIT.
- B. DESIGN GROUNDWATER ELEVATION: NOT ENCOUNTERED.
- C. MOISTURE CONDITIONS: DEFINED IN INDIVIDUAL EQUIPMENT SECTIONS.
- D. SITE ELEVATION: APPROXIMATELY 395 FEET ABOVE MEAN SEA LEVEL.
- E. FLOOD ELEVATION: APPROXIMATELY 2 FEET ABOVE SITE GRADE.
- F. DESIGN ROOF LOADS AT RECREATION CENTER:
1. DEAD LOAD: 24.5 PSF
 2. LIVE LOAD: 20 PSF (Reducible)

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION 018102
SEISMIC DESIGN CRITERIA**

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES: SEISMIC DESIGN CRITERIA FOR THE FOLLOWING:
 - 1. ANCHORAGE OF MECHANICAL AND ELECTRICAL EQUIPMENT.
 - 2. SEISMIC DESIGN AND DESIGN OF ANCHORAGE FOR SMALL TANKS FABRICATED OFF SITE AND SHIPPED TO THE PROJECT SITE.
 - 3. OTHER STRUCTURES OR ITEMS AS SPECIFIED OR INDICATED ON THE DRAWINGS.
- B. RELATED SECTIONS:
 - 1. SECTION 032117 - ADHESIVE-BONDED REINFORCING BARS AND ALL-THREAD RODS.
 - 2. SECTION 050524 - MECHANICAL ANCHORING AND FASTENING TO CONCRETE AND MASONRY.

1.02 REFERENCES

- A. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE):
 - 1. 7-16 - MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.

1.03 SYSTEM DESCRIPTION

- A. DESIGN IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2022 CALIFORNIA BUILDING CODE.
- B. DESIGN SPECTRAL ACCELERATIONS APPLICABLE TO BOTH SITES:
 - 1. SHORT PERIOD SPECTRAL ACCELERATION, SDS: 0.850G.
 - 2. 1-SEC PERIOD SPECTRAL ACCELERATION, SD1: 0.487G.
- C. SITE CLASS: D.
- D. DESIGN OF NON-STRUCTURAL COMPONENTS AND THEIR CONNECTIONS TO STRUCTURES:
 - 1. COMPONENT AMPLIFICATION FACTOR, AP: IN ACCORDANCE WITH ASCE 7, TABLES 13.5-1 AND 13.6-1.
 - 2. COMPONENT RESPONSE MODIFICATION FACTOR, RP: IN ACCORDANCE WITH ASCE 7, TABLES 13.5-1 AND 13.6-1.
 - 3. COMPONENT IMPORTANCE FACTOR, IP:

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Table 1: Component Importance Factor, I_p		
Component	Description	I_p
Electrical	Equipment, components, and distributed support systems provided and installed under Division 26.	1.5
Mechanical and Process Equipment	Equipment, components, and distributed support systems provided and installed under Divisions 10-23 and 32-46.	1.5
Architectural Components	Components and distributed support systems provided and installed under Divisions 8 through 10.	1.5

E. DESIGN OF NON-BUILDING STRUCTURES:

1. IN ACCORDANCE WITH THE SEISMIC DESIGN CRITERIA SPECIFIED HEREIN AND WITHIN THE APPLICABLE SECTION.
2. NON-BUILDING STRUCTURES SHALL BE CONSIDERED ALL SELF-SUPPORTING STRUCTURES THAT CARRY GRAVITY LOADS AND THAT MAY BE REQUIRED TO RESIST THE EFFECTS OF EARTHQUAKES. SUCH STRUCTURES INCLUDE, BUT ARE NOT LIMITED TO, TANKS (FABRICATED OFFSITE), VESSELS, STEEL STORAGE RACKS, PIPE RACKS, STORAGE BINS, HOPPERS, STACKS, FLARES, STANDPIPES, TELECOMMUNICATION TOWERS, POLES, ETC.
3. COMPONENT RESPONSE MODIFICATION FACTOR, R : IN ACCORDANCE WITH ASCE 7, TABLES 15.4-1 AND 15.4-2 UNLESS OTHERWISE SPECIFIED IN THE APPLICABLE SPECIFICATION SECTION FOR THE NON-BUILDING STRUCTURE.
4. COMPONENT IMPORTANCE FACTOR, I_E : AS SPECIFIED IN THE APPLICABLE SPECIFICATION SECTION FOR THE NON-BUILDING STRUCTURE.

F. SEISMIC DESIGN CATEGORY (SDC): D.

G. SEISMIC DESIGN CATEGORY (SDC) FOR CERTIFICATION OF MECHANICAL AND ELECTRICAL EQUIPMENT AS REQUIRED BY ASCE 7:

1. SEISMIC DESIGN CATEGORY D.

H. RISK CATEGORY:

1. CATEGORY II.

I. DESIGN REQUIREMENTS: ANCHORAGE OF EQUIPMENT TO STRUCTURES.

1. DO NOT USE FRICTION TO RESIST SLIDING DUE TO SEISMIC FORCES. DO NOT DESIGN OR PROVIDE CONNECTIONS THAT USE FRICTION TO RESIST SEISMIC LOADS. RESIST SEISMIC FORCES THROUGH DIRECT TENSION AND/OR SHEAR ON ANCHORS AND FASTENERS.
2. DO NOT USE MORE THAN 60 PERCENT OF THE WEIGHT OF THE MECHANICAL AND ELECTRICAL EQUIPMENT FOR DESIGNING ANCHORS FOR RESISTING OVERTURNING DUE TO SEISMIC FORCES.
3. DO NOT USE MORE THAN 60 PERCENT OF THE WEIGHT OF THE TANK FOR RESISTING OVERTURNING DUE TO SEISMIC FORCES.
4. ANCHORING AND FASTENING TO CONCRETE AND MASONRY.
 - a. PROVIDE ANCHORS SPECIFIED IN SECTION 050524.
 - b. USE ONLY CAST-IN ANCHORS (ANCHOR BOLTS OR WELDED STUDS) FOR ANCHORS AT CONNECTIONS THAT RESIST SEISMIC FORCES.

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- c. DO NOT USE CONCRETE ANCHORS, FLUSH SHELLS, SLEEVE ANCHORS, SCREW ANCHORS, POWDER ACTUATED FASTENERS, OR OTHER TYPES OF POST-INSTALLED MECHANICAL ANCHORS UNLESS INDICATED ON THE DRAWINGS OR ACCEPTED IN WRITING BY THE ENGINEER.

1.04 SUBMITTALS

- A. SHOP DRAWINGS AND CALCULATIONS: COMPLETE SHOP DRAWINGS AND SEISMIC CALCULATIONS.
- B. CALCULATIONS SHALL BE SIGNED AND STAMPED BY A CIVIL OR STRUCTURAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION 018104
WIND DESIGN CRITERIA**

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES: WIND DESIGN CRITERIA.
- B. RELATED SECTION:
 - 1. SECTION 032117 - ADHESIVE-BONDED REINFORCING BARS AND ALL-THREAD RODS.
 - 2. SECTION 050524 - MECHANICAL ANCHORING AND FASTENING TO CONCRETE AND MASONRY.

1.02 SYSTEM DESCRIPTION

- A. DESIGN REQUIREMENTS FOR SITE:
 - 1. BUILDING CODE CRITERIA: DESIGN FOR WIND IN ACCORDANCE WITH THE 2022 CALIFORNIA BUILDING CODE.
 - a. RISK CATEGORY: II.
 - b. BASIC WIND SPEED: 95 MILES PER HOUR.
 - c. EXPOSURE CATEGORY: C
 - d. TOPOGRAPHIC FACTOR, KZT: 1.0
 - e. WIND IMPORTANCE FACTOR, IW: 1.0.
- B. RESIST WIND FORCES THROUGH DIRECT BEARING ON ANCHORS AND FASTENERS. DO NOT DESIGN OR PROVIDE CONNECTIONS THAT USE FRICTION TO RESIST WIND LOADS.
- C. ANCHORING AND FASTENING TO CONCRETE AND MASONRY
 - 1. PROVIDE ANCHORS SPECIFIED IN SECTIONS 032117 AND 050524.
 - 2. USE ONLY CAST-IN AND BUILT-IN ANCHORS (ANCHOR BOLTS AND WELDED STUDS) FOR ANCHORS AT CONNECTIONS THAT RESIST WIND FORCES.
 - 3. DO NOT USE CONCRETE ANCHORS, FLUSH SHELLS, SLEEVE ANCHORS, FLUSH SHELLS, SCREW ANCHORS, POWDER ACTUATED FASTENERS, OR OTHER TYPES OF POST-INSTALLED MECHANICAL ANCHORS UNLESS INDICATED ON THE DRAWINGS OR ACCEPTED IN WRITING BY THE ENGINEER.

1.03 SUBMITTALS

- A. SHOP DRAWINGS AND CALCULATIONS: COMPLETE SHOP DRAWINGS AND WIND DESIGN CALCULATIONS.
- B. CALCULATIONS SHALL BE SIGNED AND STAMPED BY A CIVIL OR STRUCTURAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION 031100
CONCRETE FORMWORK**

PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. FORM WORK FOR ALL CAST-IN-PLACE AND SITE PRE-CAST CONCRETE, INCLUDING ACCESSORIES SUCH AS ANCHORS, CLAMPS AND SNAP TIES.
2. ALL REQUIRED FORMING MATERIALS NECESSARY TO COMPLETE THE FORMWORK, INCLUDING ANCHORS, CLAMPS, SNAP TIES, ETC.
3. SHORES, SCAFFOLDS AND BRACES REQUIRED TO SUPPORT FORMWORK.
4. INSTALLATION ONLY OF ALL HARDWARE EMBEDDED IN CONCRETE, INCLUDING ANCHOR BOLTS, INSERTS, BEAM AND COLUMN CONNECTIONS EXCEPT AS EXCLUDED BELOW.
5. INSTALLATION ONLY OF ALL REGLETS, WOOD NAILING BLOCKS AND STRIPS AND CHAMFER STRIPS EMBEDDED IN CONCRETE.
6. INSTALLATION ONLY OF SLEEVES, ANCHORS, INSERTS, ETC., REQUIRED FOR THE MECHANICAL, ELECTRICAL, FIRE SPRINKLER AND PLUMBING SYSTEMS, IN ACCORD WITH LAYOUTS FURNISHED UNDER APPROPRIATE SECTIONS, WHEN THESE INSERTS PENETRATE OR ARE ANCHORED TO FORMS.
7. REMOVAL OF FORMS.

B. RELATED SECTIONS:

1. SECTION 033000 - CAST-IN-PLACE CONCRETE.
2. SECTION 036000 - GROUTING.
3. SECTION 033529 - CONCRETE FINISHING.
4. SECTION 055000 - METAL FABRICATIONS
5. SECTION 079000 - JOINT SEALANTS.

1.02 REFERENCES

A. AMERICAN CONCRETE INSTITUTE (ACI):

1. 117 - SPECIFICATIONS FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS AND COMMENTARY.
2. 301 - SPECIFICATIONS FOR STRUCTURAL CONCRETE
3. 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
4. 347R - GUIDE TO FORMWORK FOR CONCRETE

B. NSF INTERNATIONAL (NSF):

1. 61 - DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS.

C. UNDERWRITERS LABORATORIES (UL):

D. AMERICAN PLYWOOD ASSOCIATION (APA):

1. "VOLUNTARY PRODUCT STANDARD PS-1 FOR CONSTRUCTION AND INDUSTRIAL PLYWOOD".

E. INTERNATIONAL CODE COUNCIL EVALUATION SERVICE (ICC-ES):

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1. CALIFORNIA BUILDING CODE AND CALIFORNIA AMENDMENTS, VOLUME 2, CHAPTER 19, "CONCRETE".
 2. ALL FORMWORK SHALL MEET THE REQUIREMENTS OF THIS CODE. THIS CODE SUPPLEMENTS THE STANDARD SPECIFICATION AND SHALL SUPERSEDE THE STANDARD SPECIFICATION IN CASES WHERE PROVISIONS ARE IN CONFLICT.
- F. WESTERN WOOD PRODUCTS ASSOCIATION (WWPA):
1. "WESTERN LUMBER GRADING RULES".

1.03 DEFINITIONS

- A. GREEN CONCRETE: CONCRETE WITH LESS THAN 100 PERCENT OF THE MINIMUM SPECIFIED COMPRESSIVE STRENGTH (F'C).

1.04 SYSTEM DESCRIPTION

- A. DESIGN REQUIREMENTS:
1. DESIGN OF CONCRETE FORMS, FALSEWORK, AND SHORING IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
 2. DESIGN FORMS AND TIES TO WITHSTAND CONCRETE PRESSURES WITHOUT BULGING, SPREADING, OR LIFTING OF FORMS.
- B. PERFORMANCE REQUIREMENTS:
1. CONSTRUCT FORMS SO THAT FINISHED CONCRETE CONFORMS TO SHAPES, LINES, GRADES, AND DIMENSIONS INDICATED ON THE DRAWINGS.
 2. IT IS INTENDED THAT SURFACE OF CONCRETE AFTER STRIPPING PRESENTS SMOOTH, HARD, AND DENSE FINISH THAT REQUIRES MINIMUM AMOUNT OF FINISHING.
 3. PROVIDE SUFFICIENT NUMBER OF FORMS SO THAT THE WORK MAY BE PERFORMED RAPIDLY AND PRESENT UNIFORM APPEARANCE IN FORM PATTERNS AND FINISH.
 4. USE FORMS THAT ARE CLEAN AND FREE FROM DIRT, CONCRETE, AND OTHER DEBRIS.
 - a. COAT WITH FORM RELEASE AGENT IF REQUIRED, PRIOR TO USE OR REUSE.

1.05 SUBMITTALS

- A. INFORMATION ON PROPOSED FORMING SYSTEM:
1. SUBMIT IN SUCH DETAIL AS THE ENGINEER MAY REQUIRE TO ASSURE HIMSELF THAT INTENT OF THE SPECIFICATIONS CAN BE COMPLIED WITH BY USE OF PROPOSED SYSTEM.
 2. ALTERNATE COMBINATIONS OF PLYWOOD THICKNESS AND STUD SPACING MAY BE SUBMITTED.
- B. FORM RELEASE AGENT. NSF 61 CERTIFICATION PREPARED BY NSF, UNDERWRITERS LABORATORIES (UL) OR OTHER, SIMILAR, NATIONALLY RECOGNIZED TESTING LABORATORY ACCEPTABLE TO THE ENGINEER.
- C. PRODUCT DATA FOR PROPRIETARY PRODUCTS, INCLUDING FORMING ACCESSORIES, WATERSTOPS AND JOINT SYSTEMS.

1.06 QUALITY ASSURANCE

- A. QUALIFICATIONS OF FORMWORK MANUFACTURERS: USE ONLY FORMING SYSTEMS BY MANUFACTURERS HAVING A MINIMUM OF 5 YEARS-EXPERIENCE, EXCEPT AS OTHERWISE SPECIFIED, OR ACCEPTED IN WRITING BY THE ENGINEER.
- B. GENERAL: CONFORM WITH ACI 301 EXCEPT AS MODIFIED BY THE REQUIREMENTS SPECIFIED HEREIN

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AND THE DETAILS ON THE DRAWINGS.

- C. REGULATORY REQUIREMENTS: INSTALL WORK OF THIS SECTION IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
- D. ALLOWABLE TOLERANCES: DESIGN, CONSTRUCT, SET, AND MAINTAIN THE FORMWORK SO AS TO ENSURE COMPLETED WORK WITHIN THE SUGGESTED TOLERANCE LIMITS SPECIFIED IN ACI 347R, SECTION 5.3

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. FORMS: BUILT-UP PLYWOOD:

- 1. BUILT-UP PLYWOOD FORMS MAY BE SUBSTITUTED FOR PREFABRICATED FORMING SYSTEM SUBJECT TO FOLLOWING MINIMUM REQUIREMENTS:
 - a. SIZE AND MATERIAL:
 - 1) USE FULL SIZE 4-FOOT BY 8-FOOT PLYWOOD SHEETS, EXCEPT WHERE SMALLER PIECES ARE ABLE TO COVER ENTIRE AREA.
 - 2) SHEET CONSTRUCTION: 5-PLY PLYWOOD SHEETS, 3/4-INCH NOMINAL, MADE WITH 100 PERCENT WATERPROOF ADHESIVE, AND HAVING FINISH SURFACE THAT IS COATED OR OVERLAID WITH SURFACE WHICH IS IMPERVIOUS TO WATER AND ALKALINE CALCIUM AND SODIUM HYDROXIDE OF CEMENT.
 - 3) EXTERIOR-GRADE PLYWOOD PANELS, SUITABLE FOR CONCRETE FORMS, COMPLYING WITH DOC PS 1, AND AS FOLLOWS:
 - a) HIGH-DENSITY OVERLAY, CLASS 1 OR BETTER.
 - b) MEDIUM-DENSITY OVERLAY, CLASS 1 OR BETTER; MILL-RELEASE AGENT TREATED AND EDGE SEALED.
 - c) STRUCTURAL 1, B-B OR BETTER; MILL OILED AND EDGE SEALED.
 - d) B-B (CONCRETE FORM), CLASS 1: PLYFORM (APA) OR EQUAL; MILL OILED AND EDGE SEALED.
 - b. WALES: MINIMUM 2-INCH BY 4-INCH LUMBER.
 - c. STUDDING AND WALES: CONTAIN NO LOOSE KNOTS AND BE FREE OF WARPS, CUPS, AND BOWS.

B. FORMS: STEEL OR STEEL FRAMED:

- 1. STEEL FORMS:
 - a. RIGIDLY CONSTRUCTED AND CAPABLE OF BEING BRACED FOR MINIMUM DEFLECTION OF FINISH SURFACE.
 - b. CAPABLE OF PROVIDING FINISH SURFACES THAT ARE FLAT WITHOUT BOWS, CUPS, OR DENTS.
- 2. STEEL FRAMED PLYWOOD FORMS:
 - a. PROVIDE FORMS THAT ARE RIGIDLY CONSTRUCTED AND CAPABLE OF BEING BRACED.
 - b. PLYWOOD PANELING: 5-PLY, 5/8-INCH NOMINAL OR 3/4-INCH NOMINAL, MADE WITH 100 PERCENT WATERPROOF ADHESIVE, AND HAVING FINISH SURFACE THAT IS COATED OR OVERLAID WITH SURFACE WHICH IS IMPERVIOUS TO WATER AND ALKALINE CALCIUM AND SODIUM HYDROXIDE OF CEMENT.

C. FORM RELEASE AGENT.

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1. EFFECTIVE, NON-STAINING, BOND-BREAKING COATING COMPATIBLE WITH FORM SURFACES AND CONCRETE MIXES USED.
 2. FORMULATE FORM-RELEASE AGENT WITH RUST INHIBITOR FOR STEEL FORM-FACING MATERIALS.
 3. CERTIFIED FOR CONFORMANCE TO NSF 61 AND LEAVING NO TASTE OR ODOR ON THE CONCRETE SURFACE.
- D. FORM TIES:
1. GENERAL:
 - a. PROVIDE FORM TIES FOR FORMING SYSTEM SELECTED THAT ARE MANUFACTURED BY RECOGNIZED MANUFACTURER OF CONCRETE FORMING EQUIPMENT.
 - b. DO NOT USE WIRE TIES OR WOOD SPREADERS OF ANY FORM.
 - c. PROVIDE TIES OF TYPE THAT ACCURATELY TIE, LOCK, AND SPREAD FORMS.
 - d. PROVIDE FORM TIES OF SUCH DESIGN THAT WHEN FORMS ARE REMOVED, THEY LOCATE NO METAL OR OTHER MATERIAL WITHIN 1-1/2 INCHES OF THE SURFACE OF THE CONCRETE.
 - e. DO NOT ALLOW HOLES IN FORMS FOR TIES TO ALLOW LEAKAGE DURING PLACEMENT OF CONCRETE.
 2. CONE-SNAP TIES:
 - a. CONE-SNAP TIES SHALL FORM A CONE SHAPED DEPRESSION IN THE CONCRETE WITH MINIMUM DIAMETER OF 1 INCH AT THE SURFACE OF THE CONCRETE AND MINIMUM DEPTH OF 1-1/2 INCHES.
 - b. PROVIDE NEOPRENE WATERSEAL WASHER THAT IS LOCATED NEAR THE CENTER OF THE CONCRETE.
 3. TAPER TIES:
 - a. NEOPRENE PLUGS FOR TAPER TIE HOLES: SIZE SO THAT AFTER THEY ARE DRIVEN, PLUGS ARE LOCATED IN CENTER THIRD OF WALL THICKNESS.
- E. INCIDENTALS:
1. EXTERNAL ANGLES:
 - a. WHERE NOT OTHERWISE INDICATED ON THE DRAWINGS, PROVIDE WITH 3/4-INCH BEVEL, FORMED BY UTILIZING TRUE DIMENSIONED WOOD OR SOLID PLASTIC CHAMFER STRIP ON WALKWAYS, SLABS, WALLS, BEAMS, COLUMNS, AND OPENINGS.
 - b. PROVIDE 1/4-INCH BEVEL FORMED BY UTILIZING TRUE DIMENSIONED WOOD OR SOLID PLASTIC CHAMFER STRIP ON WALKWAYS, WALLS, AND SLABS AT EXPANSION AND CONSTRUCTION JOINTS.

PART 3 EXECUTION

3.01 EXAMINATION

- A. SITE VERIFICATION OF CONDITIONS:
1. DO NOT PLACE CONCRETE UNTIL FORMS HAVE BEEN CHECKED FOR ALIGNMENT, LEVEL, AND STRENGTH, AND MECHANICAL AND ELECTRICAL INSERTS OR OTHER EMBEDDED ITEMS FOR CORRECT LOCATION.

3.02 INSTALLATION

A. FORMS: BUILT-UP PLYWOOD:

1. STUDDING:
 - a. SPACED AT 16 INCHES OR 24 INCHES ON CENTER.
 - b. CLOSER SPACING MAY BE REQUIRED DEPENDING UPON STRENGTH REQUIREMENTS OF THE FORMS, IN ORDER TO PREVENT ANY BULGING SURFACES ON FACES OF FINISHED CONCRETE WORK.
 - c. INSTALL STUDS PERPENDICULAR TO GRAIN OF EXTERIOR PLYS OF PLYWOOD SHEETS.
2. WALES: FORM WALES OF DOUBLE LUMBER MATERIAL WITH MINIMUM SIZE AS SPECIFIED IN THIS SECTION.
3. NUMBER OF FORM REUSES: DEPENDS UPON DURABILITY OF SURFACE COATING OR OVERLAY USED, AND ABILITY TO MAINTAIN FORMS IN CONDITION SUCH THAT THEY ARE CAPABLE OF PRODUCING FLAT, SMOOTH, HARD, DENSE FINISH ON CONCRETE WHEN STRIPPED.

B. FORMS: STEEL OR STEEL FRAMED:

1. STEEL FORMS:
 - a. ADEQUATELY BRACE FORMS FOR MINIMUM DEFLECTION OF FINISH SURFACE.
2. STEEL FRAMED PLYWOOD FORMS:
 - a. RIGIDLY CONSTRUCT AND BRACE WITH JOINTS FITTING CLOSELY AND SMOOTHLY.
 - b. NUMBER OF FORM REUSES: DEPENDS UPON DURABILITY OF SURFACE COATING OR OVERLAY USED.
3. BUILT-UP PLYWOOD FORMS: AS SPECIFIED IN THIS SECTION MAY BE USED IN CONJUNCTION WITH STEEL FORMS OR STEEL FRAMED PLYWOOD FORMS FOR SPECIAL FORMING CONDITIONS SUCH AS CORBELS AND FORMING AROUND ITEMS WHICH WILL PROJECT THROUGH FORMS.

C. USE EARTH TRENCHES OR EXCAVATIONS FOR FOOTINGS IF SOIL CONDITION PERMITS; USE SPECIFIED MATERIALS TO FORM SECTIONS OF FOOTING, WHICH ARE EXPOSED. INCREASE HORIZONTAL FOOTING DIMENSIONS BY 1 INCH, MINIMUM, FROM DIMENSIONS SHOWN, WHEN EARTH FORMS ARE USED.

D. FORM BRACING AND ALIGNMENT:

1. LINE AND GRADE: LIMIT DEVIATIONS TO TOLERANCES WHICH WILL PERMIT PROPER INSTALLATION OF STRUCTURAL EMBEDDED ITEMS OR MECHANICAL AND ELECTRICAL EQUIPMENT AND PIPING.
2. FORMWORK:
 - a. SECURELY BRACE, SUPPORT, TIE DOWN, OR OTHERWISE HOLD IN PLACE TO PREVENT MOVEMENT.
 - b. MAKE ADEQUATE PROVISIONS FOR UPLIFT PRESSURE, LATERAL PRESSURE ON FORMS, AND DEFLECTION OF FORMS.
3. WHEN SECOND LIFT IS PLACED ON HARDENED CONCRETE: TAKE SPECIAL PRECAUTIONS IN FORM WORK AT TOP OF OLD LIFT AND BOTTOM OF NEW LIFT TO PREVENT:
 - a. SPREADING AND VERTICAL OR HORIZONTAL DISPLACEMENT OF FORMS.
 - b. GROUT "BLEEDING" ON FINISH CONCRETE SURFACES.
4. PIPE STUBS, ANCHOR BOLTS, AND OTHER EMBEDDED ITEMS: SET IN FORMS WHERE REQUIRED.
5. CRACKS, OPENINGS, OR OFFSETS AT JOINTS IN FORMWORK: CLOSE THOSE THAT ARE 1/16-INCH OR LARGER BY TIGHTENING FORMS OR BY FILLING WITH ACCEPTABLE CRACK FILLER.

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E. FORMS: INCIDENTALS:

1. REENTRANT ANGLES: MAY BE LEFT SQUARE.
2. LEVEL STRIPS: INSTALL AT TOP OF WALL CONCRETE PLACEMENTS TO MAINTAIN TRUE LINE AT HORIZONTAL CONSTRUCTION JOINTS.
3. INSERTS:
 - a. ENCASE PIPES, ANCHOR BOLTS, STEPS, REGLETS, CASTINGS, AND OTHER INSERTS, AS INDICATED ON THE DRAWINGS OR AS REQUIRED, IN CONCRETE.
 - b. LOCATE HARDWARE ACCURATELY AND ANCHOR SECURELY TO FORMS OR OTHER FALSEWORK. USE METAL DOOR AND WINDOW FRAMES WHEN THEY ARE SO ADAPTABLE.
4. PIPE AND CONDUIT PENETRATIONS:
 - a. INSTALL PIPE AND CONDUIT IN STRUCTURES AS INDICATED ON THE DRAWINGS, AND SEAL WITH MATERIALS AS SPECIFIED IN SECTION 079000.

F. FORM RELEASE AGENT:

1. APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

G. FORM TIES:

1. CONE-SNAP TIES: TIE FORMS TOGETHER AT NOT MORE THAN 2-FOOT CENTERS VERTICALLY AND HORIZONTALLY.

3.03 FORM REMOVAL

A. KEEP FORMS IN PLACE FOR AT LEAST THE PERIODS INDICATED IN THE FOLLOWING PARAGRAPHS.

1. VERTICAL FORMS:

- a. KEEP VERTICAL FORMS IN PLACE FOR A MINIMUM OF 24 HOURS AFTER CONCRETE IS PLACED.
- b. IF, AFTER 24 HOURS, CONCRETE HAS SUFFICIENT STRENGTH AND HARDNESS TO RESIST SURFACE OR OTHER DAMAGE, FORMS MAY BE REMOVED.

2. OTHER FORMS AND SHORING: KEEP IN PLACE:

- a. SIDES OF FOOTINGS: 24 HOURS MINIMUM.
- b. VERTICAL SIDES OF BEAMS, GIRDERS, WALL COLUMNS AND SIMILAR MEMBERS: 48 HOURS MINIMUM.
- c. BOTTOM OF SLABS, BEAMS, AND GIRDERS: UNTIL CONCRETE STRENGTH REACHES SPECIFIED STRENGTH F'C OR UNTIL SHORING IS INSTALLED.
- d. SHORING FOR SLABS, BEAMS, AND GIRDERS: SHORE UNTIL CONCRETE STRENGTH REACHES SPECIFIED STRENGTH.
- e. WALL BRACING: BRACE WALLS UNTIL CONCRETE STRENGTH OF BEAMS AND SLABS Laterally Supporting Wall REACHES SPECIFIED STRENGTH.

B. GREEN CONCRETE:

1. NO HEAVY LOADING ON GREEN CONCRETE WILL BE PERMITTED.

C. REMOVE FORMWORK PROGRESSIVELY AND IN ACCORDANCE WITH CODE REQUIREMENTS SO THAT NO SHOCK LOADS OR UNBALANCED LOADS ARE IMPOSED ON STRUCTURE.

D. WHERE FORMS ARE REMOVED IN LESS THAN 7 DAYS, CURING SHALL BE CONTINUED AS FOLLOWS:

1. IMMEDIATELY FOLLOWING FORM REMOVAL THOROUGHLY WET SURFACE.
2. CONTINUE CURING IN ACCORDANCE WITH PROVISIONS OF DIVISION 03 SECTION "CAST-IN-PLACE CONCRETE".

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- E. REUSE OF FORMS: FORMS MAY BE REUSED PROVIDED THEY ARE STRAIGHT, CLEAN, FREE FROM NAILS, DIRT, HARDENED CONCRETE, RUST, AND OTHER INJURIOUS MATTER AND EDGES AND SURFACES ARE IN GOOD CONDITION:
1. CLEAN AND REPAIR DAMAGE CAUSED BY PLACING, REMOVAL, OR STORAGE. REUSE OF FORMWORK THAT WOULD REDUCE QUALITY OF EXPOSED-TO-VIEW CONCRETE WILL NOT BE PERMITTED.
 2. FORMS SHALL NOT BE REUSED FOR ARCHITECTURAL CONCRETE IF THERE IS EVIDENCE OF SURFACE WEAR OR DEFECT THAT WOULD IMPAIR THE QUALITY OF THE SURFACE.

3.04 SURFACE REPAIRS AND FINISHING

- A. IMMEDIATELY AFTER FORMS ARE REMOVED, CAREFULLY EXAMINE CONCRETE SURFACES, AND REPAIR ANY IRREGULARITIES IN SURFACES AND FINISHES AS SPECIFIED IN SECTION 033000.
- B. FORM TIES: REMOVE FORM TIES FROM SURFACES. FILL TIE HOLES AS FOLLOWS:
1. REMOVE FORM TIES FROM SURFACES.
 2. ROUGHEN CONE SHAPED TIE HOLES BY HEAVY SANDBLASTING BEFORE REPAIR.
 3. DRY PACK CONE SHAPED TIE HOLES WITH DRY-PACK MORTAR AS SPECIFIED IN SECTION 036000.
 4. TAPER TIES:
 - a. AFTER FORMS AND TAPER TIES ARE REMOVED FROM WALL, PLUG TIE HOLES WITH NEOPRENE PLUG AS FOLLOWS:
 - 1) HEAVY SANDBLAST AND THEN CLEAN TIE HOLES.
 - 2) AFTER CLEANING, DRIVE NEOPRENE PLUG INTO EACH OF TAPER TIE HOLES WITH STEEL ROD. FINAL LOCATION OF NEOPRENE PLUG SHALL BE IN CENTER THIRD OF WALL THICKNESS. BOND NEOPRENE PLUG TO CONCRETE WITH EPOXY.
 - 3) LOCATE STEEL ROD IN CYLINDRICAL RECESS AND AGAINST MIDDLE OF PLUG DURING DRIVING.
 - a) AT NO TIME ARE PLUGS TO BE DRIVEN ON FLAT AREA OUTSIDE CYLINDRICAL RECESS.
 - b. DRY-PACK OF TAPER TIE HOLES:
 - 1) AFTER INSTALLING PLUGS IN TIE HOLES, COAT TIE HOLE SURFACE WITH EPOXY BONDING AGENT AND FILL WITH DRY-PACK MORTAR AS SPECIFIED IN SECTION 036000.
 - a) PLACE DRY-PACK MORTAR IN HOLES IN LAYERS WITH THICKNESS NOT EXCEEDING TIE HOLE DIAMETER AND HEAVILY COMPACT EACH LAYER.
 - b) DRY-PACK THE OUTSIDE OF THE HOLE NO SOONER THAN 7 DAYS AFTER THE INSIDE OF THE HOLE HAS BEEN DRY PACKED.
 - c) WALL SURFACES IN AREA OF DRY-PACKED TIE HOLES: ON THE WATER SIDE OF WATER CONTAINING STRUCTURES AND THE OUTSIDE OF BELOW GRADE WALLS:
 - COVER WITH MINIMUM OF 10 MILS OF EPOXY GEL.
 - PROVIDE EPOXY GEL COATING ON WALL SURFACES THAT EXTEND MINIMUM OF 2 INCHES PAST DRY-PACK MORTAR FILLED TIE HOLES.
 - PROVIDE FINISH SURFACES THAT ARE FREE FROM SAND STREAKS OR OTHER VOIDS.

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3.05 TOLERANCES:

- A. FINISHED CONCRETE SHALL CONFORM TO SHAPES, LINES, GRADES, AND DIMENSIONS INDICATED ON THE DRAWINGS.
- B. CONSTRUCT WORK WITHIN THE TOLERANCES IN ACCORDANCE WITH ACI 117, EXCEPT AS MODIFIED IN THE FOLLOWING PARAGRAPHS OR AS INDICATED ON THE DRAWINGS.
1. GENERAL:
 - a. AT CERTAIN LOCATIONS IN THE WORK, TOLERANCES REQUIRED FOR EQUIPMENT PLACEMENT AND OPERATION MAY BE MORE RESTRICTIVE THAN THE GENERAL TOLERANCE REQUIREMENTS OF THIS SECTION.
 - b. CONFIRM EQUIPMENT MANUFACTURERS' REQUIRED TOLERANCES FOR LOCATION AND OPERATION OF EQUIPMENT THAT WILL BE INSTALLED, AND CONSTRUCT CONCRETE TO SATISFY THOSE REQUIREMENTS.
 2. SLABS:
 - a. SLOPE: UNIFORMLY SLOPED TO DRAIN WHEN SLOPE IS INDICATED ON THE DRAWINGS.
 - b. SLABS INDICATED TO BE LEVEL: HAVE MAXIMUM VERTICAL DEVIATION OF 1/8-INCH IN 10-FOOT HORIZONTAL LENGTH WITHOUT ANY APPARENT CHANGES IN GRADE.
 3. INSERTS AND EMBEDMENTS:
 - a. SET INSERTS AND EMBEDMENTS TO TOLERANCES REQUIRED FOR PROPER INSTALLATION AND OPERATION OF EQUIPMENT OR SYSTEMS TO WHICH INSERT PERTAINS.
 - b. MAXIMUM TOLERANCES: AS FOLLOWS:

ITEM	TOLERANCE
SLEEVES AND INSERTS	PLUS 1/8 MINUS 1/8 INCHES.
ANCHOR BOLTS:	
PROJECTED ENDS	PLUS 1/4 MINUS 0.0 INCHES.
AXIAL ALIGNMENT	NOT MORE THAN 2 DEGREES OFF THE AXIS INDICATED ON THE DRAWINGS.
SETTING LOCATION	PLUS 1/16 MINUS 1/16 INCHES.

- C. REMOVE AND REPLACE WORK THAT DOES NOT CONFORM TO REQUIRED TOLERANCES. PROCEDURES AND PRODUCTS EMPLOYED IN AND RESULTING FROM SUCH RE-WORK SHALL BE ACCEPTABLE TO THE ENGINEER.

END OF SECTION

**SECTION 031500
CONCRETE ACCESSORIES**

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES:
1. WATERSTOPS.
 2. JOINT FILLERS.

1.02 REFERENCES

- A. ASTM INTERNATIONAL (ASTM):
1. D 570 - STANDARD TEST METHOD FOR WATER ABSORPTION OF PLASTICS.
 2. D 624 - STANDARD TEST METHOD FOR TEAR STRENGTH OF CONVENTIONAL VULCANIZED RUBBER AND THERMOPLASTIC ELASTOMERS.
 3. D 638 - STANDARD TEST METHOD FOR TENSILE PROPERTIES OF PLASTICS.
 4. D 746 - STANDARD TEST METHOD FOR BRITTLINESS TEMPERATURE OF PLASTICS AND ELASTOMERS BY IMPACT.
 5. D 747 - STANDARD TEST METHOD FOR APPARENT BENDING MODULUS OF PLASTICS BY MEANS OF A CANTILEVER BEAM.
 6. D 792 - STANDARD TEST METHODS FOR DENSITY AND SPECIFIC GRAVITY (RELATIVE DENSITY) OF PLASTICS BY DISPLACEMENT.
 7. D 1751 - STANDARD SPECIFICATION FOR PREFORMED EXPANSION JOINT FILLER FOR CONCRETE PAVING AND STRUCTURAL CONSTRUCTION (NONEXTRUDING AND RESILIENT BITUMINOUS TYPES).
 8. D 1752 - STANDARD SPECIFICATION FOR PREFORMED SPONGE RUBBER CORK AND RECYCLED PVC EXPANSION JOINT FILLERS FOR CONCRETE PAVING AND STRUCTURAL CONSTRUCTION.
 9. D 2240 - STANDARD TEST METHOD FOR RUBBER PROPERTY - DUROMETER HARDNESS.
- B. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI):
1. A135.4 - BASIC HARDBOARD.
- C. U. S. ARMY CORPS OF ENGINEERS (USACE):
1. CRD-C-572, SPECIFICATION FOR POLYVINYL CHLORIDE WATERSTOP.

1.03 SUBMITTALS

- A. PRODUCT DATA:
1. POLYVINYL CHLORIDE WATERSTOPS: COMPLETE PHYSICAL CHARACTERISTICS.
 2. PREFORMED EXPANSION JOINT MATERIAL: SUFFICIENT INFORMATION ON EACH TYPE OF MATERIAL FOR REVIEW TO DETERMINE CONFORMANCE OF MATERIAL TO REQUIREMENTS SPECIFIED.
- B. SAMPLES:
1. POLYVINYL CHLORIDE WATERSTOP.
- C. LABORATORY TEST REPORTS: INDICATING THAT AVERAGE PROPERTIES OF POLYVINYL CHLORIDE

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WATERSTOPS MATERIAL AND FINISH CONFORM TO REQUIREMENTS SPECIFIED IN THIS SECTION.

D. QUALITY CONTROL SUBMITTALS:

1. CERTIFICATES OF COMPLIANCE:

- a. WRITTEN CERTIFICATES THAT POLYVINYL CHLORIDE WATERSTOPS SUPPLIED ON THIS PROJECT MEET OR EXCEED PHYSICAL PROPERTY IN ACCORDANCE WITH USACE CRD-C-572 AND THE REQUIREMENTS OF THIS SECTION.

2. MANUFACTURER'S INSTRUCTIONS: FOR MATERIALS SPECIFIED IN THIS SECTION THAT ARE SPECIFIED TO BE INSTALLED WITH SUCH INSTRUCTIONS.

1.04 QUALITY ASSURANCE

A. MOCK-UPS:

1. WELDING DEMONSTRATION:

- a. DEMONSTRATE ABILITY TO WELD ACCEPTABLE JOINTS IN POLYVINYL CHLORIDE WATERSTOPS BEFORE INSTALLING WATERSTOP IN FORMS.

B. FIELD JOINTS:

1. POLYVINYL CHLORIDE WATERSTOPS FIELD JOINTS: FREE OF MISALIGNMENT, BUBBLES, INADEQUATE BOND, POROSITY, CRACKS, OFFSETS, AND OTHER DEFECTS WHICH WOULD REDUCE THE POTENTIAL RESISTANCE OF MATERIAL TO WATER PRESSURE AT ANY POINT. REPLACE DEFECTIVE JOINTS. REMOVE FAULTY MATERIAL FROM SITE AND DISPOSED OF BY CONTRACTOR AT ITS OWN EXPENSE.

C. INSPECTIONS:

1. QUALITY OF WELDED JOINTS WILL BE SUBJECT TO ACCEPTANCE OF ENGINEER.
2. POLYVINYL CHLORIDE WATERSTOP: FOLLOWING DEFECTS REPRESENT PARTIAL LIST THAT WILL BE GROUNDS FOR REJECTION:
 - a. OFFSETS AT JOINTS GREATER THAN 1/16 INCH OR 15 PERCENT OF THE MATERIAL THICKNESS, AT ANY POINT, WHICHEVER IS LESS.
 - b. EXTERIOR CRACK AT JOINT DUE TO INCOMPLETE BOND, WHICH IS DEEPER THAN 1/16 INCH OR 15 PERCENT OF MATERIAL THICKNESS, AT ANY POINT, WHICHEVER IS LESS.
 - c. ANY COMBINATION OF OFFSET OR CRACK THAT WILL RESULT IN NET REDUCTION IN CROSS SECTION OF WATERSTOP IN EXCESS OF 1/16 INCH OR 15 PERCENT OF MATERIAL THICKNESS, AT ANY POINT, WHICHEVER IS LESS.
 - d. MISALIGNMENT OF JOINT THAT WILL RESULT IN MISALIGNMENT OF WATERSTOP IN EXCESS OF 1/2 INCH IN 10 FEET.
 - e. POROSITY IN WELDED JOINT AS EVIDENCED BY VISUAL INSPECTION.
 - f. BUBBLES OR INADEQUATE BONDING

PART 2 PRODUCTS

2.01 JOINT FILLERS

A. GENERAL:

1. USE SPECIFIC TYPE IN APPLICATIONS AS INDICATED ON THE DRAWINGS.
2. DO NOT USE SCRAP OR RECYCLED MATERIALS TO MANUFACTURE JOINT FILLERS.

B. PREFORMED EXPANSION JOINT MATERIALS:

1. BITUMINOUS FIBER EXPANSION JOINT MATERIAL:

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- a. PROPERTIES:
 - 1) THICKNESS: TO MATCH JOINT WIDTH INDICATED ON THE DRAWINGS.
 - 2) ASPHALT-IMPREGNATED FIBER IN ACCORDANCE WITH ASTM D 1751.
- b. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - 1) DURAJOINT.
 - 2) W.R. MEADOWS, SEALTIGHT FIBRE EXPANSION JOINT.
- 2. SYNTHETIC SPONGE RUBBER EXPANSION JOINT MATERIAL:
 - a. PROPERTIES:
 - 1) THICKNESS: AS RECOMMENDED FOR WIDTH INDICATED ON THE DRAWINGS.
 - 2) MATERIAL IN ACCORDANCE WITH ASTM D 1752, TYPE I.
 - b. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - 1) DURAJOINT.
 - 2) W.R. MEADOWS, SEALTIGHT SPONGE RUBBER.

2.02 WATERSTOPS

- A. WATERSTOPS - POLYVINYL CHLORIDE (PVC):
 - 1. MANUFACTURED FROM PRIME VIRGIN POLYVINYL CHLORIDE PLASTIC COMPOUND CONTAINING THE PLASTICIZERS, RESINS, STABILIZERS, AND OTHER MATERIALS NECESSARY TO MEET THE REQUIREMENTS AS SPECIFIED IN THIS SECTION.
 - 2. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. VINYLEX CORPORATION.
 - b. GREENSTREAK PLASTIC PRODUCTS COMPANY, INC.
 - 3. TYPE: RIBBED WATERSTOP, UNLESS OTHERWISE SPECIFIED ELSEWHERE:
 - a. CONSTRUCTION JOINTS: 6-INCH WIDE RIBBED TYPE.
 - b. EXPANSION JOINT FOR WALL PENETRATIONS FOR CONCRETE ENCASED ELECTRICAL DUCT BANKS: 6-INCH RIBBED TYPE WITH HOLLOW CENTER BULB.
 - c. EXPANSION JOINTS: 9-INCH WIDE RIBBED TYPE WITH HOLLOW CENTER BULB.
 - d. DUMBBELL-TYPE WATERSTOP WILL NOT BE ALLOWED UNLESS OTHERWISE SPECIFIED OR INDICATED ON THE DRAWINGS.
 - e. NO SCRAP OR RECLAIMED MATERIAL SHALL BE USED.
 - 4. PROPERTIES AS INDICATED IN THE FOLLOWING TABLE:

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PART 2

PHYSICAL CHARACTERISTICS	TEST METHOD	REQUIRED RESULTS
SPECIFIC GRAVITY	ASTM D 792	NOT LESS THAN 1.3
HARDNESS	ASTM D 2240	70 TO 90 TYPE A15 SHORE DUROMETER
TENSILE STRENGTH	ASTM D 638	NOT LESS THAN 2,000 POUNDS PER SQUARE INCH
ULTIMATE ELONGATION	ASTM D 638	NOT LESS THAN 300 PERCENT
ALKALI EXTRACTION	CRD-C-572	CHANGE IN WEIGHT AFTER 7 DAYS: BETWEEN MINUS 0.1 PERCENT AND PLUS 0.25 PERCENT. CHANGE IN HARDNESS AFTER 7 DAYS: NOT MORE THAN PLUS 5 POINTS
LOW TEMPERATURE BRITTLE POINT	ASTM D 746	NO SIGN OF CRACKING OR CHIPPING AT - 35 DEGREES FAHRENHEIT
WATER ABSORPTION	ASTM D 570	NOT MORE THAN 0.15 PERCENT AFTER 24 HOURS
ACCELERATED EXTRACTION TEST	CRD-C-572	TENSILE STRENGTH: NOT LESS THAN 1,600 POUNDS PER SQUARE INCH. ELONGATION: NOT LESS THAN 280 PERCENT.
STIFFNESS IN FLEXURE	ASTM D 747	NOT LESS THAN 600 POUNDS PER SQUARE INCH.
TEAR RESISTANCE	ASTM D 624	NOT LESS THAN 225 POUNDS PER INCH
THICKNESS	-	3/8 INCH.
CENTER BULB		
6-INCH WATERSTOPS	-	7/8 INCH OR 1-INCH NOMINAL OUTSIDE DIAMETER.
9-INCH WATERSTOPS	-	FOR EXPANSION JOINTS 1 INCH AND NARROWER: 1-INCH NOMINAL OUTSIDE DIAMETER. FOR EXPANSION JOINTS WIDER THAN 1 INCH: 2-INCH NOMINAL OUTSIDE DIAMETER.
ALLOWABLE TOLERANCES		
WIDTH	-	PLUS OR MINUS 3/16 INCH.
THICKNESS	-	PLUS OR MINUS 1/32 INCH.

PART 3 EXECUTION

3.01 INSTALLATION

A. WATERSTOPS:

1. GENERAL:

- a. STORE WATERSTOPS SO AS TO PERMIT FREE CIRCULATION OF AIR AROUND WATERSTOP MATERIAL AND PREVENT DIRECT EXPOSURE TO SUNLIGHT.
- b. INSTALL WATERSTOPS IN CONCRETE JOINTS WHERE INDICATED ON THE DRAWINGS.
- c. CARRY WATERSTOPS IN WALLS INTO LOWER SLABS AND JOIN TO WATERSTOPS IN SLABS WITH APPROPRIATE TYPES OF FITTINGS.
- d. IN WATERBEARING STRUCTURES: PROVIDE ALL JOINTS WITH WATERSTOPS, WHETHER INDICATED ON THE DRAWINGS OR NOT.
- e. PROVIDE WATERSTOPS THAT ARE CONTINUOUS.
- f. SET WATERSTOPS ACCURATELY TO POSITION AND LINE AS INDICATED ON THE DRAWINGS.
- g. HOLD AND SECURELY FIX EDGES IN POSITION AT INTERVALS OF NOT MORE THAN 24 INCHES SO THAT THEY DO NOT MOVE DURING PLACING OF CONCRETE.
- h. POSITION THE WATERSTOP SO THAT SYMMETRICAL HALVES OF WATERSTOP ARE EQUALLY DIVIDED BETWEEN CONCRETE POURS. CENTER AXIS OF WATERSTOP SHALL BE COINCIDENT WITH CENTERLINE OF THE JOINT.
- i. DO NOT DRIVE NAILS, SCREWS, OR OTHER FASTENERS THROUGH WATERSTOPS IN VICINITY OF CONSTRUCTION JOINTS.
- j. USE WIRES AT NOT MORE THAN 24 INCHES ON CENTERS NEAR OUTER EDGE OF WATERSTOP TO TIE WATERSTOPS INTO POSITION.
- k. SPECIAL CLIPS MAY BE USED IN LIEU OF WIRES, AT CONTRACTOR'S OPTION.
- l. TERMINATE WATERSTOPS 3 INCHES FROM TOP OF FINISH SURFACES OF WALLS AND SLABS UNLESS OTHERWISE SPECIFIED OR INDICATED ON THE DRAWINGS.
- m. WHEN ANY WATERSTOP IS INSTALLED IN CONCRETE ON ONE SIDE OF JOINT, WHILE THE OTHER HALF OR PORTION OF THE WATERSTOP REMAINS EXPOSED TO THE ATMOSPHERE FOR MORE THAN 2 DAYS, TAKE SUITABLE PRECAUTIONS TO SHADE AND PROTECT EXPOSED WATERSTOP FROM DIRECT RAYS OF SUNLIGHT DURING ENTIRE EXPOSURE AND UNTIL EXPOSED PORTION IS EMBEDDED IN CONCRETE.
- n. WHEN PLACING CONCRETE AT WATERSTOPS IN SLABS, LIFT EDGE OF WATERSTOP WHILE PLACING CONCRETE BELOW THE WATERSTOP. MANUALLY FORCE WATERSTOP AGAINST AND INTO CONCRETE, AND THEN COVER WATERSTOP WITH FRESH CONCRETE.

2. POLYVINYL CHLORIDE WATERSTOP:

- a. INSTALL WATERSTOPS SO THAT JOINTS ARE WATERTIGHT.
- b. WELD JOINTS SUCH AS UNIONS, CROSSES, ELLS, AND TEES, WITH THERMOSTATICALLY CONTROLLED EQUIPMENT RECOMMENDED BY WATERSTOP MANUFACTURER:
 - 1) DO NOT DAMAGE MATERIAL BY HEAT SEALING.
 - 2) MAKE JOINTS BY OVERLAPPING, THEN SIMULTANEOUSLY CUT ENDS OF SECTIONS TO BE SPLICED SO THEY WILL FORM SMOOTH EVEN JOINT. HEAT CUT ENDS WITH SPLICING TOOL UNTIL THE PLASTIC MELTS. PRESS 2 ENDS TOGETHER UNTIL PLASTIC COOLS.
 - 3) MAINTAIN CONTINUITY OF WATERSTOP RIBS AND TUBULAR CENTER AXIS.
 - 4) THE SPLICES SHALL HAVE TENSILE STRENGTH OF NOT LESS THAN 60 PERCENT OF UNSPLICED MATERIALS TENSILE STRENGTH.

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- c. BUTT JOINTS OF ENDS OF 2 IDENTICAL WATERSTOP SECTIONS MAY BE MADE WHILE MATERIAL IS IN FORMS.
- d. MANUFACTURER SHALL FACTORY PREFABRICATE JOINTS FOR CROSSES AND TEES.
- e. SPLIT-TYPE WATERSTOPS WILL NOT BE PERMITTED EXCEPT WHERE SPECIFICALLY INDICATED ON THE DRAWINGS.

B. JOINTS:

- 1. CONSTRUCT CONSTRUCTION AND EXPANSION JOINTS AS INDICATED ON THE DRAWINGS.
- 2. PREFORMED EXPANSION JOINT MATERIAL: FASTEN EXPANSION JOINT STRIPS TO CONCRETE, MASONRY, OR FORMS WITH ADHESIVE. NO NAILING WILL BE PERMITTED, NOR SHALL EXPANSION JOINT STRIPS BE PLACED WITHOUT FASTENING

END OF SECTION

**SECTION 032000
CONCRETE REINFORCING**

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES:
 - 1. REINFORCING BARS.
 - a. CARBON STEEL.
 - 2. BAR SUPPORTS.
 - 3. TIE WIRES.
 - 4. MECHANICAL REINFORCING BAR COUPLERS.
 - 5. SMOOTH DOWELS AT CONSTRUCTION JOINTS.
- B. RELATED SECTIONS.
 - 1. SECTION 013300 - SUBMITTAL PROCEDURES.
 - 2. SECTION 014000 - QUALITY REQUIREMENTS.
 - 3. SECTION 014524 - SPECIAL INSPECTION, SPECIAL TESTS, AND STRUCTURAL OBSERVATION.

1.02 REFERENCES

- A. AMERICAN CONCRETE INSTITUTE (ACI):
 - 1. 117 - SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS
 - 2. 301 - SPECIFICATIONS FOR STRUCTURAL CONCRETE
 - 3. 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY.
 - 4. SP-66 - ACI DETAILING MANUAL.
- B. AMERICAN IRON AND STEEL INSTITUTE (AISI).
- C. AMERICAN WELDING SOCIETY (AWS):
 - 1. D1.4 - STRUCTURAL WELDING CODE - REINFORCING STEEL.
- D. ASTM INTERNATIONAL (ASTM):
 - 1. A493 STANDARD SPECIFICATION FOR STAINLESS STEEL WIRE AND WIRE RODS FOR COLD HEADING AND COLD FORGING.
 - 2. A615 - STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON STEEL BARS FOR CONCRETE REINFORCEMENT.
 - 3. A706 - STANDARD SPECIFICATION FOR LOW-ALLOY STEEL DEFORMED AND PLAIN BARS FOR CONCRETE REINFORCEMENT.
 - 4. A970 - STANDARD SPECIFICATION FOR HEADED STEEL BARS FOR CONCRETE REINFORCEMENT
- E. CONCRETE REINFORCING STEEL INSTITUTE (CRSI):
 - 1. MANUAL OF STANDARD PRACTICE.
- F. ICC EVALUATION SERVICE (ICC-ES):
 - 1. AC133 - ACCEPTANCE CRITERIA FOR MECHANICAL CONNECTOR SYSTEMS FOR STEEL REINFORCING BARS.

1.03 DEFINITIONS

- A. ARCHITECTURAL CONCRETE: CONCRETE SURFACES THAT WILL BE EXPOSED TO VIEW IN THE FINISHED WORK. FOR PURPOSES OF THIS SECTION, ARCHITECTURAL CONCRETE INCLUDES THE FOLLOWING:
 - 1. CONCRETE SURFACES SPECIFIED TO RECEIVE PAINTS OR COATINGS.
 - 2. EXPOSED CONCRETE IN OPEN BASINS, CHANNELS, AND SIMILAR LIQUID CONTAINING STRUCTURES, THAT IS LOCATED ABOVE A LINE 2 FEET BELOW THE NORMAL OPERATING WATER SURFACE ELEVATION IN THAT STRUCTURE.
- B. BARS: REINFORCEMENT OR REINFORCING BARS AS SPECIFIED IN THIS SECTION.
- C. EVALUATION REPORT. REPORT PREPARED BY ICC-ES , OR BY OTHER TESTING AGENCY ACCEPTABLE TO THE ENGINEER AND TO THE BUILDING OFFICIAL, THAT DOCUMENTS TESTING AND REVIEW OF A PRODUCT TO CONFIRM THAT IT COMPLIES WITH THE REQUIREMENTS OF DESIGNATED ICC-ES ACCEPTANCE CRITERIA, AND ITS ACCEPTANCE FOR USE UNDER THE 2022 CALIFORNIA BUILDING CODE.
- D. GIVE AWAY BARS: REINFORCING BARS THAT ARE NOT REQUIRED BY THE CONTRACT DOCUMENTS, BUT ARE INSTALLED BY THE CONTRACTOR TO PROVIDE SUPPORT FOR THE REQUIRED REINFORCING BARS.
- E. WIRE SUPPORTS: METAL REINFORCING SUPPORTS CONSTRUCTED OF STEEL WIRE AS SPECIFIED. INCLUDES INDIVIDUAL HIGH CHAIRS, CONTINUOUS HIGH CHAIRS, BOLSTERS AND OTHER SIMILAR CONFIGURATIONS AND SHAPES.

1.04 SYSTEM DESCRIPTION

- A. THE DRAWINGS CONTAIN NOTES DESCRIBING THE SIZE AND SPACING OF REINFORCEMENT AND ITS PLACEMENT, DETAILS OF REINFORCEMENT AT WALL CORNERS AND INTERSECTIONS, AND DETAILS OF EXTRA REINFORCEMENT AROUND OPENINGS IN CONCRETE, AND OTHER RELATED INFORMATION.

1.05 SUBMITTALS

- A. GENERAL:
 - 1. SUBMIT IN ACCORDANCE WITH SECTION 013300.
 - 2. CHANGES TO REINFORCEMENT IN CONTRACT DOCUMENTS:
 - a. INDICATE IN A SEPARATE LETTER SUBMITTED WITH SHOP DRAWINGS ANY CHANGES TO REINFORCEMENT INDICATED ON THE DRAWINGS OR SPECIFIED.
 - b. SUCH CHANGES WILL NOT BE ACCEPTABLE UNLESS ENGINEER HAS ACCEPTED THEM IN WRITING.
- B. PRODUCT DATA:
 - 1. BAR SUPPORTS:
 - a. WIRE BAR SUPPORTS:
 - 1) SCHEDULE OF SUPPORT MATERIALS TO BE PROVIDED AND LOCATIONS OF USE.
 - b. PRECAST CONCRETE BAR SUPPORTS ("DOBIES"):
 - 1) MANUFACTURER'S DATA INDICATING COMPRESSION STRENGTH OF CONCRETE AND CONFIRMING DIMENSIONS AND THICKNESS(ES).HEIGHT(S) TO BE PROVIDED FOR EACH LOCATION WHERE USED.
 - 2. MECHANICAL REINFORCING BAR COUPLERS. FOR EACH TYPE AND/OR SERIES TO BE PROVIDED:
 - a. EVALUATION REPORT DOCUMENTING COMPLIANCE WITH THE REQUIREMENTS OF ICC-ES

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- b. DETAILS, PROPERTIES, AND DIMENSIONS OF COUPLERS. INCLUDE TYPE OR SIZE IDENTIFICATION, AND BAR SIZE(S) AND GRADE(S) FOR WHICH THE COUPLER IS SUITABLE.
- c. MANUFACTURER'S INSTALLATION AND TESTING INSTRUCTIONS.
- d. MANUFACTURER'S STATEMENT THAT PRODUCTS INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDED PROCEDURES WILL DEVELOP STRENGTHS AND LIMIT SLIP AS SPECIFIED IN THIS SECTION.

C. SHOP DRAWINGS:

1. REINFORCEMENT SHOP DRAWINGS:

- a. SUBMIT DRAWINGS SHOWING BENDING AND PLACEMENT OF REINFORCEMENT REQUIRED BY THE CONTRACT DOCUMENTS.
- b. CLEARLY INDICATE STRUCTURES OR PORTIONS OF STRUCTURES COVERED BY EACH SUBMITTAL.
 - 1) SUBMIT REINFORCEMENT SHOP DRAWINGS FOR EACH STRUCTURE AS A COMPLETE PACKAGE. SUBMITTALS ADDRESSING ONLY A PORTION OF A STRUCTURE WILL BE REJECTED AND RETURNED WITHOUT REVIEW, UNLESS SUCH PRESENTATION IS ACCEPTED BY ENGINEER IN ADVANCE.
- c. SHOP DRAWINGS SHALL CONFORM TO THE RECOMMENDATIONS OF THE CRSI MANUAL OF STANDARD PRACTICE AND ACI SP-66.
- d. USE THE SAME BAR IDENTIFICATION MARKS ON BENDING DETAIL DRAWINGS, PLACEMENT DRAWINGS, AND SHIPPING TAGS.
- e. SUBMITTALS CONSISTING SOLELY OF REINFORCING BAR SCHEDULES, WITHOUT ACCOMPANYING PLACEMENT DRAWINGS, WILL NOT BE ACCEPTED UNLESS ACCEPTED UNDER PRIOR WRITTEN AGREEMENT WITH ENGINEER.

2. REINFORCEMENT PLACEMENT DRAWINGS:

- a. CLEARLY SHOW PLACEMENT OF EACH BAR LISTED IN THE BILL OF MATERIALS, INCLUDING ADDITIONAL REINFORCEMENT AT CORNERS AND OPENINGS, AND OTHER REINFORCEMENT REQUIRED BY DETAILS IN THE CONTRACT DOCUMENTS.
- b. CLEARLY IDENTIFY LOCATIONS OF REINFORCEMENT WITH COATINGS (E.G. GALVANIZED OR EPOXY) AND WITH YIELD STRENGTH OTHER THAN ASTM A615, GRADE 60.
- c. SHOW SPLICE LOCATIONS.
- d. INDICATE LOCATIONS OF MECHANICAL REINFORCING COUPLERS IF USED.

3. REINFORCEMENT FABRICATION DRAWINGS.

- a. IF BEND TYPES OR NOMENCLATURE DIFFERS FROM THAT RECOMMENDED IN THE CRSI MANUAL OF STANDARD PRACTICE, PROVIDE DETAILS SHOWING BEND TYPES AND DIMENSIONAL DESIGNATIONS. CLEARLY IDENTIFY REINFORCEMENT WITH COATINGS AND WITH YIELD STRENGTH OTHER THAN ASTM A615, GRADE 60.

D. SAMPLES (WHEN REQUESTED BY ENGINEER):

- 1. BAR SUPPORTS / WIRE REINFORCEMENT SUPPORTS: SAMPLES OF EACH TYPE OF CHAIR AND BOLSTER PROPOSED FOR USE. SUBMIT WITH LETTER STATING WHERE EACH TYPE WILL BE USED.
- 2. PRECAST CONCRETE BAR SUPPORTS: SAMPLES OF EACH TYPE OF PRECAST SUPPORT PROPOSED FOR USE. SUBMIT WITH LETTER STATING WHERE EACH WILL BE USED.

E. TEST REPORTS:

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1. CERTIFIED COPY OF MILL TEST FOR EACH STEEL USED. SHOW PHYSICAL PROPERTIES AND CHEMICAL ANALYSIS.
 - a. MILL TEST REPORTS MAY BE SUBMITTED AS RECORD DOCUMENTS AT THE TIME THE REINFORCEMENT FROM THAT HEAT OF STEEL IS SHIPPED TO THE SITE.
 - b. IN SUCH CASES, SUBMIT CERTIFICATES UNDER THE SHOP DRAWING SUBMITTAL NUMBER WITH THE LETTER "R" (FOR RECORD DATE) APPENDED TO THE END (E.G., OF THE REINFORCEMENT WAS SUBMITTED AS 03320-002-1, DELIVER THE ASSOCIATED MILL CERTIFICATE AS SUBMITTAL 03320-002-1R).
 2. MECHANICAL REINFORCING BAR COUPLERS:
 - a. CURRENT EVALUATION REPORT CONFIRMING THAT COUPLERS PROVIDE SPECIFIED TENSION AND COMPRESSION STRENGTH AND CONFORM TO SPECIFIED LIMITS ON TOTAL SLIP WITHIN THE COUPLER.
 - b. CERTIFIED COPY OF MILL TESTS FOR HEAT(S) OF STEEL INCORPORATED INTO THE REINFORCING BAR COUPLERS SHIPPED.
 - c. FOR THREADED SLEEVE TYPE COUPLERS, HEAT TREATMENT LOT NUMBERS FOR EACH SHIPMENT.
- F. MANUFACTURER'S INSTRUCTIONS:
- a. MECHANICAL REINFORCING BAR COUPLERS:
 - 1) MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 - 2) MANUFACTURER'S INSTRUCTIONS FOR CONFIRMATION TESTING OF COUPLERS AFTER REINFORCING BARS HAVE BEEN INSERTED INTO THE COUPLERS.
- G. SPECIAL PROCEDURES:
- a. WELDING PROCEDURES CONFORMING TO AWS D1.4 FOR REINFORCEMENT TO BE FIELD WELDED.
 - b. PROCEDURES QUALIFICATION RECORD.
- H. QUALIFICATIONS STATEMENTS:
1. WELDER QUALIFICATIONS.
- I. CLOSEOUT DOCUMENTS:
1. FIELD QUALITY CONTROL AND INSPECTION REPORTS.
 2. FIELD QUALITY ASSURANCE SPECIAL INSPECTION AND TESTING REPORTS.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. PACKING AND SHIPPING:
1. DELIVER BARS BUNDLED AND TAGGED WITH IDENTIFYING TAGS.
- B. ACCEPTANCE AT SITE:
1. REINFORCING BARS: DELIVER REINFORCING BARS LACKING GRADE IDENTIFICATION MARKS WITH LETTER CONTAINING MANUFACTURER'S GUARANTEE OF GRADE.
- C. STORAGE:
1. STORE TO PREVENT EXCESSIVE RUSTING OR FOULING WITH GREASE OR ANY COATING THAT WILL INTERFERE WITH BOND.
 2. SEGREGATE SO AS TO MAINTAIN IDENTIFICATION AFTER BUNDLES ARE BROKEN. DO NOT USE DAMAGED, REWORKED, OR DETERIORATED MATERIAL.

1.07 SEQUENCING AND SCHEDULING

A. BAR SUPPORTS:

1. DO NOT PLACE CONCRETE UNTIL SAMPLES AND PRODUCT DATA FOR BAR SUPPORTS HAVE BEEN ACCEPTED BY ENGINEER

PART 2 PRODUCTS

2.01 MATERIALS

A. REINFORCING BARS:

1. PROVIDE REINFORCEMENT OF THE GRADES AND QUALITY SPECIFIED, FABRICATED FROM NEW STOCK, FREE FROM EXCESSIVE RUST OR SCALE, AND FREE FROM UNINTENDED BENDS OR OTHER DEFECTS AFFECTING ITS USEFULNESS.
2. REINFORCING BARS:
 - a. ASTM A615 GRADE 60 DEFORMED BARS, INCLUDING THE FOLLOWING REQUIREMENTS OR ASTM A706 GRADE 60 DEFORMED BARS.
 - 1) ACTUAL YIELD STRENGTH BASED ON MIL TESTS OF REINFORCEMENT PROVIDED SHALL NOT EXCEED THE MINIMUM YIELD STRENGTH SPECIFIED IN THIS SECTION BY MORE THAN 18,000 POUNDS PER SQUARE INCH.
 - 2) RATIO OF ACTUAL ULTIMATE TENSILE STRENGTH TO ACTUAL TENSILE YIELD STRENGTH SHALL IS NOT LESS THAN 1.25.
3. REINFORCING BARS DESIGNATED OR REQUIRED TO BE WELDED:
 - a. LOW-ALLOY, ASTM A706 GRADE 60, DEFORMED BARS.
 - b. ASTM A615 GRADE 60 DEFORMED BARS MAY BE USED IN LIEU OF ASTM A706 GRADE 60 IF FOLLOWING REQUIREMENTS ARE SATISFIED.
 - 1) WELDING PROCEDURES CONFORMING TO AWS D1.4 ARE SUBMITTED TO ENGINEER.
 - 2) THE SPECIFIC LOCATION FOR PROPOSED SUBSTITUTION IS ACCEPTABLE TO ENGINEER.

B. BAR SUPPORTS:

1. WIRE SUPPORTS:
 - a. ALL STAINLESS STEEL BAR SUPPORTS:
 - 1) CONFORMING TO CRSI MANUAL OF STANDARD PRACTICE RECOMMENDATIONS FOR TYPES AND DETAILS, BUT CUSTOM FABRICATED ENTIRELY FROM STAINLESS STEEL WIRE CONFORMING TO ASTM A493, AISI TYPE 316.
 - b. STAINLESS STEEL PROTECTED BAR SUPPORTS:
 - 1) CONFORMING TO CRSI MANUAL OF STANDARD PRACTICE CLASS 2, TYPE B, AND CONSISTING OF BRIGHT BASIC WIRE SUPPORT FABRICATED FROM COLD DRAWN CARBON STEEL WIRE WITH STAINLESS STEEL ENDS ATTACHED AT THE BOTTOM OF EACH LEG.
 - 2) STAINLESS STEEL WIRE ENDS SHALL CONFORM TO ASTM A493, AISI TYPE 316 AND SHALL EXTEND AT LEAST 3/4 INCH INWARD FROM THE FORMED SURFACE OF THE CONCRETE.
 - c. BRIGHT BASIC WIRE BAR SUPPORTS.
 - 1) CONFORMING TO CRSI MANUAL IF STANDARD PRACTICE, CLASS 3.
2. PLASTIC SUPPORTS:
 - a. PLASTIC, SUITABLE FOR USE AT WALL OR SLAB SURFACES EXPOSED TO EXTERIOR IN THE COMPLETED BUILDING, OF AN APPROVED MANUFACTURER.

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- b. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - 1) AZTEC CONCRETE ACCESSORIES.
- 3. DEFORMED STEEL REINFORCING BAR SUPPORTS:
 - a. FABRICATED OF MATERIALS AND TO CRSI DETAILS RECOMMENDED FOR TYPICAL REINFORCEMENT EMBEDDED IN CONCRETE AND BENT TO DIMENSIONS REQUIRED TO PROVIDE SPECIFIED CLEARANCES AND CONCRETE COVER.
- 4. PRECAST CONCRETE BAR SUPPORTS ("DOBIES"):
 - a. PRE-MANUFACTURED, PRECAST CONCRETE BLOCKS WITH CAST-IN ANNEALED STEEL WIRES, 16-GAGE OR HEAVIER.
 - b. COMPRESSION STRENGTH OF CONCRETE: EQUAL TO OR EXCEEDING THE COMPRESSION STRENGTH OF THE SURROUNDING CONCRETE.
 - c. BLOCK DIMENSIONS:
 - 1) HEIGHT TO PROVIDE SPECIFIED CONCRETE COVER.
 - 2) FOOTPRINT NOT LESS THAN 3 INCHES BY 3 INCHES, AND ADEQUATE TO SUPPORT THE WEIGHT OF THE REINFORCEMENT AND MAINTAIN SPECIFIED CONCRETE COVER WITHOUT SETTLING INTO THE UNDERLYING SURFACE.
- C. TIE WIRES:
 - 1. GENERAL USE: BLACK ANNEALED ASTM A82 STEEL WIRE, 16-GAGE OR HEAVIER.
- D. MECHANICAL REINFORCING BAR COUPLERS:
 - 1. GENERAL:
 - a. ONLY PRODUCTS CONFORMING TO THE REQUIREMENTS OF ACI 318 FOR MECHANICAL SPLICES, AND HOLDING A CURRENT EVALUATION REPORT THAT DOCUMENTS THE FOLLOWING PERFORMANCE CHARACTERISTICS, WILL BE CONSIDERED FOR USE.
 - b. STRENGTH OF COUPLER: CAPABLE OF DEVELOPING TENSION AND COMPRESSION STRENGTH NOT LOWER THAN THE LESSER OF THE FOLLOWING:
 - 1) ACI 318 "TYPE 2" UNITS: IN STATIC TENSION AND COMPRESSION:
 - a) MINIMUM 125 PERCENT OF THE ASTM-SPECIFIED MINIMUM YIELD STRENGTH OF THE REINFORCEMENT BEING SPLICED[OR TERMINATED].
 - b) MINIMUM 100 PERCENT OF THE ASTM-SPECIFIED MINIMUM ULTIMATE STRENGTH OF THE REINFORCEMENT BEING SPLICED[OR TERMINATED].
 - c. SLIP OF REINFORCING BARS WITHIN COUPLER: TOTAL SLIP OF THE REINFORCING BARS WITHIN THE SPLICE SLEEVE LIMITED AS FOLLOWS:
 - 1) FOR BAR SIZES #14 AND SMALLER, ELONGATION BETWEEN GAGE POINTS MEASURED CLEAR OF THE SPLICE SLEEVE NOT EXCEEDING 0.010 INCHES AFTER COUPLER HAS BEEN LOADED TO A TENSION OF 30,000 POUNDS PER SQUARE INCH AND LOAD RELAXED TO A TENSION OF 3,000 POUNDS PER SQUARE INCH.
 - d. FABRICATION:
 - 1) THREADED JOINTS:
 - a) PROVIDE THREADED ENDS DESIGNED SO THAT CROSS-THREADING OF BARS WILL NOT OCCUR DURING ASSEMBLY.
 - b) FABRICATE MALE ENDS FOR FEMALE COUPLERS USING COUPLER MANUFACTURER'S BAR THREADING EQUIPMENT TO ENSURE PROPER TAPER AND THREAD ENGAGEMENT.

- 2) MARK EACH SLEEVE WITH HEAT TREATMENT LOT NUMBER.
2. COUPLERS: THREADED - REINFORCING BAR SPLICE AT CONSTRUCTION JOINTS.
 - a. STEEL SLEEVE BUTT SPLICE WITH TAPERED INTERNAL THREADS IN FORGED OR SWAGED HEAD, AND NAILING FLANGE FOR ATTACHING TO FORMS. PROVIDE WITH MATCHING, TAPERED MALE-THREADED DOWELS FOR INSERTION AND TIGHTENING INTO THREADED SLEEVE AFTER FORM REMOVAL.
 - 1) PROVIDE SLEEVE WITH FACTORY-INSTALLED PLUGS TO PREVENT CONCRETE MORTAR FROM ENTERING INTERNALLY THREADED COUPLER.
 - 2) PROVIDE OPTIONAL CLIPPED NAILING FLANGES AS REQUIRED TO MAINTAIN MINIMUM SPECIFIED CONCRETE COVER OVER ALL SURFACES OF COUPLER.
 - b. HOLDING CURRENT EVALUATION REPORT DEMONSTRATING ACCEPTANCE UNDER ICC ES AC133.
 - c. MANUFACTURERS: ONE OF THE FOLLOWING, OR EQUAL:
 - 1) DAYTON SUPERIOR: DBDI SPLICE SYSTEM.
 - 2) ERICO-PENTAIR: LENTON FORM SAVER.
3. COUPLERS: THREADED - REINFORCING BAR SPLICE:
 - a. STEEL SLEEVE BUTT SPLICE WITH TAPERED INTERNAL THREADS AT EACH END FOR JOINING TO MATCHING TAPERED MALE THREADS ON REINFORCING BARS.
 - b. HOLDING CURRENT EVALUATION REPORT DEMONSTRATING ACCEPTANCE UNDER ICC ES AC133.
 - c. MANUFACTURERS: ONE OF THE FOLLOWING, OR EQUAL:
 - 1) DAYTON SUPERIOR: TAPER-LOCK SYSTEM.
 - 2) ERICO-PENTAIR: LENTON TAPER THREADED SPLICING SYSTEM.
4. SMOOTH DOWELS AT CONSTRUCTION JOINTS: ASTM A615, GRADE 40, PLAIN BILLET-STEEL BARS, OR ANY MILD-STEEL ROD STOCK OF 40,000 PSI OR GREATER YIELD STRENGTH. PROVIDE DOWELS WITH SMOOTH ENDS WITHOUT "RIVET" HEADS OR DEFORMATIONS OF ANY KIND.
5. WELDING ELECTRODES: E8018 FOR GRADE 60. E8029 MAY BE USED AT HORIZONTAL POSITIONS. AT BUTT-WELDED TENSION SPLICES IN GRADE 60 STEEL, E9018 ELECTRODES SHALL BE USED.

2.02 FABRICATION

- A. SHOP FABRICATION AND ASSEMBLY:
 1. CUT AND BEND BARS IN ACCORDANCE WITH PROVISIONS OF ACI 318 AND THE CRSI MANUAL OF STANDARD PRACTICE.
 2. BEND BARS COLD. USE BENDING COLLARS TO DEVELOP THE RECOMMENDED BEND RADIUS.
 3. PROVIDE BARS FREE FROM DEFECTS AND KINKS AND FROM BENDS NOT INDICATED ON THE DRAWINGS.
 4. CIRCUMFERENTIAL AND RADIUS REINFORCEMENT: ROLL TO THE RADIUS REQUIRED FOR ITS LOCATION IN THE STRUCTURE BEFORE INSTALLATION.
 5. BARS TO BE FITTED WITH MECHANICAL COUPLERS:
 - a. FABRICATE THREADED ENDS FOR CONNECTIONS IN SHOP USING MANUFACTURER'S RECOMMENDED TOOLS. FIELD FABRICATION IS NOT ALLOWED.
 - b. CUT ENDS SQUARE

PART 3 EXECUTION

3.01 EXAMINATION

A. VERIFICATION OF CONDITIONS:

1. REINFORCING BARS:

- a. VERIFY THAT REINFORCEMENT IS NEW STOCK, FREE FROM RUST SCALE, LOOSE MILL SCALE, EXCESSIVE RUST, DIRT, OIL, AND OTHER COATINGS THAT WILL ADVERSELY AFFECT BONDING CAPACITY WHEN PLACED IN THE WORK.

3.02 PREPARATION

A. SURFACE PREPARATION:

1. REINFORCING BARS - UNCOATED:

- a. CLEAN REINFORCEMENT OF CONCRETE, DIRT, OIL AND OTHER COATINGS THAT WILL ADVERSELY AFFECT BOND BEFORE EMBEDDING BARS IN SUBSEQUENT CONCRETE PLACEMENTS.
- b. THIN COATING OF RED RUST RESULTING FROM SHORT EXPOSURE WILL NOT BE CONSIDERED OBJECTIONABLE. THOROUGHLY CLEAN BARS HAVING RUST SCALE, LOOSE MILL SCALE, OR THICK RUST COAT.
- c. PARTIALLY EMBEDDED REINFORCEMENT: REMOVE CONCRETE OR OTHER DELETERIOUS COATINGS FROM DOWELS AND OTHER PROJECTING BARS BY WIRE BRUSHING OR SANDBLASTING BEFORE BARS ARE EMBEDDED IN SUBSEQUENT CONCRETE PLACEMENTS.

3.03 INSTALLATION

A. REINFORCING BARS: GENERAL:

- 1. FIELD-CUTTING OF REINFORCING BARS IS NOT PERMITTED.
- 2. FIELD-BENDING OF REINFORCING BARS, INCLUDING STRAIGHTENING AND REBENDING, IS NOT PERMITTED.

B. PLACING REINFORCING BARS:

- 1. ACCURATELY PLACE BARS TO MEET POSITION AND COVER REQUIREMENTS INDICATED ON THE DRAWINGS AND SPECIFIED. SECURE BARS IN POSITION.
- 2. AVOIDING CUTTING OR PUNCTURING VAPOR RETARDER/BARRIER DURING REINFORCEMENT PLACEMENT AND CONCRETING OPERATIONS. REPAIR DAMAGES BEFORE PLACING CONCRETE.
- 3. PLACE REINFORCING BARS TO GIVE FOLLOWING MINIMUM CONCRETE COVER:
 - a. SURFACES POURED AGAINST EARTH: 3 INCHES.
 - b. FORMED SURFACES EXPOSED TO EARTH OR WEATHER: 2-INCHES.
 - c. SLABS, WALLS, NOT EXPOSED TO WEATHER OR EARTH: 1-INCH.
 - d. BEAMS, GIRDERS NOT EXPOSED TO EARTH OR WEATHER: 1-1/2 INCHES.
 - e. COLUMN SPIRALS AND TIES: 1-1/2 INCHES.
 - f. OTHER LOCATIONS: ONE BAR DIAMETER.
- 4. TOLERANCES FOR PLACEMENT AND MINIMUM CONCRETE COVER: AS LISTED IN TABLE 1.

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TABLE 1- REINFORCEMENT PLACING TOLERANCES		
MEMBER	TOLERANCE ON REINFORCEMENT LOCATION (1)	TOLERANCE ON MINIMUM CONCRETE COVER (1,2)
SLABS, BEAMS, WALLS AND COLUMNS EXCEPT AS NOTED BELOW:		
10 INCHES THICK AND LESS	± 3/8 INCH	- 3/8 INCH
MORE THAN 10 INCHES THICK	± 1/2 INCH	- 1/2 INCH
FORMED SOFFITS:	AS NOTED ABOVE	- 1/4 INCH
LONGITUDINAL LOCATIONS OF BENDS AND ENDS OF REINFORCEMENT:		
CONDITIONS NOT LISTED BELOW:	± 2 INCHES	- 1/2 INCH
AT DISCONTINUOUS ENDS OF BRACKETS AND CORBELS	± 1/2 INCH	- 1/4 INCH
AT DISCONTINUOUS ENDS OF OTHER MEMBERS:	± 1 INCH	- 1/2 INCH
NOTES: (1) ± INDICATES "PLUS OR MINUS;" - INDICATES "MINUS;" + INDICATES "PLUS." (2) TOLERANCE ON COVER IS LIMITED AS NOTED BUT DECREASE IN COVER SHALL NOT EXCEED ONE THIRD OF THE MINIMUM COVER INDICATED ON THE DRAWINGS.		

5. SPACING BETWEEN BARS:
 - a. MINIMUM CLEAR SPACING BETWEEN BARS IN A LAYER:
 - 1) AS INDICATED ON THE DRAWINGS, BUT NOT LESS THAN THE LARGER OF
 - 2) 1.5 TIMES THE BAR DIAMETER OR 1-1/2 INCHES.
 - b. MINIMUM CLEAR SPACING BETWEEN BARS IN 2 OR MORE PARALLEL LAYERS:
 - 1) PLACE BARS IN UPPER LAYERS DIRECTLY ABOVE BARS IN LOWER LAYERS.
 - 2) MINIMUM SPACING BETWEEN LAYERS: AS INDICATED ON THE DRAWINGS, BUT NOT LESS THAN THE LARGER OF 1.5 TIMES THE BAR DIAMETER OR 1-1/2 INCHES.
 - c. LIMITS ON MINIMUM CLEAR SPACING BETWEEN BARS ALSO APPLIES TO THE CLEAR SPACING BETWEEN A LAP SPLICE AND THE ADJACENT BARS AND/OR LAP SPLICES.
6. LAP SPLICES FOR BARS:
 - a. LAP SPLICE LOCATIONS AND LAP SPLICE LENGTHS: AS INDICATED ON THE DRAWINGS. WHERE LAP LENGTHS ARE NOT INDICATED, PROVIDE IN ACCORDANCE WITH ACI 318.
 - b. UNLESS OTHERWISE SPECIFICALLY INDICATED ON THE DRAWINGS (AND NOTED AS "NON-CONTACT LAP SPLICE"), INSTALL BARS AT LAP SPLICES IN CONTACT WITH EACH OTHER AND FASTEN TOGETHER WITH TIE WIRE.
 - c. WHERE BARS ARE TO BE LAP SPLICED AT CONCRETE JOINTS, ENSURE THAT BARS PROJECT FROM THE FIRST CONCRETE PLACEMENT A LENGTH EQUAL TO OR GREATER THAN MINIMUM LAP SPLICE LENGTH INDICATED ON THE DRAWINGS.
 - d. STAGGER LAP SPLICES WHERE INDICATED ON THE DRAWINGS.
 - e. WHERE LAP SPLICE LENGTHS ARE NOT INDICATED ON THE DRAWINGS, PROVIDE LAP SPLICE LENGTHS IN ACCORDANCE WITH ACI 318.

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C. REINFORCING SUPPORTS:

1. PROVIDE SUPPORTS OF SUFFICIENT NUMBERS, SIZES, AND LOCATIONS TO MAINTAIN CONCRETE COVER, TO PREVENT SAGGING AND SHIFTING, AND TO SUPPORT LOADS DURING CONSTRUCTION WITHOUT DISPLACEMENT AND WITHOUT GOUGING OR INDENTATION INTO FORMING SURFACES.
 - a. QUANTITIES AND LOCATIONS OF SUPPORTS SHALL NOT BE LESS THAN THOSE INDICATED IN ACI SP-66 AND THE CRSI MANUAL OF STANDARD PRACTICE.
2. DO NOT USE BRICK, CONCRETE MASONRY UNITS, CONCRETE SPALLS, ROCKS, WOOD, OR SIMILAR MATERIALS FOR SUPPORTING REINFORCEMENT.
3. DO NOT USE "GIVE AWAY BARS" THAT HAVE LESS COVER THAN THAT REQUIRED BY THE CONTRACT DOCUMENTS. DO NOT ADJUST THE LOCATION OF REINFORCEMENT REQUIRED BY THE CONTRACT DOCUMENTS TO PROVIDE COVER FOR GIVE AWAY BARS.
4. PROVIDE BAR SUPPORTS OF HEIGHT REQUIRED TO MAINTAIN THE CLEAR CONCRETE COVER INDICATED ON THE DRAWINGS.
5. PROVIDE BAR SUPPORTS AT FORMED VERTICAL FACES TO MAINTAIN THE CLEAR CONCRETE COVER INDICATED ON THE DRAWINGS.
6. SCHEDULE OF REINFORCEMENT SUPPORT MATERIALS: PROVIDE BAR SUPPORTS AS INDICATED IN TABLE 2.

TABLE 2- REINFORCEMENT SUPPORT MATERIALS		
CASE	LOCATION	MATERIAL
A.	CONCRETE PLACED OVER EARTH AND CONCRETE SEAL SLABS ("MUD MATS"):	PRECAST CONCRETE BAR SUPPORTS.
B.	CONCRETE PLACED AGAINST FORMS AND EXPOSED TO WATER OR WASTEWATER PROCESS LIQUIDS (WHETHER OR NOT SUCH CONCRETE RECEIVED ADDITIONAL LININGS OR COATINGS):	ALL STAINLESS-STEEL BAR SUPPORTS.
C.	CONCRETE PLACED AGAINST FORMS AND EXPOSED TO EARTH, WEATHER, FREQUENT WASHDOWN, OR GROUNDWATER IN THE FINISHED WORK	ALL STAINLESS-STEEL BAR SUPPORTS.
D.	CONCRETE PLACED AGAINST FORMS AND EXPOSED TO INTERIOR EQUIPMENT/PIPING AREAS IN THE FINISHED WORK	STAINLESS STEEL PROTECTED BARS SUPPORT.
E.	BETWEEN MATS OF REINFORCEMENT, AND FULLY EMBEDDED WITHIN A CONCRETE MEMBER	BRIGHT BASIC WIRE BARS SUPPORT, OR DEFORMED STEEL REINFORCING BARS.

D. TYING OF REINFORCING:

1. FASTEN REINFORCEMENT SECURELY IN PLACE WITH WIRE TIES.
2. TIE REINFORCEMENT AT SPACINGS SUFFICIENT TO PREVENT SHIFTING.
 - a. PROVIDE AT LEAST 3 TIES IN EACH BAR LENGTH. (DOES NOT APPLY TO DOWEL LAP SPLICES OR TO BARS SHORTER THAN 4 FEET, UNLESS NECESSARY FOR RIGIDITY).
3. TIE SLAB BARS AT EVERY INTERSECTION AROUND PERIMETER OF SLAB.
4. TIE WALL BARS AND SLAB BAR INTERSECTIONS OTHER THAN AROUND PERIMETER AT NOT LESS

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THAN EVERY FOURTH INTERSECTION, BUT AT NOT MORE THAN THE SPACING INDICATED IN
TABLE 3:

TABLE 3- MAXIMUM SPACING OF TIE WIRES FOR REINFORCEMENT		
BAR SIZE	SLAB BAR SPACING INCHES	WALL BAR SPACING INCHES
BARS NUMBER 5 AND SMALLER	60	48
BARS NUMBER 6 THROUGH NUMBER 9	96	60
BARS NUMBER 10 AND NUMBER 11	120	96

5. AFTER TYING:
 - a. BEND ENDS OF WIRES INWARD TOWARDS THE CENTER OF THE CONCRETE SECTION. MINIMUM CONCRETE COVER FOR TIE WIRES SHALL BE THE SAME AS COVER REQUIREMENTS FOR REINFORCEMENT.
 - b. REMOVE TIE WIRE CLIPPINGS FROM INSIDE FORMS BEFORE PLACING CONCRETE.
6. ALL 90, 135, AND 180-DEGREE HOOKS ARE ACI STANDARD BENDS AND EXTENSION LENGTHS UNLESS NOTED OTHERWISE ON THE DRAWINGS. HOOKS MAY BE RACKED AT AN ANGLE WHEN THE CONCRETE DIMENSIONS INTERFERE WITH PLACEMENT.
- E. WELDING REINFORCING BARS:
 1. WELD REINFORCING BARS ONLY WHERE INDICATED ON THE DRAWINGS OR WHERE ACCEPTANCE IS RECEIVED FROM ENGINEER PRIOR TO WELDING.
 2. PERFORM WELDING IN ACCORDANCE WITH AWS D1.4 AND WELDING PROCEDURES ACCEPTED BY ENGINEER.
 - a. CONFORM TO REQUIREMENTS FOR MINIMUM PREHEAT AND INTERPASS TEMPERATURES.
 3. SUBMIT:
 - a. WELDING PROCEDURES SPECIFICATION.
 - b. PROCEDURES QUALIFICATION RECORD.
 - c. WELDER QUALIFICATION TEST RECORD.
 4. DO NOT TACK WELD REINFORCING BARS EXCEPT WHERE SPECIFICALLY INDICATED ON THE DRAWINGS.
- F. REINFORCING BAR MECHANICAL COUPLERS:
 1. INSTALL ONLY AT LOCATIONS INDICATED ON THE DRAWINGS OR WHERE PRIOR APPROVAL HAS BEEN OBTAINED FROM ENGINEER.
 2. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND REQUIREMENTS OF EVALUATION REPORT.
 - a. MAKE SPLICES USING MANUFACTURER'S STANDARD EQUIPMENT, JIGS, CLAMPS, AND OTHER REQUIRED ACCESSORIES.
 - b. AFTER ASSEMBLY OF THE SPLICE, TIGHTEN USING TORQUE LOAD NOT LESS THAN THAT RECOMMENDED BY THE MANUFACTURER.
 3. UNLESS GREATER COVER IS INDICATED ON THE DRAWINGS, PROVIDE CLEAR COVER FROM SURFACE OF CONCRETE TO OUTSIDE FACE OF COUPLERS THAT IS NOT LESS THAN THE MINIMUM CONCRETE COVER SPECIFIED FOR TYPICAL REINFORCEMENT.
 - a. IF COVER IS LESS THAN REQUIRED, CONTACT ENGINEER FOR EVALUATION OF CONDITIONS

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BEFORE MODIFYING LOCATIONS OF BARS OR PLACING CONCRETE.

- b. MODIFICATIONS TO MAINTAIN OR PROVIDE REQUIRED CONCRETE COVER, SUCH AS ADDITION OF CONCRETE; RE-POSITIONING OF STIRRUPS, TIES, ETC., MAY BE COMPLETED ONLY AFTER APPROVAL BY ENGINEER.
- G. ELEMENTS SHALL BE CORRECTLY AND ACCURATELY POSITIONED AND PLUMBED IN THEIR ASSIGNED POSITIONS. ELEMENTS SHALL BE SECURELY AND ADEQUATELY BRACED BY APPROVED METHODS UNTIL THE PERMANENT CLOSURES, ANCHORS, AND BRACING ARE COMPLETED.

3.04 FIELD QUALITY CONTROL

- A. PROVIDE QUALITY CONTROL FOR THE WORK OF THIS SECTION AS SPECIFIED IN SECTION 01_40_00.
- B. FIELD INSPECTIONS AND TESTING:
 - 1. SUBMIT RECORDS OF INSPECTIONS AND TESTING TO ENGINEER IN ELECTRONIC FORMAT WITHIN 24 HOURS AFTER COMPLETION.
- C. MANUFACTURER'S SERVICES:
 - 1. FURNISH MANUFACTURER'S TECHNICAL REPRESENTATIVE TO CONDUCT JOBSITE TRAINING REGARDING PROPER STORAGE, HANDLING, AND INSTALLATION OF MECHANICAL REINFORCING BAR COUPLERS FOR PERSONNEL WHO WILL PERFORM THE INSTALLATION. ENGINEER MAY ATTEND TRAINING SESSION.

3.05 FIELD QUALITY ASSURANCE

- A. PROVIDE QUALITY ASSURANCE AS SPECIFIED IN SECTION 014000.
- B. SPECIAL INSPECTIONS AND TESTS:
 - 1. PROVIDE AS SPECIFIED IN SECTION 014524.
 - 2. FREQUENCY OF INSPECTIONS:
 - a. UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR IN THIS SECTION, PROVIDE PERIODIC SPECIAL INSPECTION AS REQUIRED BY THE 2022 CALIFORNIA BUILDING CODE.
 - 3. PREPARATION:
 - a. REVIEW DRAWINGS AND SPECIFICATION FOR THE WORK TO BE OBSERVED.
 - b. REVIEW APPROVED SUBMITTAL SAND SHOP DRAWINGS.
 - 4. INSPECTIONS: SPECIAL INSPECTION SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING ITEMS.
 - a. REINFORCEMENT: GENERAL:
 - 1) TYPE (MATERIAL) AND LOCATION OF REINFORCEMENT SUPPORTS.
 - 2) BAR MATERIAL/STEEL GRADE AND BAR SIZE.
 - 3) LOCATION, PLACEMENT, AND SPACING OF BARS.
 - 4) CLEAR CONCRETE COVER OVER REINFORCEMENT.
 - 5) LAP SPLICE: LOCATION AND LAP LENGTH. BARS WITHIN TOLERANCES FOR CONTACT (UNLESS NON-CONTACT SPLICE IS INDICATED ON THE DRAWINGS.)
 - 6) BAR HOOKS AND DEVELOPMENT LENGTHS EMBEDDED WITHIN CONCRETE SECTIONS AS INDICATED ON THE DRAWINGS.
 - 7) REINFORCEMENT TIED IN POSITION AND TIE WIRE LEGS TURNED INWARD TOWARD THE CENTER OF THE CONCRETE SECTION.
 - b. REINFORCEMENT: WELDING. INSPECTOR QUALIFICATION AND INSPECTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF AWS D1.4.
 - 1) PROVIDE PERIODIC INSPECTION FOR:
 - a) WELDABILITY OF REINFORCEMENT OTHER THAN ASTM A706.
 - b) SINGLE PASS FILLET WELDS WITH THICKNESS LESS THAN OR EQUAL TO 5/16 INCH.
 - 2) PROVIDE CONTINUOUS INSPECTION FOR:
 - a) OTHER WELDS.
 - b) WELDS AT MECHANICAL REINFORCING BAR COUPLERS AND END ANCHORS.

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- 3) IN ADDITION TO VISUAL INSPECTION, OWNER MAY INSPECT REINFORCING BAR WELDS BY OTHER METHODS, INCLUDING RADIOGRAPHIC INSPECTION.
5. MECHANICAL REINFORCING BAR COUPLERS.
 - a. SPECIAL INSPECTION SHALL INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING ITEMS:
 - 1) COUPLER MODEL AND IDENTIFICATION.
 - 2) COUPLERS ARE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ENGINEERING REPORT FOR EACH PRODUCT.
 - 3) CONFIRMATION OF THE FOLLOWING:
 - a) GRADE AND SIZE OF REINFORCING BARS.
 - b) POSITION OF COUPLERS.
 - c) INSERTION LENGTH OF REINFORCEMENT.
 - d) TIGHTENING OF BARS IN THE COUPLERS.
6. RECORDS OF INSPECTIONS.
 - a. PROVIDE A WRITTEN RECORD OF EACH INSPECTION USING FORMS ACCEPTABLE TO THE ENGINEER AND TO THE BUILDING OFFICIAL.
 - b. SUBMIT ELECTRONIC COPIES OF INSPECTION REPORTS TO ENGINEER WITHIN 24 HOURS AFTER COMPLETION OF INSPECTIONS.

3.06 NON-CONFORMING WORK

- A. BEFORE PLACING CONCRETE, ADJUST OR REMOVE AND RE-INSTALL REINFORCEMENT TO CONFORM TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

3.07 CLEANING

- A. CLEAN ALL EXPOSED SURFACES FREE OF MORTAR, LAITANCE, AND CONSTRUCTION SOIL. DO NOT USE WIRE BRUSHES OR ANY ACID SOLUTIONS. TAKE SPECIAL PRECAUTIONS TO REMOVE ALL ALKALIS AND OTHER COMPOUNDS FROM SURFACE OF UNITS WHICH MIGHT CAUSE ETCHING OF GLASS OR METAL SURFACES DUE TO RUN-OFF FROM RAIN OR WINDOW CLEANING OPERATIONS.

3.08 PROTECTION

- A. PROTECT ALL UNITS EXPOSED IN THE FINISHED WORK FROM STAINS OR DAMAGE DURING REMAINDER OF CONSTRUCTION PERIOD. UNITS WHICH MAY BECOME STAINED OR DAMAGED SHALL BE CLEANED OR REPAIRED, PROVIDED THAT SUCH ACTIONS CAN RESTORE THE UNITS TO THEIR ORIGINAL APPEARANCE AND CONDITION. WHERE STRUCTURAL DAMAGE RESULTS OR WHERE REMEDIAL WORK IS NOT SATISFACTORY TO THE ARCHITECT, UNITS SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
- B. PROTECTION SHALL BE CONSIDERED THE RESPONSIBILITY OF THE ERECTOR UNTIL THE INSTALLATION IS APPROVED BY THE ARCHITECT AND CONSTRUCTION MANAGER.

END OF SECTION

**SECTION 033000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES: CAST-IN-PLACE CONCRETE.
- B. RELATED SECTIONS:
 - 1. SECTION 031500 - CONCRETE ACCESSORIES.
 - 2. SECTION 033529 - TOOLED CONCRETE FINISHING.
 - 3. SECTION 036000 - GROUTING.
 - 4. SECTION 036301 - EPOXIES.

1.02 REFERENCES

- A. AMERICAN CONCRETE INSTITUTE (ACI):
 - 1. 301 - SPECIFICATIONS FOR STRUCTURAL CONCRETE
 - 2. 305.1 - SPECIFICATION FOR HOT WEATHER CONCRETING
 - 3. 306.1 - STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING
 - 4. 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY.
 - 5. 350 - CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES AND COMMENTARY.
 - 6. ACI COLLECTION OF CODES, SPECIFICATIONS, AND PRACTICES.
- B. ASTM INTERNATIONAL (ASTM):
 - 1. C31 - STANDARD PRACTICE FOR MAKING AND CURING CONCRETE TEST SPECIMENS IN THE FIELD.
 - 2. C33 - STANDARD SPECIFICATION FOR CONCRETE AGGREGATES.
 - 3. C39 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS.
 - 4. C40 - STANDARD TEST METHOD FOR ORGANIC IMPURITIES IN FINE AGGREGATES FOR CONCRETE.
 - 5. C42 - STANDARD TEST METHOD OF OBTAINING AND TESTING DRILLED CORES AND SAWED BEAMS OF CONCRETE.
 - 6. C88 - STANDARD TEST METHOD OF SOUNDNESS OF AGGREGATES BY USE OF SODIUM SULFATE OR MAGNESIUM SULFATE.
 - 7. C94 - STANDARD SPECIFICATION FOR READY-MIXED CONCRETE.
 - 8. C114 - STANDARD TEST METHODS FOR CHEMICAL ANALYSIS OF HYDRAULIC CEMENT.
 - 9. C117 - STANDARD TEST METHOD FOR MATERIALS FINER THAN 75-M (NO. 200) SIEVE IN MINERAL AGGREGATES BY WASHING.
 - 10. C123 - STANDARD TEST METHOD FOR LIGHTWEIGHT PARTICLES IN AGGREGATE.
 - 11. C131 - STANDARD TEST METHOD FOR RESISTANCE TO DEGRADATION OF SMALL-SIZE COARSE AGGREGATE BY ABRASION AND IMPACT IN THE LOS ANGELES MACHINE.

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12. C136 - STANDARD TEST METHOD FOR SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES.
 13. C138 - STANDARD TEST METHOD FOR DENSITY (UNIT WEIGHT), YIELD, AND AIR CONTENT (GRAVIMETRIC) OF CONCRETE
 14. C142 - STANDARD TEST METHOD FOR CLAY LUMPS AND FRIABLE PARTICLES IN AGGREGATE.
 15. C143 - STANDARD TEST METHOD FOR SLUMP OF HYDRAULIC-CEMENT CONCRETE.
 16. C150 - STANDARD SPECIFICATION FOR PORTLAND CEMENT.
 17. C156 - STANDARD TEST METHOD FOR WATER LOSS [FROM A MORTAR SPECIMEN] THROUGH LIQUID MEMBRANE-FORMING CURING COMPOUNDS FOR CONCRETE.
 18. C157 - STANDARD TEST METHOD FOR LENGTH CHANGE OF HARDENED HYDRAULIC- CEMENT MORTAR AND CONCRETE.
 19. C171 - STANDARD SPECIFICATIONS FOR SHEET MATERIALS FOR CURING CONCRETE.
 20. C172 - STANDARD PRACTICE FOR SAMPLING FRESHLY MIXED CONCRETE.
 21. C173 - STANDARD TEST METHOD FOR AIR CONTENT OF FRESHLY MIXED CONCRETE BY THE VOLUMETRIC METHOD.
 22. C227 - STANDARD TEST METHOD FOR POTENTIAL ALKALI REACTIVITY OF CEMENT- AGGREGATE COMBINATIONS (MORTAR-BAR METHOD).
 23. C260 - STANDARD SPECIFICATION FOR AIR-ENTRAINING ADMIXTURES FOR CONCRETE.
 24. C295 - STANDARD GUIDE TO PETROGRAPHIC EXAMINATION OF AGGREGATES FOR CONCRETE.
 25. C309 - STANDARD SPECIFICATION FOR LIQUID MEMBRANE-FORMING COMPOUNDS FOR CURING CONCRETE.
 26. C311 - STANDARD TEST METHODS FOR SAMPLING AND TESTING FLY ASH OR NATURAL POZZOLANS FOR USE IN PORTLAND-CEMENT CONCRETE.
 27. C494 - STANDARD SPECIFICATION FOR CHEMICAL ADMIXTURES FOR CONCRETE.
 28. C618 - STANDARD SPECIFICATION FOR COAL FLY ASH AND RAW OR CALCINED NATURAL POZZOLAN FOR USE IN CONCRETE.
 29. C856 - STANDARD PRACTICE FOR PETROGRAPHIC EXAMINATION OF HARDENED CONCRETE.
 30. C1064 - STANDARD TEST METHOD FOR TEMPERATURE OF FRESHLY MIXED HYDRAULIC-CEMENT CONCRETE
 31. C1260 - STANDARD TEST METHOD OF POTENTIAL ALKALI REACTIVITY OF AGGREGATES (MORTAR BAR METHOD).
 32. C1293 - STANDARD TEST METHOD FOR DETERMINATION OF LENGTH CHANGE OF CONCRETE DUE TO ALKALI-SILICA REACTION.
 33. C1602 - STANDARD SPECIFICATION FOR MIXING WATER USED IN THE PRODUCTION OF HYDRAULIC CEMENT CONCRETE
 34. D75 - STANDARD PRACTICE FOR SAMPLING AGGREGATES.
 35. D2103 - STANDARD SPECIFICATION FOR POLYETHYLENE FILM AND SHEETING.
- C. NSF INTERNATIONAL (NSF):
1. 61 - DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS.

1.03 DEFINITIONS

- A. ALKALI: SUM OF SODIUM OXIDE AND POTASSIUM OXIDE CALCULATED AS SODIUM OXIDE.
- B. CEMENTITIOUS MATERIALS: PORTLAND CEMENT AND FLY ASH.
- C. COLD WEATHER: A PERIOD WHEN FOR MORE THAN 3 CONSECUTIVE DAYS, THE AVERAGE DAILY OUTDOOR TEMPERATURE DROPS BELOW 40 DEGREES FAHRENHEIT. THE AVERAGE DAILY TEMPERATURE IS THE AVERAGE OF THE HIGHEST AND LOWEST TEMPERATURES DURING THE PERIOD FROM MIDNIGHT TO MIDNIGHT. WHEN TEMPERATURES ABOVE 50 DEGREES FAHRENHEIT OCCUR DURING MORE THAN HALF OF ANY 24-HOUR DURATION, THE PERIOD SHALL NO LONGER BE REGARDED AS COLD WEATHER.
- D. COLD WEATHER CONCRETING: OPERATIONS FOR PLACING, FINISHING, CURING, AND PROTECTION OF CONCRETE DURING COLD WEATHER.
- E. GREEN CONCRETE: CONCRETE WITH LESS THAN 100 PERCENT OF THE SPECIFIED STRENGTH.
- F. HAIRLINE CRACK: CRACK WITH A CRACK WIDTH OF LESS THAN 4 THOUSANDTHS OF AN INCH.
- G. HOT WEATHER: A PERIOD WHEN PROJECT CONDITIONS SUCH AS LOW HUMIDITY, HIGH TEMPERATURE, SOLAR RADIATION, AND HIGH WINDS, PROMOTE RAPID DRYING OF FRESHLY PLACED CONCRETE.
- H. HOT WEATHER CONCRETING: OPERATIONS FOR PLACING, FINISHING, CURING, AND PROTECTION OF CONCRETE DURING HOT WEATHER.

1.04 SYSTEM DESCRIPTION

- A. PERFORMANCE REQUIREMENTS:
 - 1. GENERAL:
 - a. EXCEPT AS OTHERWISE SPECIFIED, PROVIDE CONCRETE COMPOSED OF PORTLAND CEMENT, FLY ASH, FINE AGGREGATE, COARSE AGGREGATE, ADMIXTURES AND WATER SO PROPORTIONED AND MIXED AS TO PRODUCE PLASTIC, WORKABLE MIXTURE IN ACCORDANCE WITH REQUIREMENTS AS SPECIFIED IN THIS SECTION AND SUITABLE TO SPECIFIC CONDITIONS OF PLACEMENT.
 - b. PROPORTION MATERIALS IN A MANNER THAT WILL SECURE LOWEST WATER-CEMENTITIOUS MATERIALS RATIO THAT IS CONSISTENT WITH GOOD WORKABILITY, PLASTIC AND COHESIVE MIXTURE, AND A MIXTURE THAT IS WITHIN SPECIFIED SLUMP RANGE.
 - c. PROPORTION FINE AND COARSE AGGREGATES IN MANNER SUCH AS NOT TO PRODUCE HARSHNESS IN PLACING OR HONEYCOMBING.
 - 2. IT IS THE INTENT OF THIS SECTION TO SECURE FOR EVERY PART OF THE WORK CONCRETE WITH HOMOGENEOUS MIXTURE, WHICH WHEN HARDENED WILL HAVE REQUIRED STRENGTH, WATER TIGHTNESS, AND DURABILITY:
 - a. IT IS RECOGNIZED THAT SOME SURFACE HAIRLINE CRACKS AND CRAZING WILL DEVELOP IN THE CONCRETE SURFACES.
 - b. CONSTRUCTION AND EXPANSION JOINTS HAVE BEEN SPECIFIED AND POSITIONED IN STRUCTURES AS INDICATED ON THE DRAWINGS, AND CURING METHODS SPECIFIED, FOR PURPOSE OF REDUCING NUMBER AND SIZE OF CRACKS, DUE TO NORMAL EXPANSION AND CONTRACTION EXPECTED FROM SPECIFIED CONCRETE MIXES.
 - c. REPAIR CRACKS WHICH DEVELOP IN WALLS OR SLABS AND REPAIR CRACKS WHICH SHOW ANY SIGNS OF LEAKAGE UNTIL ALL LEAKAGE IS STOPPED.
 - d. PRESSURE INJECT VISIBLE CRACKS, OTHER THAN HAIRLINE CRACKS AND CRAZING, IN FOLLOWING AREAS WITH EPOXY AS SPECIFIED IN SECTION 036301:

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- 1) FLOORS AND WALLS OF WATER BEARING STRUCTURES.
 - 2) WALLS AND OVERHEAD SLABS OF PASSAGEWAYS OR OCCUPIED SPACES, OUTSIDES OF WHICH ARE EXPOSED TO WEATHER OR MAY BE WASHED DOWN AND ARE NOT SPECIFIED TO RECEIVE SEPARATE WATERPROOF MEMBRANE.
 - 3) OTHER ITEMS NOT SPECIFIED TO RECEIVE SEPARATE WATERPROOF MEMBRANE: SLABS OVER WATER CHANNELS, WET WELLS, RESERVOIRS, AND OTHER SIMILAR SURFACES.
- e. WALLS OR SLABS, AS SPECIFIED ABOVE, THAT LEAK OR SWEAT BECAUSE OF POROSITY OR CRACKS TOO SMALL FOR SUCCESSFUL PRESSURE INJECTION WITH EPOXY: SEAL ON WATER OR WEATHER SIDE BY COATINGS OF SURFACE SEALANT SYSTEM, AS SPECIFIED IN THIS SECTION.
- f. PRESSURE INJECTION AND SEALING: CONTINUE AS SPECIFIED ABOVE UNTIL STRUCTURE IS WATERTIGHT AND REMAINS WATERTIGHT FOR NOT LESS THAN 1 YEAR AFTER FINAL ACCEPTANCE OR DATE OF FINAL REPAIR, WHICHEVER OCCURS LATER IN TIME.
3. WORKMANSHIP AND METHODS: PROVIDE CONCRETE WORK, INCLUDING DETAILING OF REINFORCING, CONFORMING WITH BEST STANDARD PRACTICES AND AS SET FORTH IN ACI 318, ACI 350, MANUAL OF CONCRETE PRACTICES, AND RECOMMENDED PRACTICES.

1.05 SUBMITTALS

- A. CEMENT MILL TESTS:
1. INCLUDE ALKALI CONTENT REPRESENTATIVE OF EACH SHIPMENT OF CEMENT FOR VERIFICATION OF COMPLIANCE WITH SPECIFIED REQUIREMENTS.
 2. PROVIDE MILL TEST REPORTS DATED NOT MORE THAN 90 DAYS BEFORE THE DATE OF SUBMITTAL.
- B. COLD WEATHER CONCRETING:
1. PROCEDURES FOR THE PRODUCTION, TRANSPORTATION, PLACEMENT, PROTECTION, CURING, AND TEMPERATURE MONITORING FOR CONCRETE DURING COLD WEATHER.
 2. PROCEDURES TO BE IMPLEMENTED UPON ABRUPT CHANGES IN WEATHER CONDITIONS OR EQUIPMENT FAILURES.
- C. CONCRETE MIXES: FULL DETAILS, INCLUDING MIX DESIGN CALCULATIONS FOR CONCRETE MIXES PROPOSED FOR USE FOR EACH CLASS OF CONCRETE:
1. INCLUDE INFORMATION ON CORRECTION OF BATCHING FOR VARYING MOISTURE CONTENTS OF FINE AGGREGATE.
 2. SOURCE QUALITY TEST RECORDS WITH MIX DESIGN SUBMITTAL:
 3. INCLUDE CALCULATIONS FOR REQUIRED COMPRESSIVE STRENGTH (F'CR) BASED ON SOURCE QUALITY TEST RECORDS.
- D. CONCRETE AGGREGATE TESTS: CERTIFIED COPIES IN TRIPLICATE OF COMMERCIAL LABORATORY TESTS NOT MORE THAN 90 DAYS OLD OF ALL SAMPLES OF CONCRETE AGGREGATES:
1. COARSE AGGREGATE:
 - a. ABRASION LOSS.
 - b. CLAY LUMPS AND FRIABLE PARTICLES.
 - c. COAL AND LIGNITE.
 - d. MATERIALS FINER THAN 200 SIEVE.
 - e. REACTIVITY.
 - f. SHALE AND CHERT.

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- g. SOUNDNESS.
- 2. FINE AGGREGATE:
 - a. CLAY LUMPS.
 - b. COLOR.
 - c. DECANTATION.
 - d. REACTIVITY.
 - e. SHALE AND CHERT.
 - f. SOUNDNESS.
- E. DRYING SHRINKAGE TEST DATA.
- F. FINE OR COARSE AGGREGATE BATCHED FROM MORE THAN 1 BIN: ANALYSES FOR EACH BIN, AND COMPOSITE ANALYSIS MADE UP FROM THESE, USING PROPORTIONS OF MATERIALS TO BE USED IN MIX.
- G. FLY ASH CERTIFICATE OF COMPLIANCE: IDENTIFY SOURCE OF FLY ASH AND CERTIFY COMPLIANCE IN ACCORDANCE WITH ASTM C618.
- H. FOR CONDITIONS THAT PROMOTE RAPID DRYING OF FRESHLY PLACED CONCRETE SUCH AS LOW HUMIDITY, HIGH TEMPERATURE, AND WIND: CORRECTIVE MEASURES FOR USE PRIOR TO PLACING CONCRETE.
- I. HOT WEATHER CONCRETING: PROCEDURES FOR PRODUCTION, PLACEMENT, FINISHING, CURING, PROTECTION, AND TEMPERATURE MONITORING FOR CONCRETE DURING HOT WEATHER AND APPROPRIATE CORRECTIVE MEASURES.
- J. HEATING EQUIPMENT FOR COLD WEATHER CONCRETING: INFORMATION ON TYPE OF EQUIPMENT USED FOR HEATING MATERIALS AND NEW CONCRETE IN PROCESS OF CURING DURING EXCESSIVELY COLD WEATHER.
- K. PRODUCT DATA: SUBMIT DATA COMPLETELY DESCRIBING PRODUCTS AND DOCUMENTATION OF ADMIXTURE COMPATIBILITY TEST RESULTS AS REQUIRED.
- L. SEQUENCE OF CONCRETE PLACING: SUBMIT PROPOSED SEQUENCE OF PLACING CONCRETE SHOWING PROPOSED BEGINNING AND ENDING OF INDIVIDUAL PLACEMENTS.
- M. SIEVE ANALYSIS: SUBMIT SIEVE ANALYSES OF FINE AND COARSE AGGREGATES BEING USED IN TRIPLICATE AT LEAST EVERY 3 WEEKS AND AT ANY TIME THERE IS SIGNIFICANT CHANGE IN GRADING OF MATERIALS.
- N. TRIAL BATCH TEST DATA:
 - 1. SUBMIT DATA FOR EACH TEST CYLINDER.
 - 2. SUBMIT DATA THAT IDENTIFIES MIX AND SLUMP FOR EACH TEST CYLINDER.
- O. WEATHER MONITORING: RECORDS OF:
 - 1. RELATIVE HUMIDITY.
 - 2. SITE AMBIENT TEMPERATURE.
 - 3. WIND SPEED.
- P. TEMPERATURE OF FRESHLY PLACED CONCRETE.

1.06 DELIVERY, STORAGE, AND HANDLING

A. PACKING AND SHIPPING:

1. DELIVER, STORE, AND HANDLE CONCRETE MATERIALS IN MANNER THAT PREVENTS DAMAGE AND INCLUSION OF FOREIGN SUBSTANCES.
 2. DELIVER AND STORE PACKAGED MATERIALS IN ORIGINAL CONTAINERS UNTIL READY FOR USE.
 3. DELIVER AGGREGATE TO MIXING SITE AND HANDLE IN SUCH MANNER THAT VARIATIONS IN MOISTURE CONTENT WILL NOT INTERFERE WITH STEADY PRODUCTION OF CONCRETE OF SPECIFIED DEGREE OF UNIFORMITY AND SLUMP.
- B. ACCEPTANCE AT SITE: REJECT MATERIAL CONTAINERS OR MATERIALS SHOWING EVIDENCE OF WATER OR OTHER DAMAGE.**

1.07 PROJECT CONDITIONS

A. ENVIRONMENTAL REQUIREMENTS:

1. MONITORING WEATHER CONDITIONS:

- a. INSTALL AN OUTDOOR WEATHER STATION CAPABLE OF MEASURING AND RECORDING AMBIENT TEMPERATURE, WIND SPEED, AND HUMIDITY. FURNISH INSTRUMENTS ACCURATE TO WITHIN 2 DEGREES FAHRENHEIT, 5 PERCENT RELATIVE HUMIDITY, AND 1 MILE PER HOUR WIND SPEED.
- b. MEASURE AND RECORD TEMPERATURE OF FRESH CONCRETE. FURNISH AND USE SUFFICIENT NUMBER OF MAXIMUM AND MINIMUM SELF-RECORDING THERMOMETERS TO ADEQUATELY MEASURE TEMPERATURE OF CONCRETE.
- c. MONITOR AND KEEP RECORDS OF THE WEATHER FORECAST STARTING AT LEAST 48 HOURS PRIOR TO PLACING CONCRETE IN ORDER TO ALLOW ENOUGH TIME FOR TAKING APPROPRIATE MEASURES PERTAINING TO HOT OR COLD WEATHER CONCRETING.

2. HOT WEATHER CONCRETING:

- a. INITIATE EVAPORATION CONTROL MEASURES WHEN CONCRETE AND AIR TEMPERATURES, RELATIVE HUMIDITY OF THE AIR, AND THE WIND VELOCITY HAVE THE CAPACITY TO EVAPORATE WATER FROM A FREE SURFACE AT A RATE THAT IS EQUAL TO OR GREATER THAN 0.2 POUNDS PER SQUARE FEET PER HOUR. DETERMINE EVAPORATION RATE USING THE MENZEL FORMULA AND MONOGRAPH IN ACI 305 3.1.3.
- b. WHEN AMBIENT AIR TEMPERATURE IS ABOVE 85 DEGREES FAHRENHEIT: PRIOR TO PLACING CONCRETE, COOL FORMS AND REINFORCING STEEL BY WATER COOLING TO BELOW 90 DEGREES FAHRENHEIT.
- c. MONITOR WEATHER CONDITIONS AT THE SITE INCLUDING AIR TEMPERATURE, HUMIDITY, AND WIND SPEED, TO ASSESS THE NEED FOR EVAPORATION CONTROL MEASURES BEGIN MONITORING SITE CONDITIONS NO LATER THAN 1 HOUR BEFORE THE START OF CONCRETE PLACEMENT. CONTINUE TO MONITOR SITE CONDITIONS AT INTERVALS OF 30 MINUTES UNTIL CONCRETE CURING HAS BEGUN.
- d. TEMPERATURE OF CONCRETE MIX AT TIME OF PLACEMENT: KEEP TEMPERATURE BELOW 90 DEGREES FAHRENHEIT BY METHODS WHICH DO NOT IMPAIR QUALITY OF CONCRETE.
- e. FOR CONDITIONS THAT PROMOTE RAPID DRYING OF FRESHLY PLACED CONCRETE SUCH AS LOW HUMIDITY, HIGH TEMPERATURE, AND WIND: TAKE CORRECTIVE MEASURES TO MINIMIZE RAPID WATER LOSS FROM CONCRETE:
- f. FURNISH AND USE SUFFICIENT NUMBER OF MAXIMUM AND MINIMUM SELF-RECORDING THERMOMETERS TO ADEQUATELY MEASURE TEMPERATURE AROUND CONCRETE.

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3. COLD WEATHER CONCRETING:
 - a. CONCRETE PLACED BELOW AMBIENT AIR TEMPERATURE OF 45 DEGREES FAHRENHEIT AND FALLING OR BELOW 40 DEGREES FAHRENHEIT:
 - 1) MAKE PROVISION FOR HEATING WATER.
 - b. FOLLOW RECOMMENDATIONS OF ACI 306 FOR PREPARATION, PLACEMENT, AND PROTECTION OF CONCRETE DURING COLD WEATHER.
 - c. IF MATERIALS HAVE BEEN EXPOSED TO FREEZING TEMPERATURES TO DEGREE THAT ANY MATERIAL IS BELOW 35 DEGREES FAHRENHEIT: HEAT SUCH MATERIALS.
 - d. HEATING WATER, CEMENT, OR AGGREGATE MATERIALS:
 - 1) DO NOT HEAT IN EXCESS OF 160 DEGREES FAHRENHEIT.
 - e. PROTECTION OF CONCRETE IN FORMS:
 - 1) DO NOT REMOVE FORMS FROM CONCRETE WHEN OUTSIDE AMBIENT AIR TEMPERATURE IS BELOW 50 DEGREES FAHRENHEIT UNTIL CONCRETE HAS ATTAINED ITS MINIMUM SPECIFIED COMPRESSIVE STRENGTH. EVIDENCE OF STRENGTH SHALL BE BASED ON BY TESTING OF CYLINDERS STORED IN THE FIELD UNDER EQUIVALENT CONDITIONS TO THOSE AT THE CONCRETE STRUCTURE.
 - 2) PROTECT BY MEANS OF COVERING WITH TARPULINS, OR OTHER ACCEPTABLE COVERING ACCEPTABLE TO ENGINEER.
 - 3) PROVIDE MEANS FOR CIRCULATING WARM MOIST AIR AROUND FORMS IN MANNER TO MAINTAIN TEMPERATURE OF 50 DEGREES FAHRENHEIT FOR AT LEAST 5 DAYS.

1.08 SEQUENCING AND SCHEDULING

- A. SCHEDULE PLACING OF CONCRETE IN SUCH MANNER AS TO COMPLETE ANY SINGLE PLACING OPERATION TO CONSTRUCTION OR EXPANSION JOINT.

PART 2 PRODUCTS

2.01 MATERIALS

- A. ADMIXTURES:
 1. GENERAL:
 - a. DO NOT USE ADMIXTURES OF ANY TYPE, EXCEPT AS SPECIFIED, UNLESS WRITTEN ACCEPTANCE HAS BEEN OBTAINED FROM THE ENGINEER.
 - b. ADMIXTURES SHALL BE COMPATIBLE WITH CONCRETE AND OTHER ADMIXTURES. ADMIXTURES OTHER THAN POZZOLANS SHALL BE THE PRODUCTS OF A SINGLE MANUFACTURE TO ENSURE COMPATIBILITY.
 - c. DO NOT USE ADMIXTURES CONTAINING CHLORIDES CALCULATED AS CHLORIDE ION IN EXCESS OF 0.5 PERCENT BY WEIGHT OF CEMENT.
 - d. USE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. ADD EACH ADMIXTURE TO CONCRETE MIX SEPARATELY.
 - e. ALL ADMIXTURES SHALL BE NSF 61 CERTIFIED.
 2. AIR ENTRAINING ADMIXTURE:
 - a. PROVIDE CONCRETE WITH 5 PERCENT, WITHIN 1 PERCENT, ENTRAINED AIR OF EVENLY DISPERSED AIR BUBBLES AT TIME OF PLACEMENT.
 - b. IN ACCORDANCE WITH ASTM C260.

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3. MID-RANGE WATER REDUCING ADMIXTURE:
 - a. MAY BE USED AT THE CONTRACTOR'S OPTION.
 - b. IN ACCORDANCE WITH ASTM C494, TYPE A OR TYPE D.
 - c. NOT CONTAIN AIR-ENTRAINING AGENTS.
 - d. LIQUID FORM BEFORE ADDING TO THE CONCRETE MIX.
 - e. NO DECREASE IN CEMENT IS PERMITTED AS RESULT OF USE OF WATER REDUCING ADMIXTURE.
 4. HIGH-RANGE WATER REDUCING ADMIXTURE (SUPER-PLASTICIZER): ARE NOT TO BE USED WITHOUT ACCEPTANCE BY THE ENGINEER.
 5. SHRINKAGE-REDUCING ADMIXTURE (SRA):
 - a. MAY BE USED AT THE CONTRACTOR'S OPTION.
 - b. SHALL BE COMPATIBLE WITH AIR ENTRAINING ADMIXTURES PROPOSED FOR USE.
- B. AGGREGATE:
1. GENERAL:
 - a. PROVIDE CONCRETE AGGREGATES THAT ARE SOUND, UNIFORMLY GRADED, AND FREE OF DELETERIOUS MATERIAL IN EXCESS OF ALLOWABLE AMOUNTS SPECIFIED.
 - b. GRADE AGGREGATE IN ACCORDANCE WITH ASTM C136 AND D75.
 - c. PROVIDE UNIT WEIGHT OF FINE AND COARSE AGGREGATE THAT PRODUCES IN PLACE CONCRETE WITH WEIGHT OF NOT LESS THAN 140 POUNDS PER CUBIC FOOT.
 - d. DO NOT USE AGGREGATE MADE FROM RECYCLED MATERIALS SUCH AS CRUSHED AND SCREENED HYDRAULIC-CEMENT CONCRETE, BRICK, AND OTHER CONSTRUCTION MATERIALS.
 2. FINE AGGREGATE:
 - a. PROVIDE FINE AGGREGATE FOR CONCRETE OR MORTAR CONSISTING OF CLEAN, NATURAL SAND OR OF SAND PREPARED FROM CRUSHED STONE OR CRUSHED GRAVEL.
 - b. DO NOT PROVIDE AGGREGATE HAVING DELETERIOUS SUBSTANCES IN EXCESS OF FOLLOWING PERCENTAGES BY WEIGHT OF CONTAMINATING SUBSTANCES.
 - 1) IN NO CASE SHALL TOTAL EXCEED PERCENT LISTED.

ITEM	TEST METHOD	PERCENT
REMOVED BY DECANTATION (DIRT, SILT, ETC.)	ASTM C117	3
SHALE OR CHERT	ASTM C123	1
	ASTM C295*	1
CLAY LUMPS	ASTM C142	1
*TEST METHOD C123 IS USED TO IDENTIFY PARTICLES IN THE SAMPLE LIGHTER THAN 2.40 SPECIFIC GRAVITY. TEST METHOD C295 IS USED TO IDENTIFY WHICH OF THE LIGHTWEIGHT PARTICLES ARE SHALE OR CHERT. IF THE RESULTS OF TEST METHOD C123 ARE LESS THAN 1 PERCENT, TEST METHOD C295 IS NOT REQUIRED.		

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- c. EXCEPT AS OTHERWISE SPECIFIED, GRADE FINE AGGREGATE FROM COARSE TO FINE IN ACCORDANCE WITH ASTM C33.
 - d. [IN ACCORDANCE WITH NSF 61.]
- 3. COARSE AGGREGATE:
 - a. PROVIDE COARSE AGGREGATE CONSISTING OF GRAVEL OR CRUSHED STONE MADE UP OF CLEAN, HARD, DURABLE PARTICLES FREE FROM CALCAREOUS COATINGS, ORGANIC MATTER, OR OTHER FOREIGN SUBSTANCES.
 - b. NOT EXCEEDING 15 PERCENT BY WEIGHT, OF THIN OR ELONGATED PIECES HAVING LENGTH GREATER THAN 5 TIMES AVERAGE THICKNESS.
 - c. [IN ACCORDANCE WITH NSF 61.]
 - d. DELETERIOUS SUBSTANCES: NOT IN EXCESS OF FOLLOWING PERCENTAGES BY WEIGHT, AND IN NO CASE HAVING TOTAL OF ALL DELETERIOUS SUBSTANCES EXCEEDING 2 PERCENT.

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ITEM	TEST METHOD	PERCENT
SHALE OR CHERT	ASTM C123	1.25
	ASTM C295*	1
COAL AND LIGNITE	ASTM C123	1/4
CLAY LUMPS AND FRIABLE PARTICLES	ASTM C142	1/4
MATERIALS FINER THAN NUMBER 200 SIEVE	ASTM C117	1/2**
<p>* TEST METHOD C123 IS USED TO IDENTIFY PARTICLES IN THE SAMPLE LIGHTER THAN 2.40 SPECIFIC GRAVITY. TEST METHOD C295 IS USED TO IDENTIFY WHICH OF THE LIGHTWEIGHT PARTICLES ARE SHALE, CHERT, COAL, OR LIGNITE. IF THE RESULTS OF TEST METHOD C123 ARE LESS THAN 1.25 PERCENT (THE MINIMUM COMBINED PERCENTAGE OF SHALE, CHERT, COAL AND LIGNITE), TEST METHOD C295 IS NOT REQUIRED.</p> <p>** EXCEPT WHEN MATERIAL FINER THAN NUMBER 200 SIEVE CONSISTS OF CRUSHER DUST, MAXIMUM AMOUNT SHALL BE 1 PERCENT.</p>		

e. GRADING:

- 1) AGGREGATE FOR CONCRETE: IN ACCORDANCE WITH ASTM C33, SIZE NUMBER 57, EXCEPT AS OTHERWISE SPECIFIED OR AUTHORIZED IN WRITING BY THE ENGINEER.
- 2) AGGREGATE FOR CLASS CE CONCRETE FOR ENCASEMENT OF ELECTRICAL CONDUITS:
 - a) GRADED IN ACCORDANCE WITH ASTM C33, SIZE NUMBER 8.

C. CONCRETE SEALER:

1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. EUCLID CHEMICAL COMPANY: DIAMOND HARD.
 - b. L&M CONSTRUCTION CHEMICALS: SEALHARD.

D. CONDUIT ENCASEMENT COLORING AGENT:

1. COLOR: RED COLOR CONCRETE USED FOR ENCASEMENT OF ELECTRICAL DUCTS, CONDUITS AND SIMILAR TYPE ITEMS.
2. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. DAVIS COMPANY, #100 UTILITY RED.
 - b. I. REISS COMPANY, INC., EQUIVALENT PRODUCT.
 - c. EUCLID CHEMICAL COMPANY, INCRETE DIVISION, "COLORCRETE BRICK RED."
3. CONDUIT ENCASEMENT CONCRETE: MIX INTO EACH CUBIC YARD OF CONCRETE 10 POUND OF COLORING AGENT.

E. EVAPORATION RETARDANT:

1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. BASF, CLEVELAND, OHIO, CONFILM.
 - b. EUCLID CHEMICAL COMPANY, CLEVELAND, OHIO, EUCOBAR.

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F. FLY ASH:

1. FLY ASH IN ACCORDANCE WITH ASTM C618, CLASS F, MAY BE USED IN CONCRETE MADE WITH TYPE II PORTLAND CEMENT.
2. MAXIMUM OF 15 PERCENT BY WEIGHT OF FLY ASH TO TOTAL WEIGHT OF CEMENTITIOUS MATERIALS.
 - a. THE TOTAL WEIGHT OF CEMENTITIOUS MATERIALS SHALL NOT BE LESS THAN MINIMUM CEMENTITIOUS MATERIALS LISTED IN TABLE A.
3. DO NOT USE IN CONCRETE MADE WITH PORTLAND-POZZOLAN CEMENT.
4. LOSS ON IGNITION: NOT EXCEED 4 PERCENT.
5. FLY ASH SHALL BE NSF 61 CERTIFIED.

G. NONSLIP ABRASIVE:

1. ALUMINUM OXIDE ABRASIVE SIZE 8/16, HAVING STRUCTURE OF HARD AGGREGATE THAT IS HOMOGENOUS, NONGLAZING, RUSTPROOF, AND UNAFFECTED BY FREEZING, MOISTURE, OR CLEANING COMPOUNDS.
2. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. EXOLON COMPANY, TONAWANDA, NEW YORK.
 - b. ABRASIVE MATERIALS, INCORPORATED, HILLSDALE, MICHIGAN.
 - c. "NON-SLIP AGGREGATE", EUCLID CHEMICAL COMPANY, CLEVELAND, OHIO.

H. PORTLAND CEMENT:

1. CONFORM TO SPECIFICATIONS AND TESTS IN ACCORDANCE WITH ASTM C150, TYPES II OR III, LOW ALKALI, EXCEPT AS SPECIFIED OTHERWISE.
2. HAVE TOTAL ALKALI CONTAINING NOT MORE THAN 0.60 PERCENT.
3. EXPOSED CONCRETE IN ANY INDIVIDUAL STRUCTURE: USE ONLY ONE BRAND OF PORTLAND CEMENT.
4. CEMENT FOR FINISHES OR REPAIRS: PROVIDE CEMENT FROM SAME SOURCE AND OF SAME TYPE AS CONCRETE TO BE FINISHED OR REPAIRED.
5. PORTLAND CEMENT SHALL BE NSF 61 CERTIFIED.

I. SHEET MEMBRANE FOR CURING:

1. POLYETHYLENE FILM:
 - a. IN ACCORDANCE WITH ASTM C171.
 - b. COLOR: WHITE.
 - c. THICKNESS: NOMINAL THICKNESS OF POLYETHYLENE FILM SHALL NOT BE LESS THAN 0.0040 INCHES WHEN MEASURED IN ACCORDANCE WITH ASTM D2103. THICKNESS OF POLYETHYLENE FILM AT ANY POINT SHALL NOT BE LESS THAN 0.0030 INCHES.
 - d. LOSS OF MOISTURE: NOT EXCEED 0.055 GRAMS PER SQUARE CENTIMETER OF SURFACE WHEN TESTED IN ACCORDANCE WITH ASTM C156.

J. SPRAYED MEMBRANE CURING COMPOUND: CLEAR TYPE WITH FUGITIVE DYE IN ACCORDANCE WITH ASTM C309, TYPE 1D.

K. SURFACE SEALANT SYSTEM:

1. NSF 61 CERTIFIED.
2. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. EUCLID CHEMICAL CO., VANDEX SUPER.

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- b. KRYTON INTERNATIONAL, INC., KRYSTOL T1.
- c. XYPEX CHEMICAL CORP., XYPEX CONCENTRATE.

L. WATER:

- 1. WATER USED SHALL CONFORM TO THE REQUIREMENTS OF ASTM C1602 AND C94 AS WELL AS ACI SPECIFICATIONS 301 AND 318.
- 2. WATER FOR CONCRETE, WASHING AGGREGATE, AND CURING CONCRETE: CLEAN AND FREE FROM OIL AND DELETERIOUS AMOUNTS OF ALKALI, ACID, ORGANIC MATTER, OR OTHER SUBSTANCES.
- 3. CHLORIDES AND SULFATE IONS:
 - a. WATER FOR CONVENTIONAL REINFORCED CONCRETE: USE WATER CONTAINING NOT MORE THAN 1,000 MILLIGRAMS PER LITER OF CHLORIDES CALCULATED AS CHLORIDE ION, NOR MORE THAN 1,000 MILLIGRAMS PER LITER OF SULFATES CALCULATED AS SULFATE ION.
 - b. WATER FOR PRESTRESSED OR POST-TENSIONED CONCRETE: USE WATER CONTAINING NOT MORE THAN 650 MILLIGRAMS PER LITER OF CHLORIDES CALCULATED AS CHLORIDE ION, OR MORE THAN 800 MILLIGRAMS PER LITER OF SULFATES CALCULATED AS SULFATE ION.

2.02 EQUIPMENT

A. MIXING CONCRETE:

- 1. MIXERS MAY BE OF STATIONARY PLANT, PAVER, OR TRUCK MIXER TYPE.
- 2. PROVIDE ADEQUATE EQUIPMENT AND FACILITIES FOR ACCURATE MEASUREMENT AND CONTROL OF MATERIALS AND FOR READILY CHANGING PROPORTIONS OF MATERIAL.
- 3. MIXING EQUIPMENT:
 - a. CAPABLE OF COMBINING AGGREGATES, CEMENTITIOUS MATERIALS, AND WATER WITHIN SPECIFIED TIME INTO THOROUGHLY MIXED AND UNIFORM MASS AND DISCHARGING MIXTURE WITHOUT SEGREGATION.
 - b. MAINTAIN CONCRETE MIXING PLANT AND EQUIPMENT IN GOOD WORKING ORDER AND OPERATED AT LOADS, SPEEDS, AND TIMING RECOMMENDED BY MANUFACTURER OR AS SPECIFIED.
 - c. PROPORTION CEMENTITIOUS MATERIALS AND AGGREGATE BY WEIGHT.

B. MACHINE MIXING:

- 1. BATCH PLANT SHALL BE CAPABLE OF CONTROLLING DELIVERY OF ALL MATERIAL TO MIXER WITHIN 1 PERCENT BY WEIGHT OF INDIVIDUAL MATERIAL.
- 2. IF BULK CEMENTITIOUS MATERIALS ARE USED, WEIGH THEM ON SEPARATE VISIBLE SCALE WHICH WILL ACCURATELY REGISTER SCALE LOAD AT ANY STAGE OF WEIGHING OPERATION FROM ZERO TO FULL CAPACITY.
- 3. PREVENT CEMENTITIOUS MATERIALS FROM COMING INTO CONTACT WITH AGGREGATE OR WITH WATER UNTIL MATERIALS ARE IN MIXER READY FOR COMPLETE MIXING WITH ALL MIXING WATER.
- 4. PROCEDURE OF MIXING CEMENTITIOUS MATERIALS WITH SAND OR WITH SAND AND COARSE AGGREGATE FOR DELIVERY TO PROJECT SITE, FOR FINAL MIXING AND ADDITION OF MIXING WATER WILL NOT BE PERMITTED.
- 5. RETEMPERING OF CONCRETE WILL NOT BE PERMITTED.
- 6. DISCHARGE ENTIRE BATCH BEFORE RECHARGING.
- 7. VOLUME OF MIXED MATERIAL PER BATCH: NOT EXCEED MANUFACTURER'S RATED CAPACITY OF MIXER.

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8. MIXERS:
 - a. PERFORM MIXING IN BATCH MIXERS OF ACCEPTABLE TYPE.
 - b. EQUIP EACH MIXER WITH DEVICE FOR ACCURATELY MEASURING AND INDICATING QUANTITY OF WATER ENTERING CONCRETE, AND OPERATING MECHANISM SUCH THAT LEAKAGE WILL NOT OCCUR WHEN VALVES ARE CLOSED.
 - c. EQUIP EACH MIXER WITH DEVICE FOR AUTOMATICALLY MEASURING, INDICATING, AND CONTROLLING TIME REQUIRED FOR MIXING:
 - 1) INTERLOCK DEVICE TO PREVENT DISCHARGE OF CONCRETE FROM MIXER BEFORE EXPIRATION OF MIXING PERIOD.
- C. TRANSIT-MIXED CONCRETE:
 1. MIX AND DELIVER IN ACCORDANCE WITH ASTM C94.
 2. TOTAL ELAPSED TIME BETWEEN ADDITION OF WATER AT BATCH PLANT AND DISCHARGING COMPLETED MIX:
 - a. NOT TO EXCEED 90 MINUTES.
 - b. ELAPSED TIME AT PROJECT SITE SHALL NOT EXCEED 30 MINUTES.
 3. UNDER CONDITIONS CONTRIBUTING TO QUICK SETTING, TOTAL ELAPSED TIME PERMITTED MAY BE REDUCED BY THE ENGINEER.
 4. EQUIP EACH TRUCK MIXER WITH DEVICE INTERLOCKED TO PREVENT DISCHARGE OF CONCRETE FROM DRUM BEFORE REQUIRED NUMBER OF TURNS AND FURNISH DEVICE THAT IS CAPABLE OF COUNTING NUMBER OF REVOLUTIONS OF DRUM.
 5. CONTINUOUSLY REVOLVE DRUM AFTER IT IS ONCE STARTED UNTIL IT HAS COMPLETELY DISCHARGED ITS BATCH:
 - a. DO NOT ADD WATER UNTIL DRUM HAS STARTED REVOLVING.
 - b. RIGHT IS RESERVED TO INCREASE REQUIRED MINIMUM NUMBER OF REVOLUTIONS OR TO DECREASE DESIGNATED MAXIMUM NUMBER OF REVOLUTIONS ALLOWED, IF NECESSARY, TO OBTAIN SATISFACTORY MIXING. THE CONTRACTOR WILL NOT BE ENTITLED TO ADDITIONAL COMPENSATION BECAUSE OF SUCH INCREASE OR DECREASE.
- D. OTHER TYPES OF MIXERS: IN CASE OF OTHER TYPES OF MIXERS, MIXING SHALL BE AS FOLLOWS:
 1. MIX CONCRETE UNTIL THERE IS UNIFORM DISTRIBUTION OF MATERIALS, AND DISCHARGE MIXER COMPLETELY BEFORE RECHARGING.
 2. NEITHER SPEED NOR VOLUME LOADING OF MIXER SHALL EXCEED MANUFACTURER'S RECOMMENDATIONS.
 3. CONTINUE MIXING FOR MINIMUM OF 1-1/2 MINUTES AFTER ALL MATERIALS ARE IN DRUM, AND FOR BATCHES LARGER THAN 1 CUBIC YARD INCREASE MINIMUM MIXING TIME 15 SECONDS FOR EACH ADDITIONAL CUBIC YARD OR FRACTION THEREOF.

2.03 MIXES

- A. MEASUREMENTS OF MATERIALS:
 1. MEASURE MATERIALS BY WEIGHING, EXCEPT AS OTHERWISE SPECIFIED OR WHERE OTHER METHODS ARE SPECIFICALLY AUTHORIZED IN WRITING BY THE ENGINEER.
 2. FURNISH APPARATUS FOR WEIGHING AGGREGATES AND CEMENTITIOUS MATERIALS THAT IS SUITABLY DESIGNED AND CONSTRUCTED FOR THIS PURPOSE.

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3. ACCURACY OF WEIGHING DEVICES: FURNISH DEVICES THAT HAVE CAPABILITY OF PROVIDING SUCCESSIVE QUANTITIES OF INDIVIDUAL MATERIAL THAT CAN BE MEASURED TO WITHIN 1 PERCENT OF DESIRED AMOUNT OF THAT MATERIAL.
 4. MEASURING OR WEIGHING DEVICES: SUBJECT TO REVIEW BY THE ENGINEER. SHALL BEAR VALID SEAL OF THE SEALER OF WEIGHTS AND MEASURES HAVING JURISDICTION.
 5. WEIGHING CEMENTITIOUS MATERIALS:
 - a. WEIGH CEMENTITIOUS MATERIALS SEPARATELY.
 - b. CEMENT IN UNBROKEN STANDARD PACKAGES (SACKS): NEED NOT BE WEIGHED.
 - c. WEIGH BULK CEMENTITIOUS MATERIALS AND FRACTIONAL PACKAGES.
 6. MEASURE MIXING WATER BY VOLUME OR BY WEIGHT.
- B. CONCRETE PROPORTIONS AND CONSISTENCY:
1. PROVIDE CONCRETE THAT CAN BE WORKED READILY INTO CORNERS AND ANGLES OF FORMS AND AROUND REINFORCEMENT WITHOUT EXCESSIVE VIBRATION AND WITHOUT PERMITTING MATERIALS TO SEGREGATE OR FREE WATER TO COLLECT ON SURFACE.
 2. PREVENT UNNECESSARY OR HAPHAZARD CHANGES IN CONSISTENCY OF CONCRETE.
 3. RATIO OF COARSE AGGREGATE TO FINE AGGREGATE: NOT LESS THAN 1.0 OR MORE THAN 2.0 FOR ALL CONCRETE CLASSES, WITH EXCEPTION OF CLASS CE.
 4. AGGREGATE:
 - a. OBTAIN AGGREGATE FROM SOURCE THAT IS CAPABLE OF PROVIDING UNIFORM QUALITY, MOISTURE CONTENT, AND GRADING DURING ANY SINGLE DAY'S OPERATION.
 5. MAXIMUM CONCRETE MIX WATER TO CEMENTITIOUS MATERIALS RATIO, MINIMUM CEMENTITIOUS MATERIALS CONTENT, AND SLUMP RANGE: CONFORM TO VALUES SPECIFIED IN TABLE A IN THIS SECTION.
 6. CONCRETE BATCH WEIGHTS: CONTROL AND ADJUST TO SECURE MAXIMUM YIELD. AT ALL TIMES, MAINTAIN PROPORTIONS OF CONCRETE MIX WITHIN SPECIFIED LIMITS.
 7. MIX MODIFICATION: IF REQUIRED, BY THE ENGINEER, MODIFY MIXTURE WITHIN LIMITS SET FORTH IN THIS SECTION.
- C. CONCRETE MIXES:
1. PROPORTIONING OF CONCRETE MIX: PROPORTION MIXES BASED ON REQUIRED COMPRESSIVE STRENGTH F'CR.
 2. MIXES:
 - a. ADJUSTING OF WATER: AFTER ACCEPTANCE, DO NOT CHANGE MIXES WITHOUT ACCEPTANCE BY ENGINEER, EXCEPT THAT AT ALL TIMES ADJUST BATCHING OF WATER TO COMPENSATE FOR FREE MOISTURE CONTENT OF FINE AGGREGATE.
 - b. TOTAL WATER CONTENT OF EACH CONCRETE CLASS: NOT EXCEED THOSE SPECIFIED IN TABLE A IN THIS SECTION.
 - c. CHECKING MOISTURE CONTENT OF FINE AGGREGATE: FURNISH SATISFACTORY MEANS AT BATCHING PLANT FOR CHECKING MOISTURE CONTENT OF FINE AGGREGATE.
 3. CHANGE IN MIXES: SUBMIT NEW MIX DESIGN AND PERFORM NEW TRIAL BATCH AND TEST PROGRAM AS SPECIFIED IN THIS SECTION.
- D. CLASSES OF CONCRETE:
1. PROVIDE CONCRETE CONSISTING OF PROPERTIES INDICATED IN TABLE BELOW.
 2. WEIGHT OF CONCRETE CLASSES: MINIMUM WEIGHT OF 140 POUNDS PER CUBIC FOOT.

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TABLE A: CONCRETE						
	AGGREGATE GRADATION CLASS	MINIMUM SPECIFIED COMPRESSIVE STRENGTH F'C AT 28 DAYS (POUNDS PER SQUARE INCH)	WATER-TO- CEMENTITIOUS MATERIALS RATIO	CEMENTITIOUS MATERIALS PER CUBIC YARD OF CONCRETE BY WEIGHT (POUNDS)	SLUMP RANGE (INCHES)	
CURB, GUTTERS, DRIVE, APPROACHES, SIDEWALK	C	2,500	MAXIMUM 0.50	465	3	
FENCE FOUNDATION SLAB ON GRADE	C	3,000	0.50	520	4	
FOUNDATIONS	C	3,000	0.50	520	4	

3. PUMPED CONCRETE: PROVIDE PUMPED CONCRETE THAT COMPLIES WITH ALL REQUIREMENTS OF THIS SECTION.
4. DO NOT PLACE CONCRETE WITH SLUMP OUTSIDE LIMITS INDICATED IN TABLE A.
5. CLASSES:
 - a. MAKE WITH TYPE II LOW ALKALI PORTLAND CEMENT.
 - b. ADMIXTURES: PROVIDE ADMIXTURES AS SPECIFIED IN THIS SECTION.
- E. AIR ENTRAINING ADMIXTURE:
 1. ADD AGENT TO BATCH IN PORTION OF MIXING WATER.
 2. BATCH SOLUTION BY MEANS OF MECHANICAL BATCHER CAPABLE OF ACCURATE MEASUREMENT.

2.04 SOURCE QUALITY CONTROL

A. TESTS:

1. TRIAL BATCHES:
 - a. AFTER CONCRETE MIX DESIGNS HAVE BEEN ACCEPTED BY ENGINEER, HAVE TRIAL BATCHES OF THE ACCEPTED CLASS A, CLASS B, AND CLASS D CONCRETE MIX DESIGNS PREPARED BY TESTING LABORATORY ACCEPTABLE TO THE ENGINEER.
 - b. PREPARE TRIAL BATCHES USING CEMENTITIOUS MATERIALS AND AGGREGATES PROPOSED TO BE USED FOR THE WORK.
 - c. PREPARE TRIAL BATCHES WITH SUFFICIENT QUANTITY TO DETERMINE SLUMP, WORKABILITY, CONSISTENCY, SETTING TIME, AND FINISHING CHARACTERISTICS, AND TO PROVIDE SUFFICIENT TEST CYLINDERS.
 - d. TEST CYLINDERS: PROVIDE CYLINDERS HAVING 6-INCH DIAMETER BY 12-INCH LENGTH AND THAT ARE PREPARED IN ACCORDANCE WITH ASTM C31 FOR TESTS SPECIFIED IN THIS SECTION.
 - e. DETERMINE SLUMP IN ACCORDANCE WITH ASTM C143.
 - f. TEST CYLINDERS FROM TRIAL BATCH:

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- 1) TEST 8 CYLINDERS FOR COMPRESSIVE STRENGTH IN ACCORDANCE WITH ASTM C39:
 - a) TEST 4 CYLINDERS AT 7 DAYS AND 4 AT 28 DAYS.
 - b) ESTABLISH RATIO BETWEEN 7 DAY AND 28 DAY STRENGTH FOR MIX. 7-DAY STRENGTH MAY BE TAKEN AS SATISFACTORY INDICATION OF 28-DAY STRENGTH PROVIDED EFFECTS ON CONCRETE OF TEMPERATURE AND HUMIDITY BETWEEN 7 DAY AND 28 DAY ARE TAKEN INTO ACCOUNT.
- 2) AVERAGE COMPRESSIVE STRENGTH OF 4 TEST CYLINDERS TESTED AT 28 DAYS: EQUAL TO OR GREATER THAN REQUIRED AVERAGE COMPRESSIVE STRENGTH (F'CR) ON WHICH CONCRETE MIX DESIGN IS BASED.
- g. DRYING SHRINKAGE:
 - 1) PREPARE 5 DRYING SHRINKAGE SPECIMENS IN ACCORDANCE WITH ASTM C157, EXCEPT AS MODIFIED IN THIS SECTION.
 - 2) REMOVE DRYING SHRINKAGE SPECIMENS FROM MOLDS AT AGE OF 23 HOURS WITHIN 1 HOUR AFTER TRIAL BATCHING, THEN IMMEDIATELY PLACE THEM IN WATER AT 73 DEGREES FAHRENHEIT WITHIN 3 DEGREES FOR AT LEAST 30 MINUTES AND THEN MEASURE SPECIMENS WITHIN 30 MINUTES THEREAFTER TO DETERMINE ORIGINAL LENGTH.
 - a) THEN SUBMERGE SPECIMENS IN SATURATED LIMEWATER AT 73 DEGREES FAHRENHEIT WITHIN 3 DEGREES FOR MOIST CURING.
 - 3) MAKE MEASUREMENT TO DETERMINE EXPANSION EXPRESSED AS PERCENTAGE OF ORIGINAL LENGTH AT AGE 7 DAYS.
 - a) USE LENGTH AT AGE 7 DAYS AS BASE LENGTH FOR DRYING SHRINKAGE CALCULATIONS.
 - 4) IMMEDIATELY STORE SPECIMENS IN HUMIDITY CONTROLLED ROOM MAINTAINED AT 73 DEGREES FAHRENHEIT WITHIN 3 DEGREES AND 50 PERCENT WITHIN A 4 PERCENT RELATIVE HUMIDITY FOR REMAINDER OF TEST.
 - 5) MAKE AND REPORT MEASUREMENTS TO DETERMINE SHRINKAGE EXPRESSED AS PERCENTAGE OF BASE LENGTH SEPARATELY FOR 7, 14, 21, AND 28 DAYS OF DRYING AFTER 7 DAYS OF MOIST CURING.
 - 6) DRYING SHRINKAGE DEFORMATION:
 - a) MEASURE DRYING SHRINKAGE DEFORMATION OF EACH SPECIMEN AS DIFFERENCE BETWEEN BASE LENGTH AND LENGTH AFTER DRYING AT EACH TEST AGE.
 - b) MEASURE AVERAGE DRYING SHRINKAGE DEFORMATION OF SPECIMENS TO NEAREST 0.0001 INCH AT EACH TEST AGE.
 - c) IF DRYING SHRINKAGE OF ANY SPECIMEN DEPARTS FROM AVERAGE OF TEST AGE BY MORE THAN 0.0004 INCH, DISREGARD RESULTS OBTAINED FROM THAT SPECIMEN AND TEST ANOTHER SPECIMEN.
 - d) SHRINKAGE OF TRIAL BATCH CONCRETE AT 28 DAYS DRYING AGE SHALL NOT EXCEED 0.040 PERCENT MAXIMUM.
- h. PERFORM TEST BATCHES AND TESTS REQUIRED TO ESTABLISH TRIAL BATCHES AND ACCEPTABILITY OF MATERIALS WITHOUT CHANGE IN CONTRACT PRICE.
- i. DO NOT PLACE CONCRETE UNTIL THE CONCRETE MIX DESIGN AND TRIAL BATCH HAVE BEEN ACCEPTED BY ENGINEER.
2. REQUIRED AVERAGE COMPRESSIVE STRENGTH:
 - a. DETERMINE REQUIRED AVERAGE COMPRESSIVE STRENGTH (F'C) FOR SELECTION OF

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CONCRETE PROPORTIONS FOR MIX DESIGN, FOR EACH CLASS OF CONCRETE, USING CALCULATED STANDARD DEVIATION FOR ITS CORRESPONDING SPECIFIED COMPRESSIVE STRENGTH (F'C,) IN ACCORDANCE WITH ACI 318 AND ACI 350.

- b. WHEN TEST RECORDS OF AT LEAST 30 CONSECUTIVE TESTS THAT SPAN PERIOD OF NOT LESS THAN 45 CALENDAR DAYS ARE AVAILABLE, ESTABLISH STANDARD DEVIATION AS IN ACCORDANCE WITH ACI 318 AND ACI 350 AND AS MODIFIED IN THIS SECTION.
- c. PROVIDE TEST RECORDS FROM WHICH TO CALCULATE STANDARD DEVIATION THAT REPRESENT MATERIALS, QUALITY CONTROL PROCEDURES, AND CONDITIONS SIMILAR TO MATERIALS, QUALITY CONTROL PROCEDURES, AND CONDITIONS EXPECTED TO APPLY IN PREPARATION OF CONCRETE FOR THE WORK.
- d. PROVIDE TEST RECORDS WITH MATERIALS AND PROPORTIONS THAT ARE MORE RESTRICTED THAN THOSE FOR THE WORK.
- e. SPECIFIED COMPRESSIVE STRENGTH (F'C) OF CONCRETE USED IN TEST RECORDS: WITHIN 1,000 POUNDS PER SQUARE INCH OF THAT SPECIFIED FOR THE WORK.
- f. WHEN LACKING ADEQUATE TEST RECORDS FOR CALCULATION OF STANDARD DEVIATION MEETING REQUIREMENTS, DETERMINE REQUIRED AVERAGE COMPRESSIVE STRENGTH F'CR FROM FOLLOWING TABLE B.

TABLE B: REQUIRED AVERAGE COMPRESSION STRENGTH	
SPECIFIED COMPRESSIVE STRENGTH F'C (POUNDS PER SQUARE INCH)	REQUIRED AVERAGE COMPRESSIVE STRENGTH F'CR (POUNDS PER SQUARE INCH)
LESS THAN 3,000	$F'C + 1,000$
3,000 TO 5,000	$F'C + 1,200$
OVER 5,000	$1.10F'C + 700$

3. AGGREGATE:

- a. TESTING OF CONCRETE AGGREGATE IS AT CONTRACTOR'S EXPENSE.
- b. PROVIDE TEST REPORTS REPRESENTING SAMPLES OF MATERIALS TAKEN AND TESTED AT THE FOLLOWING TIMES:
 - 1) NOT MORE THAN 60 DAYS PRIOR TO THE DATE ON THE PROPOSED MATERIALS FOR CONCRETE MIXES.
 - 2) NOT MORE THAN 60 DAYS PRIOR TO ANY CHANGE IN THE SOURCE OF AGGREGATES, INCLUDING SUPPLIERS AND/OR QUARRIES.
 - 3) WHENEVER THERE IS A SIGNIFICANT CHANGE IN AGGREGATE QUALITY OR GRADATION FROM A PREVIOUSLY SUBMITTED AND ACCEPTED SOURCE.
- c. SAMPLE AGGREGATE IN ACCORDANCE WITH ASTM D75.
- d. FINE AND COARSE AGGREGATES:
 - 1) GRADATION: TEST IN ACCORDANCE WITH ASTM C136. USE SIEVES WITH SQUARE OPENINGS FOR TESTING GRADING OF AGGREGATES.
 - 2) ALKALI-SILICA REACTIVITY:
 - a) PROVIDE FINE AND COARSE AGGREGATE WITH EXPANSION NOT GREATER THAN 0.10

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PERCENT AT 14 DAYS WHEN TESTED IN ACCORDANCE WITH ASTM C1260, UNLESS THE AGGREGATE HAS BEEN DETERMINED TO BE NOT DELETERIOUSLY REACTIVE BASED ON TESTING IN ACCORDANCE WITH ONE OF THE FOLLOWING:

- ASTM C227: EXPANSION NOT GREATER THAN 0.05 PERCENT AND 3 MONTHS, AND NOT GREATER THAN 0.10 PERCENT AT 6 MONTHS.
- ASTM C1293: EXPANSION NOT GREATER THAN 0.04 PERCENT AT 1 YEAR.

e. FINE AGGREGATE:

- 1) PROVIDE FINE AGGREGATE THAT DOES NOT CONTAIN STRONG ALKALI NOR ORGANIC MATTER WHICH GIVES COLOR DARKER THAN STANDARD COLOR WHEN TESTED IN ACCORDANCE WITH ASTM C40.
- 2) PROVIDE AGGREGATE HAVING SOUNDNESS IN ACCORDANCE WITH ASTM C33 WHEN TESTED IN ACCORDANCE WITH ASTM C88.

f. COARSE AGGREGATE:

- 1) SOUNDNESS WHEN TESTED IN ACCORDANCE WITH ASTM C88: HAVE LOSS NOT GREATER THAN 10 PERCENT WHEN TESTED WITH SODIUM SULFATE.
- 2) ABRASION LOSS: NOT EXCEED 45 PERCENT AFTER 500 REVOLUTIONS WHEN TESTED IN ACCORDANCE WITH ASTM C131.

g. FLY ASH:

- 1) SAMPLING AND TESTING: SAMPLE AND TEST FLY ASH IN ACCORDANCE WITH ASTM C311.

h. PORTLAND CEMENT:

- 1) DETERMINATION OF ALKALI CONTENT: IN ACCORDANCE WITH ASTM C114.

PART 3 EXECUTION

3.01 INSTALLATION

A. LIQUID EVAPORATION RETARDANT:

1. UNDER CONDITIONS THAT RESULT IN RAPID EVAPORATION OF MOISTURE FROM THE SURFACE OF THE CONCRETE, IMMEDIATELY AFTER THE CONCRETE HAS BEEN SCREEDED, COAT THE SURFACE OF THE CONCRETE WITH A LIQUID EVAPORATION RETARDANT.
2. APPLY THE EVAPORATION RETARDANT AGAIN AFTER EACH WORK OPERATION AS NECESSARY TO PREVENT DRYING SHRINKAGE CRACKS.
3. CONDITIONS WHICH RESULT IN RAPID EVAPORATION OF MOISTURE MAY INCLUDE ONE OR MORE OF THE FOLLOWING:
 - a. LOW HUMIDITY.
 - b. WINDY CONDITIONS.
 - c. HIGH TEMPERATURE.

B. SURFACE SEALANT SYSTEM:

1. APPLY AS RECOMMENDED BY MANUFACTURER PUBLISHED INSTRUCTIONS.
2. WHERE CONCRETE CONTINUES TO SWEAT OR LEAK, APPLY ADDITIONAL COATS OF SURFACE SEALANT UNTIL THE SWEATING OR LEAKS STOP.

C. JOINTS AND BONDING:

1. AS FAR AS PRACTICABLE CONSTRUCT CONCRETE WORK AS MONOLITH.
2. LOCATIONS OF CONSTRUCTION, EXPANSION, AND OTHER JOINTS ARE INDICATED ON THE

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DRAWINGS OR AS SPECIFIED IN THIS SECTION.

3. TIME BETWEEN PLACEMENT OF ADJACENT CONCRETE SEPARATED BY JOINTS:
 - a. PROVIDE NOT LESS THAN 3 DAYS (72 HOURS) BETWEEN PLACEMENT OF ADJACENT SECTIONS FOR THE FOLLOWING:
 - 1) SLABS.
 - 2) WALLS.
 - b. PROVIDE NOT LESS THAN 7 DAYS (168 HOURS) BETWEEN PLACEMENT OF UPPER AND LOWER POURS FOR THE FOLLOWING:
 - 1) WALLS OVER SLABS.
 - 2) SLABS OVER WALLS.
 - 3) SLABS KEYED INTO THE SIDES OF WALLS.
4. CONSTRUCTION JOINTS:
 - a. WHERE CONSTRUCTION JOINTS ARE NOT INDICATED ON THE DRAWINGS, PROVIDE CONSTRUCTION JOINTS IN SLABS AND WALLS AT INTERVALS NOT GREATER THAN 35 FEET.
 - b. IN ORDER TO PRESERVE STRENGTH AND WATERTIGHTNESS OF STRUCTURES, MAKE NO OTHER JOINTS, EXCEPT AS AUTHORIZED THE ENGINEER.
 - c. AT CONSTRUCTION JOINTS, THOROUGHLY CLEAN CONCRETE OF LAITANCE, GREASE, OIL, MUD, DIRT, CURING COMPOUNDS, MORTAR DROPPINGS, OR OTHER OBJECTIONABLE MATTER BY MEANS OF HEAVY SANDBLASTING.
 - d. CLEANING OF CONSTRUCTION JOINTS:
 - 1) WASH CONSTRUCTION JOINTS FREE OF SAWDUST, CHIPS, AND OTHER DEBRIS AFTER FORMS ARE BUILT AND IMMEDIATELY BEFORE CONCRETE OR GROUT PLACEMENT.
 - 2) SHOULD FORMWORK CONFINE SAWDUST, CHIPS, OR OTHER LOOSE MATTER IN SUCH MANNER THAT IT IS IMPOSSIBLE TO REMOVE THEM BY FLUSHING WITH WATER, USE VACUUM CLEANER FOR THEIR REMOVAL, AFTER WHICH FLUSH CLEANED SURFACES WITH WATER.
 - 3) PROVIDE CLEANOUT HOLE AT BASE OF EACH WALL AND COLUMN FOR INSPECTION AND CLEANING.
 - e. AT HORIZONTAL JOINTS: AS INITIAL PLACEMENT OVER COLD JOINTS, THOROUGHLY SPREAD BED OF CEMENT GROUT AS SPECIFIED IN SECTION 03_60_00 WITH A THICKNESS OF NOT LESS THAN 1/2 INCH NOR MORE THAN 1 INCH.
5. TAKE SPECIAL CARE TO ENSURE THAT CONCRETE IS WELL CONSOLIDATED AROUND AND AGAINST WATERSTOPS AND WATERSTOPS ARE SECURED IN PROPER POSITION. 6. CONSTRUCTION AND EXPANSION JOINTS:
 - a. CONSTRUCTED WHERE AND AS INDICATED ON THE DRAWINGS.
 - b. WATERSTOPS, EXPANSION JOINT MATERIAL, SYNTHETIC RUBBER SEALING COMPOUND, AND OTHER SIMILAR MATERIALS: AS SPECIFIED IN SECTIONS 03_15_00 AND 07_90_00.
6. REPAIR OF CONCRETE: WHERE IT IS NECESSARY TO REPAIR CONCRETE BY BONDING MORTAR OR NEW CONCRETE TO CONCRETE WHICH HAS REACHED ITS INITIAL SET, FIRST COAT SURFACE OF SET CONCRETE WITH EPOXY BONDING AGENT AS SPECIFIED IN SECTION 03_63_01.
- D. CONVEYING AND PLACING CONCRETE:
 1. CONVEY CONCRETE FROM MIXER TO PLACE OF FINAL DEPOSIT BY METHODS THAT PREVENT SEPARATION OR LOSS OF MATERIALS.
 2. USE EQUIPMENT FOR CHUTING, PUMPING, AND CONVEYING CONCRETE OF SUCH SIZE AND

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DESIGN AS TO ENSURE PRACTICALLY CONTINUOUS FLOW OF CONCRETE AT DELIVERY END WITHOUT SEGREGATION OF MATERIALS.

3. DESIGN AND USE CHUTES AND DEVICES FOR CONVEYING AND DEPOSITING CONCRETE THAT DIRECT CONCRETE VERTICALLY DOWNWARD WHEN DISCHARGED FROM CHUTE OR CONVEYING DEVICE.
4. KEEP EQUIPMENT FOR CONVEYING CONCRETE THOROUGHLY CLEAN BY WASHING AND SCRAPING UPON COMPLETION OF DAY'S PLACEMENT.

E. PLACING CONCRETE:

1. PLACE NO CONCRETE WITHOUT PRIOR AUTHORIZATION OF THE ENGINEER.
2. DO NOT PLACE CONCRETE UNTIL:
 - a. REINFORCEMENT IS SECURE AND PROPERLY FASTENED IN ITS CORRECT POSITION AND LOOSE FORM TIES AT CONSTRUCTION JOINTS HAVE BEEN RETIGHTENED.
 - b. DOWELS, BUCKS, SLEEVES, HANGERS, PIPES, CONDUITS, ANCHOR BOLTS, AND ANY OTHER FIXTURES REQUIRED TO BE EMBEDDED IN CONCRETE HAVE BEEN PLACED AND ADEQUATELY ANCHORED.
 - c. FORMS HAVE BEEN CLEANED AND OILED AS SPECIFIED.
3. DO NOT PLACE CONCRETE IN WHICH INITIAL SET HAS OCCURRED, OR THAT HAS BEEN RETEMPERED.
4. DO NOT PLACE CONCRETE DURING RAINSTORMS OR HIGH VELOCITY WINDS.
5. PROTECT CONCRETE PLACED IMMEDIATELY BEFORE RAIN TO PREVENT WATER FROM COMING IN CONTACT WITH SUCH CONCRETE OR WINDS CAUSING EXCESSIVE DRYING.
6. KEEP SUFFICIENT PROTECTIVE COVERING ON HAND AT ALL TIMES FOR PROTECTION OF CONCRETE.
7. AFTER ACCEPTANCE, ADHERE TO PROPOSED SEQUENCE OF PLACING CONCRETE, EXCEPT WHEN SPECIFIC CHANGES ARE REQUESTED AND ACCEPTED BY THE ENGINEER.
8. NOTIFY THE ENGINEER IN WRITING OF READINESS, NOT JUST INTENTION, TO PLACE CONCRETE IN ANY PORTION OF THE WORK:
 - a. PROVIDE THIS NOTIFICATION IN SUCH TIME IN ADVANCE OF OPERATIONS, AS THE ENGINEER DEEMS NECESSARY TO MAKE FINAL INSPECTION OF PREPARATIONS AT LOCATION OF PROPOSED CONCRETE PLACING.
 - b. PLACE FORMS, REINFORCEMENT, SCREEDS, ANCHORS, TIES, AND INSERTS IN PLACE BEFORE NOTIFICATION OF READINESS IS GIVEN TO THE ENGINEER.
 - c. DEPOSITING CONCRETE:
 - 1) DEPOSIT CONCRETE AT OR NEAR ITS FINAL POSITION TO AVOID SEGREGATION CAUSED BY REHANDLING OR FLOWING.
 - 2) DO NOT DEPOSIT CONCRETE IN LARGE QUANTITIES IN ONE PLACE AND WORK ALONG FORMS WITH VIBRATOR OR BY OTHER METHODS.
 - 3) DO NOT DROP CONCRETE FREELY INTO PLACE FROM HEIGHT GREATER THAN 5 FEET.
 - 4) USE TREMIES FOR PLACING CONCRETE WHERE DROP IS OVER 5 FEET.
 - 5) COMMENCE PLACEMENT OF CONCRETE ON SLOPES, STARTING AT BOTTOM OF SLOPE.
9. PLACE CONCRETE IN APPROXIMATELY HORIZONTAL LAYERS NOT TO EXCEED 24 INCHES IN DEPTH AND BRING UP EVENLY IN ALL PARTS OF FORMS.
10. CONTINUE CONCRETE PLACEMENT WITHOUT AVOIDABLE INTERRUPTION, IN CONTINUOUS OPERATION, UNTIL END OF PLACEMENT IS REACHED.

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11. AFTER CONCRETE PLACEMENT BEGINS, CONTINUE CONCRETE PLACEMENT WITHOUT SIGNIFICANT INTERRUPTION. PLAN AND IMPLEMENT PRECAUTIONS TO PREVENT ANY DELAY, BETWEEN LAYERS BEING PLACED, FROM EXCEEDING 20 MINUTES.
 12. IF CONCRETE IS TO BE PLACED OVER PREVIOUSLY PLACED CONCRETE AND MORE THAN 20 MINUTES HAS ELAPSED, SPREAD LAYER OF CEMENT GROUT NOT LESS THAN 1/2 INCH IN THICKNESS NOR MORE THAN 1 INCH IN THICKNESS OVER SURFACE BEFORE PLACING ADDITIONAL CONCRETE.
 13. PLACEMENT OF CONCRETE FOR SLABS, BEAMS, OR WALKWAYS:
 - a. IF CAST MONOLITHICALLY WITH WALLS OR COLUMNS, DO NOT COMMENCE UNTIL CONCRETE IN WALLS OR COLUMNS HAS BEEN ALLOWED TO SET AND SHRINK.
 - b. ALLOW SET TIME OF NOT LESS THAN 1 HOUR FOR SHRINKAGE.
- F. CONSOLIDATING CONCRETE:
1. PLACE CONCRETE WITH AID OF ACCEPTABLE MECHANICAL VIBRATORS.
 2. THOROUGHLY CONSOLIDATE CONCRETE AROUND REINFORCEMENT, PIPES, OR OTHER SHAPES BUILT INTO THE WORK.
 3. PROVIDE SUFFICIENTLY INTENSE VIBRATION TO CAUSE CONCRETE TO FLOW AND SETTLE READILY INTO PLACE AND TO VISIBLY AFFECT CONCRETE OVER RADIUS OF AT LEAST 18 INCHES.
 4. VIBRATORS:
 - a. KEEP SUFFICIENT VIBRATORS ON HAND AT ALL TIMES TO VIBRATE CONCRETE AS PLACED.
 - b. IN ADDITION TO VIBRATORS IN ACTUAL USE WHILE CONCRETE IS BEING PLACED, HAVE ON HAND MINIMUM 1 SPARE VIBRATOR IN SERVICEABLE CONDITION.
 - c. DO NOT PLACE CONCRETE UNTIL IT HAS BEEN ASCERTAINED THAT ALL VIBRATING EQUIPMENT, INCLUDING SPARES, ARE IN SERVICEABLE CONDITION.
 5. TAKE SPECIAL CARE TO PLACE CONCRETE SOLIDLY AGAINST FORMS TO LEAVE NO VOIDS.
 6. TAKE EVERY PRECAUTION TO MAKE CONCRETE SOLID, COMPACT, AND SMOOTH. IF FOR ANY REASON SURFACES OR INTERIORS HAVE VOIDS OR ARE IN ANY WAY DEFECTIVE, REPAIR SUCH CONCRETE IN MANNER ACCEPTABLE TO THE ENGINEER.
- G. FOOTINGS AND SLABS ON GRADE:
1. DO NOT PLACE CONCRETE ON GROUND OR COMPACTED FILL UNTIL SUBGRADE IS IN MOIST CONDITION ACCEPTABLE TO THE ENGINEER.
 2. IF NECESSARY, SPRINKLE SUBGRADE WITH WATER NOT LESS THAN 6 OR MORE THAN 20 HOURS IN ADVANCE OF PLACING CONCRETE.
 3. IF SUBGRADE BECOMES DRY PRIOR TO CONCRETE PLACEMENT, SPRINKLE AGAIN, WITHOUT FORMING POOLS OF WATER.
 4. DO NOT PLACE CONCRETE IF SUBGRADE IS MUDDY OR SOFT.
- H. LOADING CONCRETE:
1. GREEN CONCRETE:
 - a. NO HEAVY LOADING OF GREEN CONCRETE WILL BE PERMITTED.
 2. NO BACKFILL SHALL BE PLACED AGAINST CONCRETE WALLS, CONNECTING SLABS, OR BEAMS UNTIL THE CONCRETE HAS REACHED THE SPECIFIED STRENGTH.
 3. USE CONSTRUCTION METHODS, SEQUENCING, AND ALLOW TIME FOR CONCRETE TO REACH ADEQUATE STRENGTH TO PREVENT OVERSTRESS OF THE CONCRETE STRUCTURE DURING CONSTRUCTION.

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I. CURING CONCRETE:

1. GENERAL:

- a. CURE CONCRETE BY METHODS SPECIFIED IN THIS SECTION.
- b. KEEP CONCRETE CONTINUOUSLY MOIST AND AT A TEMPERATURE OF AT LEAST 50 DEGREES FAHRENHEIT FOR MINIMUM OF 7 DAYS AFTER PLACEMENT.
- c. CURE CONCRETE TO BE PAINTED WITH WATER OR SHEET MEMBRANE.
- d. DO NOT USE SPRAYED MEMBRANE CURING OR SEALING COMPOUNDS ON CONCRETE SURFACES THAT ARE TO RECEIVE PAINT OR UPON WHICH ANY MATERIAL IS TO BE BONDED.
- e. WATER CURE OR SHEET MEMBRANE CURE CONCRETE SLABS THAT ARE SPECIFIED TO BE SEALED BY CONCRETE SEALER.
- f. CURE OTHER CONCRETE BY WATER CURING OR SPRAYED MEMBRANE CURING COMPOUND AT THE CONTRACTOR'S OPTION.
- g. FLOOR SLABS MAY BE CURED USING SHEET MEMBRANE CURING.

2. WATER CURING:

- a. KEEP SURFACES OF CONCRETE BEING WATER CURED CONSTANTLY AND VISIBLY MOIST DAY AND NIGHT FOR PERIOD OF NOT LESS THAN 7 DAYS.
- b. EACH DAY FORMS REMAIN IN PLACE COUNT AS 1 DAY OF WATER CURING.
- c. NO FURTHER CURING CREDIT WILL BE ALLOWED FOR FORMS IN PLACE AFTER CONTACT HAS ONCE BEEN BROKEN BETWEEN CONCRETE SURFACE AND FORMS.
- d. DO NOT LOOSEN FORM TIES DURING PERIOD WHEN CONCRETE IS BEING CURED BY LEAVING FORMS IN PLACE.
- e. FLOOD TOP OF WALLS WITH WATER AT LEAST 3 TIMES PER DAY, AND KEEP CONCRETE SURFACES MOIST AT ALL TIMES DURING 7 DAY CURING PERIOD.

3. SPRAYED MEMBRANE CURING COMPOUND:

- a. APPLY CURING COMPOUND TO CONCRETE SURFACE AFTER REPAIRING AND PATCHING, AND WITHIN 1 HOUR AFTER FORMS ARE REMOVED.
- b. IF MORE THAN 1 HOUR ELAPSES AFTER REMOVAL OF FORMS, DO NOT USE CURING COMPOUND, BUT USE WATER CURING FOR FULL CURING PERIOD.
- c. IF SURFACE REQUIRES REPAIRING OR PAINTING, WATER CURE SUCH CONCRETE SURFACES.
- d. DO NOT REMOVE CURING COMPOUND FROM CONCRETE IN LESS THAN 7 DAYS.
- e. CURING COMPOUND MAY BE REMOVED ONLY UPON WRITTEN REQUEST BY CONTRACTOR AND ACCEPTANCE BY ENGINEER, STATING WHAT MEASURES ARE TO BE PERFORMED TO ADEQUATELY CURE CONCRETE.
- f. TAKE CARE TO APPLY CURING COMPOUND TO CONSTRUCTION JOINTS. APPLY TO ALL SURFACES ALONG FULL PROFILE OF JOINTS.
- g. AFTER CURING PERIOD IS COMPLETE, REMOVE CURING COMPOUND PLACED WITHIN CONSTRUCTION JOINT PROFILE BY HEAVY SANDBLASTING PRIOR TO PLACING ANY NEW CONCRETE.
- h. CONTRACTOR'S OPTION: INSTEAD OF USING CURING COMPOUND FOR CURING OF CONSTRUCTION JOINTS, SUCH JOINTS MAY BE WATER CURED.
- i. APPLY CURING COMPOUND BY MECHANICAL, POWER OPERATED SPRAYER AND MECHANICAL AGITATOR THAT WILL UNIFORMLY MIX ALL PIGMENT AND COMPOUND.
- j. APPLY CURING COMPOUND IN AT LEAST 2 COATS.

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- k. APPLY EACH COAT IN DIRECTION 90 DEGREES TO PRECEDING COAT.
 - l. APPLY CURING COMPOUND IN SUFFICIENT QUANTITY SO THAT CONCRETE HAS UNIFORM APPEARANCE AND THAT NATURAL COLOR IS EFFECTIVELY AND COMPLETELY CONCEALED AT TIME OF SPRAYING.
 - m. CONTINUE TO COAT AND RECOAT SURFACES UNTIL SPECIFIED COVERAGE IS ACHIEVED AND UNTIL COATING FILM REMAINS ON CONCRETE SURFACES.
 - n. THICKNESS AND COVERAGE OF CURING COMPOUND: PROVIDE CURING COMPOUND HAVING FILM THICKNESS THAT CAN BE SCRAPPED FROM SURFACES AT ANY AND ALL POINTS AFTER DRYING FOR AT LEAST 24 HOURS.
 - o. THE CONTRACTOR IS CAUTIONED THAT METHOD OF APPLYING CURING COMPOUND SPECIFIED IN THIS SECTION MAY REQUIRE MORE CURING COMPOUND THAN NORMALLY SUGGESTED BY MANUFACTURER OF CURING COMPOUND AND ALSO MORE THAN IS CUSTOMARY IN THE TRADE.
 - p. APPLY AMOUNTS SPECIFIED IN THIS SECTION, REGARDLESS OF MANUFACTURER'S RECOMMENDATIONS OR CUSTOMARY PRACTICE.
 - q. IF THE CONTRACTOR DESIRES TO USE CURING COMPOUND OTHER THAN SPECIFIED CURING COMPOUND, COAT SAMPLE AREAS OF CONCRETE WALL WITH PROPOSED CURING COMPOUND AND ALSO SIMILAR ADJACENT AREA WITH SPECIFIED COMPOUND IN SPECIFIED MANNER FOR COMPARISON:
 - 1) IF PROPOSED SAMPLE IS NOT EQUAL OR BETTER, IN OPINION OF THE ENGINEER, IN ALL FEATURES, PROPOSED SUBSTITUTION WILL NOT BE ALLOWED.
 - r. PRIOR TO FINAL ACCEPTANCE OF THE WORK, REMOVE, BY SANDBLASTING OR OTHER ACCEPTABLE METHOD, ANY CURING COMPOUND ON SURFACES EXPOSED TO VIEW, SO THAT ONLY NATURAL COLOR OF FINISHED CONCRETE IS VISIBLE UNIFORMLY OVER ENTIRE SURFACE.
4. SHEET MEMBRANE CURING:
- a. INSTALL SHEET MEMBRANE AS SOON AS CONCRETE IS FINISHED AND CAN BE WALKED ON WITHOUT DAMAGE.
 - b. SEAL JOINTS AND EDGES WITH SMALL SAND BERM.
 - c. KEEP CONCRETE MOIST UNDER SHEET MEMBRANE.
- J. COLD WEATHER CONCRETING:
- 1. PREPARATION BEFORE CONCRETING:
 - a. REMOVE SNOW, ICE, AND FROST FROM THE SURFACES, INCLUDING REINFORCEMENT AGAINST WHICH THE CONCRETE IS TO BE PLACED.
 - b. THE SUBGRADE SHALL BE FREE OF FROST BEFORE CONCRETE PLACING BEGINS.
 - c. DO NOT PLACE CONCRETE AROUND ANY EMBEDMENT THAT IS AT A TEMPERATURE BELOW FREEZING AND IS SUFFICIENTLY MASSIVE AS TO CAUSE THE ADJACENT CONCRETE TO FREEZE.
 - 2. PLACEMENT OF CONCRETE:
 - a. PLACEMENT TEMPERATURE:
 - 1) THE MINIMUM TEMPERATURE OF CONCRETE IMMEDIATELY AFTER PLACEMENT SHALL BE AS SPECIFIED IN TABLE C.
 - 2) THE TEMPERATURE OF CONCRETE AS PLACED SHALL NOT EXCEED THE VALUES SHOWN IN TABLE C BY MORE THAN 20 DEGREES FAHRENHEIT.

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b. PROTECTION TEMPERATURE:

- 1) UNLESS OTHERWISE SPECIFIED, THE MINIMUM TEMPERATURE OF CONCRETE DURING THE PROTECTION PERIOD SHALL BE AS SHOWN TABLE C.
- 2) TEMPERATURES SPECIFIED TO BE MAINTAINED DURING THE PROTECTION PERIOD SHALL BE THOSE MEASURED AT THE CONCRETE SURFACE, WHETHER THE SURFACE IS IN CONTACT WITH FORMWORK, INSULATION, OR AIR.
- 3) MEASURE THE TEMPERATURE WITH A SURFACE MEASURING DEVICE ACCURATE TO 2 DEGREES FAHRENHEIT.
- 4) MEASURE THE TEMPERATURE OF CONCRETE IN EACH PLACEMENT AT REGULAR TIME INTERVALS AS SPECIFIED IN THE CONTRACT DOCUMENTS.

c. TERMINATION OF PROTECTION:

- 1) THE MAXIMUM DECREASE IN TEMPERATURE MEASURED AT THE SURFACE OF THE CONCRETE IN A 24-HOUR PERIOD SHALL NOT EXCEED THE VALUES LISTED IN TABLE C.
- 2) DO NOT EXCEED THESE LIMITS UNTIL THE SURFACE TEMPERATURE OF THE CONCRETE IS WITHIN 20 DEGREES FAHRENHEIT OF THE AMBIENT TEMPERATURE OF SURROUNDING TEMPERATURES.
- 3) WHEN THE SURFACE TEMPERATURE OF THE CONCRETE IS WITHIN 20 DEGREES FAHRENHEIT OF THE AMBIENT TEMPERATURE, ALL PROTECTION MAY BE REMOVED.

TABLE C CONCRETE TEMPERATURE REQUIREMENTS		
Least dimension of section (inches)	Minimum temperature of concrete as placed and to be maintained during the protection period (degrees Fahrenheit)	Maximum for gradual decrease in surface temperature during any 24 hour period after end of protection period (degrees Fahrenheit)
Less than 12	55	50
12 to less than 36	50	40
36 to 72	45	30
Greater than 72	40	20

3. CURING OF CONCRETE:

- a. PREVENT CONCRETE FROM DRYING DURING THE REQUIRED CURING PERIOD. IF WATER CURING IS USED, TERMINATE USE AT LEAST 24 HOURS BEFORE ANY ANTICIPATED EXPOSURE OF THE CONCRETE TO FREEZING TEMPERATURES.

4. PROTECTION OF CONCRETE:

- a. COMBUSTION HEATERS: VENT FLUE GASES FROM COMBUSTION HEATING UNITS TO THE OUTSIDE OF THE ENCLOSURES.
- b. OVERHEATING AND DRYING: PLACE AND DIRECT HEATERS AND DUCTS TO AVOID AREAS OF OVERHEATING OR DRYING OF THE CONCRETE SURFACE.
- c. MAXIMUM AIR TEMPERATURE: DURING THE PROTECTION PERIOD, DO NOT EXPOSE THE CONCRETE SURFACE TO AIR HAVING A TEMPERATURE MORE THAN 20 DEGREES FAHRENHEIT ABOVE THE VALUES SHOWN IN TABLE C UNLESS HIGHER VALUES ARE REQUIRED BY AN ACCEPTED CURING METHOD.
- d. PROTECTION AGAINST FREEZING:
 - 1) CURE AND PROTECT CONCRETE AGAINST DAMAGE FROM FREEZING FOR A MINIMUM OF

3 DAYS, UNLESS OTHERWISE SPECIFIED.

- a) MAINTAIN THE SURFACE TEMPERATURE OF THE CONCRETE AS SPECIFIED IN TABLE C.
- 2) DURING PERIODS NOT DEFINED AS COLD WEATHER, BUT WHEN FREEZING TEMPERATURES MAY OCCUR, PROTECT CONCRETE SURFACES AGAINST FREEZING FOR THE FIRST 24 HOURS AFTER PLACING.

3.02 CONCRETE FINISHING

- A. PROVIDE CONCRETE FINISHES AS SPECIFIED IN SECTION 033529.
- B. EDGES OF JOINTS:
 1. PROVIDE JOINTS HAVING EDGES AS INDICATED ON THE DRAWINGS.
 2. PROTECT WALL AND SLAB SURFACES AT EDGES AGAINST CONCRETE SPATTER AND THOROUGHLY CLEAN UPON COMPLETION OF EACH PLACEMENT.
- C. CONCRETE SEALER:
 1. FLOORS AND SLABS TO RECEIVE CONCRETE SEALER: AS SPECIFIED IN THE CONTRACT DOCUMENTS ON FINISH SCHEDULE.
 2. APPLY CONCRETE SEALER:
 - a. APPLY CONCRETE SEALER AT COVERAGE RATE NOT TO EXCEED 300 SQUARE FEET PER GALLON.
 - b. APPLY AS SOON AS SLAB OR FLOOR WILL BEAR WEIGHT.
 - c. SEALER:
 - 1) BEFORE APPLYING CONCRETE SEALER, SWEEP ENTIRE SURFACE CLEAN WITH VERY SOFT BRISTLED BRUSH THAT WILL NOT MARK CONCRETE FINISH AND REMOVE ANY STANDING WATER.
 - 2) APPLY CONCRETE SEALER WITH SPRAYER.
 - 3) USE OF PAINT ROLLERS OR MOP IS NOT ACCEPTABLE.
 - 4) WORKMEN SHALL WEAR FLAT SOLED SHOES WHICH WILL NOT MARK OR SCAR CONCRETE SURFACE.
 - 5) DO NOT ALLOW TRAFFIC ON FLOORS AND SLABS UNTIL CONCRETE SEALER HAS DRIED AND HARDENED.

3.03 FIELD QUALITY CONTROL

- A. TESTING OF CONCRETE:
 1. DURING PROGRESS OF CONSTRUCTION, THE OWNER WILL HAVE TESTS MADE TO DETERMINE WHETHER THE CONCRETE, AS BEING PRODUCED, COMPLIES WITH REQUIREMENTS SPECIFIED.
 2. TESTS WILL BE PERFORMED IN ACCORDANCE WITH ASTM C 31, ASTM C 39, AND ASTM C 172.
 3. THE ENGINEER WILL MAKE AND DELIVER TEST CYLINDERS TO THE LABORATORY AND TESTING EXPENSE WILL BE BORNE BY THE OWNER.
 4. FURNISH TEST EQUIPMENT.
 5. MAKE PROVISIONS FOR AND FURNISH CONCRETE FOR TEST SPECIMENS, AND PROVIDE MANUAL ASSISTANCE TO THE ENGINEER IN PREPARING SAID SPECIMENS.
 6. ASSUME RESPONSIBILITY FOR CARE OF AND PROVIDING OF CURING CONDITIONS FOR TEST SPECIMENS IN ACCORDANCE WITH ASTM C 31.

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B. COMPRESSIVE STRENGTH TESTS:

1. STRENGTH TESTS SHALL BE DEFINED AS THE AVERAGE OF THE STRENGTHS OF 2 CYLINDER SPECIMENS MADE FROM THE SAME SAMPLE OF CONCRETE AND TESTED AT 28 DAYS.
2. CONCRETE CYLINDERS SHALL BE 6-INCH DIAMETER BY 12-INCH LONG.
3. TEST NOT LESS THAN 3 CYLINDER SPECIMENS FOR EACH 100 CUBIC YARDS OF EACH CLASS OF CONCRETE NOR LESS THAN 3 CYLINDER SPECIMENS FOR EACH 5,000 SQUARE FEET OF SURFACE AREA OF WALLS OR SLABS.
4. TEST NOT LESS THAN 9 CYLINDER SPECIMENS FOR EACH DAY CONCRETE IS PLACED.
5. FOR EVERY GROUP OF 3 CYLINDER TESTS SAMPLED FROM THE SAME CLASS OF CONCRETE, ONE SHALL BE TESTED AT 7 DAYS AND TWO SHALL BE TESTED AT 28 DAYS.

C. SLUMP TESTS:

1. TEST SLUMP OF CONCRETE USING SLUMP CONE IN ACCORDANCE WITH ASTM C 143.
2. DO NOT USE CONCRETE THAT DOES NOT MEET SPECIFICATION REQUIREMENTS IN REGARDS TO SLUMP:
 - a. REMOVE SUCH CONCRETE FROM PROJECT SITE.
 - b. TEST SLUMP AT THE BEGINNING OF EACH PLACEMENT, AS OFTEN AS NECESSARY TO KEEP SLUMP WITHIN THE SPECIFIED RANGE, AND WHEN REQUESTED TO DO SO BY THE ENGINEER.

D. DENSITY AND YIELD TESTS:

1. TEST DENSITY OF CONCRETE IN ACCORDANCE WITH ASTM C 138
2. TESTING SHALL BE PERFORMED CONCURRENTLY WITH OTHER TESTS AT TIME OF PLACEMENT IN ACCORDANCE WITH ACI 301

E. TEMPERATURE TESTS:

1. TEST CONCRETE TEMPERATURE IN ACCORDANCE WITH ASTM C 1064
2. TESTING SHALL BE PERFORMED CONCURRENTLY WITH OTHER TESTS AT TIME OF PLACEMENT IN ACCORDANCE WITH ACI 301

F. AIR ENTRAINMENT TESTS:

1. TEST PERCENT OF ENTRAINED AIR IN CONCRETE AT BEGINNING OF EACH PLACEMENT, AS OFTEN AS NECESSARY TO KEEP ENTRAINED AIR WITHIN SPECIFIED RANGE, AND WHEN REQUESTED TO DO SO BY THE ENGINEER.
2. DO NOT USE CONCRETE THAT DOES NOT MEET SPECIFICATION REQUIREMENTS FOR AIR ENTRAINMENT.
 - a. REMOVE SUCH CONCRETE FROM PROJECT SITE.
3. TEST AIR ENTRAINMENT IN CONCRETE IN ACCORDANCE WITH ASTM C 173.
4. THE ENGINEER MAY AT ANY TIME TEST PERCENT OF ENTRAINED AIR IN CONCRETE RECEIVED ON PROJECT SITE.

G. ENFORCEMENT OF STRENGTH REQUIREMENT:

1. CONCRETE IS EXPECTED TO REACH HIGHER COMPRESSIVE STRENGTH (F'C) THAN THAT SPECIFIED IN TABLE A.
2. STRENGTH LEVEL OF CONCRETE WILL BE CONSIDERED ACCEPTABLE IF FOLLOWING CONDITIONS ARE SATISFIED:
 - a. THE ARITHMETIC AVERAGE OF 3 CONSECUTIVE STRENGTH TESTS MADE WITHIN THE SAME DAY IS GREATER THAN OR EQUAL TO THE SPECIFIED COMPRESSIVE STRENGTH (F'C).
 - b. NO INDIVIDUAL STRENGTH TEST SHALL FALL BELOW THE SPECIFIED COMPRESSIVE

STRENGTH (F'C) BY MORE THAN 500 POUNDS PER SQUARE INCH.

3. ACCEPTANCE OF CONCRETE STRENGTH SHALL BE MADE FOR EACH DAY THAT CONCRETE IS CAST. FOR THE PURPOSE OF ACCEPTING CONCRETE, AVERAGE OF STRENGTH TESTS THAT OCCUR ACROSS OVER MULTIPLE DAYS SHALL NOT BE CONSIDERED.
4. NON-COMPLIANT STRENGTH TESTS:
 - a. MARK NON-COMPLIANT STRENGTH TEST REPORTS TO HIGHLIGHT THAT THEY CONTAIN NON-COMPLYING RESULTS AND IMMEDIATELY FORWARD COPIES OF TEST REPORTS TO ALL PARTIES ON THE TEST REPORT DISTRIBUTION LIST.
 - b. PROVIDE TREATMENT OF NON-COMPLIANT CONCRETE AT NO ADDITIONAL COST TO OWNER AND WITH NO ADDITIONAL TIME ADDED TO PROJECT SCHEDULE:
 - c. INITIAL TREATMENT MAY CONSIST OF ADDITIONAL CURING AND TESTING OF THE AFFECTED CONCRETE.
 - 1) PROVIDE ADDITIONAL CURING OF CONCRETE USING MEANS AND DURATION ACCEPTABLE TO THE ENGINEER.
 - 2) UPON COMPLETION OF THE ADDITIONAL CURING, PROVIDE ADDITIONAL TESTING DESIGNATED BY THE ENGINEER.
 - a) OBTAIN AND TEST CORE SAMPLES FOR COMPRESSION STRENGTH IN ACCORDANCE WITH ASTM C 42, ACI 318, AND ACI 350.
 - b) PROVIDE NOT LESS THAN 3 CORES FOR EACH AFFECTED AREA. OBTAIN ENGINEER'S ACCEPTANCE OF PROPOSED CORING LOCATIONS BEFORE PROCEEDING WITH THAT WORK.
 - c) SUBMIT REPORT OF COMPRESSION STRENGTH TESTING FOR ENGINEER'S REVIEW.
 - d) IF REQUIRED BY THE ENGINEER, PROVIDE ADDITIONAL CORES AND OBTAIN PETROGRAPHIC EXAMINATION IN ACCORDANCE WITH ASTM C 856. SUBMIT REPORT OF PETROGRAPHIC ANALYSIS FOR ENGINEER'S REVIEW.
 - 3) IF ADDITIONAL CURING DOES NOT BRING AVERAGE OF 3 CORES TAKEN IN AFFECTED AREA TO AT LEAST THE MINIMUM SPECIFIED COMPRESSIVE STRENGTH (F'C), DESIGNATE SUCH CONCRETE IN AFFECTED AREA AS DEFECTIVE.

3.04 ADJUSTING

- A. PROVIDE REPAIR OF DEFECTIVE CONCRETE AT NO ADDITIONAL COST TO OWNER AND WITH NO ADDITIONAL TIME ADDED TO THE PROJECT SCHEDULE:
- B. MAKE REPAIRS USING APPROACH AND MEANS ACCEPTABLE TO THE ENGINEER.
 1. PROVIDE REPAIRS HAVING STRENGTH EQUAL TO OR GREATER THAN SPECIFIED CONCRETE FOR AREAS INVOLVED.
 2. DO NOT PATCH, REPAIR, OR COVER DEFECTIVE WORK WITHOUT INSPECTION BY THE ENGINEER.
 3. ACCEPTABLE MEANS MAY INCLUDE, BUT ARE NOT LIMITED TO STRENGTHENING, REPAIR, OR REMOVAL AND REPLACEMENT.
- C. STRENGTHENING OF DEFECTIVE CONCRETE:
 1. BY ADDITION OF CONCRETE.
 2. BY ADDITION OF REINFORCING.
 3. BY ADDITION OF BOTH CONCRETE AND REINFORCING.
- D. REPAIRS:
 1. METHODS OF REPAIR:

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- a. DRY PACK METHOD:
 - 1) USE FOR HOLES HAVING DEPTH NEARLY EQUAL TO OR GREATER THAN LEAST SURFACE DIMENSION OF HOLE, FOR CONE-BOLT HOLES, AND FOR NARROW SLOTS CUT FOR REPAIR.
 - 2) SMOOTH HOLES: CLEAN AND ROUGHEN BY HEAVY SANDBLASTING BEFORE REPAIR.
 - b. MORTAR REPLACEMENT METHOD:
 - 1) USE FOR HOLES TOO WIDE TO DRY PACK AND TOO SHALLOW FOR CONCRETE REPLACEMENT.
 - 2) COMPARATIVELY SHALLOW DEPRESSIONS, LARGE OR SMALL, WHICH EXTEND NO DEEPER THAN NEAREST SURFACE REINFORCEMENT.
 - c. CONCRETE REPLACEMENT METHOD:
 - 1) USE WHEN HOLES EXTEND ENTIRELY THROUGH CONCRETE SECTION OR WHEN HOLES ARE MORE THAN 1 SQUARE FOOT IN AREA AND EXTEND HALFWAY OR MORE THROUGH THE SECTION.
2. PREPARATION OF CONCRETE FOR REPAIR:
- a. CHIP OUT AND KEY IMPERFECTIONS IN THE WORK AND MAKE THEM READY FOR REPAIR.
 - b. OBTAIN ENGINEER'S ACCEPTANCE OF SURFACE PREPARATION METHODS AND OF PREPARED SURFACES PRIOR TO REPAIR.
 - c. SURFACES OF SET CONCRETE TO BE REPAIRED: FIRST COAT WITH EPOXY BONDING AGENT AS SPECIFIED IN SECTION 036301.
- E. REMOVE AND REPLACE DEFECTIVE CONCRETE.

END OF SECTION

**SECTION 033529
TOOLED CONCRETE FINISHING**

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES: TOOLED CONCRETE FINISHES.

1.02 QUALITY ASSURANCE

A. MOCK-UPS:

1. TEST PANELS FOR CONCRETE FINISHES:
 - a. PREPARE TEST PANELS FOR F4 AND F5 FINISHES AND TIE-HOLE REPAIRS FOR REVIEW BY ENGINEER.
 - b. ACCEPTED TEST PANELS SERVE AS STANDARD OF QUALITY AND WORKMANSHIP FOR PROJECT.
2. PREPARE TEST PANEL SHOWING HORIZONTAL AND VERTICAL JOINTS PROPOSED FOR PROJECT FOR REVIEW BY THE ENGINEER. REFER TO FINISHES SPECIFIED IN THIS SECTION.
3. TEST PANELS INDICATING METHODS FOR MAKING CONCRETE REPAIRS: PREPARE TEST PANELS FOR PROPOSED REPAIRS AT BEGINNING OF PROJECT FOR REVIEW BY ENGINEER:
 - a. ACCEPTED TEST PANELS SERVE AS STANDARD FOR REPAIRS DURING THE PROJECT.

1.03 DELIVERY, STORAGE, AND HANDLING

A. PACKING AND SHIPPING:

1. DELIVER AND STORE PACKAGED MATERIALS IN ORIGINAL CONTAINERS UNTIL READY FOR USE.

PART 2 PRODUCTS

2.01 MIXES

- A. MORTAR MIX FOR F4 FINISH: CONSIST OF 1 PART CEMENT AND 1-1/2 PARTS OF FINE SAND PASSING NUMBER 100 SCREEN. MIX WITH ENOUGH WATER AND EMULSIFIED BONDING AGENT TO HAVE CONSISTENCY OF THICK CREAM.
- B. MORTAR MIX FOR F5 FINISH: CONSIST OF 1 PART CEMENT TO 1-1/2 PARTS OF SAND WHICH PASSES NUMBER 16 SCREEN.

PART 3 EXECUTION

3.01 CONCRETE FINISHES

A. CEMENT FOR FINISHES:

1. ADDITION OF WHITE CEMENT MAY BE REQUIRED TO PRODUCE FINISH WHICH MATCHES COLOR OF CONCRETE TO BE FINISHED.
- B. FINISH VERTICAL CONCRETE SURFACES WITH ONE OF THE FOLLOWING FINISHES AS INDICATED IN THE FINISH SCHEDULE:
1. F1 FINISH: NO SPECIAL TREATMENT OTHER THAN REPAIR DEFECTIVE WORK AND FILL DEPRESSIONS 1 INCH OR DEEPER AND TIE HOLES WITH MORTAR AFTER REMOVAL OF CURING COMPOUND.

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2. F2 FINISH: NO SPECIAL TREATMENT OTHER THAN REPAIR DEFECTIVE WORK, REMOVE FINIS, FILL DEPRESSIONS 1/2 INCH OR DEEPER AND TIE HOLES WITH MORTAR AFTER REMOVAL OF CURING COMPOUND.
 3. F3 FINISH: REPAIR DEFECTIVE WORK, REMOVE FINIS, OFFSETS, AND GRIND PROJECTIONS SMOOTH. FILL DEPRESSIONS 1/4 INCH OR LARGER IN DEPTH OR WIDTH AND TIE HOLES WITH MORTAR AFTER REMOVAL OF CURING COMPOUND.
 4. F4 FINISH: RECEIVE SAME FINISH AS SPECIFIED FOR F3 FINISH, AND, IN ADDITION FILL DEPRESSIONS AND HOLES 1/16 INCH OR LARGER IN WIDTH WITH MORTAR.
 - a. "BRUSH-OFF" SANDBLAST SURFACES PRIOR TO FILLING HOLES TO EXPOSE ALL HOLES NEAR SURFACE OF THE CONCRETE.
 - b. THOROUGHLY WET SURFACES AND COMMENCE FILLING OF PITS, HOLES, AND DEPRESSIONS WHILE SURFACES ARE STILL DAMP.
 - c. PERFORM FILLING BY RUBBING MORTAR OVER ENTIRE AREA WITH CLEAN BURLAP, SPONGE RUBBER FLOATS, OR TROWELS.
 - d. DO NOT LET ANY MATERIAL REMAIN ON SURFACES, EXCEPT THAT WITHIN PITS AND DEPRESSIONS.
 - e. WIPE SURFACES CLEAN AND MOIST CURE.
 5. F5 FINISH: RECEIVE SAME FINISH AS SPECIFIED FOR F3 FINISH, AND, IN ADDITION, RECEIVE SPECIAL STONED FINISH, IN ACCORDANCE WITH FOLLOWING REQUIREMENTS:
 - a. REMOVE FORMS AND PERFORM REQUIRED REPAIRS, PATCHING, AND POINTING AS SPECIFIED IN THIS SECTION.
 - b. WET SURFACES THOROUGHLY WITH BRUSH AND RUB WITH HARD WOOD FLOAT DIPPED IN WATER CONTAINING 2 POUNDS OF PORTLAND CEMENT PER GALLON.
 - c. RUB SURFACES UNTIL FORM MARKS AND PROJECTIONS HAVE BEEN REMOVED.
 - d. SPREAD GRINDINGS FROM RUBBING OPERATIONS UNIFORMLY OVER SURFACE WITH BRUSH IN SUCH MANNER AS TO FILL PITS AND SMALL VOIDS.
 - e. MOIST CURE BRUSHED SURFACES AND ALLOW TO HARDEN FOR 3 DAYS:
 - 1) AFTER CURING, OBTAIN FINAL FINISH BY RUBBING WITH CARBORUNDUM STONE OF APPROXIMATELY NUMBER 50 GRIT UNTIL ENTIRE SURFACES HAVE SMOOTH TEXTURE AND ARE UNIFORM IN COLOR.
 - 2) CONTINUE CURING FOR REMAINDER OF SPECIFIED TIME.
 - f. IF ANY CONCRETE SURFACE IS ALLOWED TO BECOME TOO HARD TO FINISH IN ABOVE SPECIFIED MANNER, SANDBLAST AND WASH RELATED SURFACES EXPOSED TO VIEW, WHETHER FINISHED OR NOT.
 - 1) WHILE STILL DAMP, RUB OVER SURFACE, PLASTIC MORTAR, AS SPECIFIED FOR BRUSHED SURFACES AND HANDSTONED WITH NUMBER 60 GRIT CARBORUNDUM STONE, USING ADDITIONAL MORTAR FOR BRUSHED SURFACES UNTIL SURFACE IS EVENLY FILLED WITHOUT AN EXCESS OF MORTAR.
 - 2) CONTINUE STONING UNTIL SURFACE IS HARD.
 - 3) AFTER MOIST CURING FOR 3 DAYS, MAKE SURFACE SMOOTH IN TEXTURE AND UNIFORM IN COLOR BY USE OF NUMBER 50 OR NUMBER 60 GRIT CARBORUNDUMSTONE.
 - 4) AFTER STONING, CONTINUE CURING UNTIL 7 DAY CURING PERIOD IS COMPLETED.
- C. FINISH HORIZONTAL CONCRETE SURFACES WITH ONE OF THE FOLLOWING FINISHES AS INDICATED IN THE FINISH SCHEDULE AFTER PROPER AND ADEQUATE VIBRATION AND TAMPING:

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1. S1 FINISH: SCREEDED TO GRADE AND LEAVE WITHOUT SPECIAL FINISH.
2. S2 FINISH: SMOOTH STEEL TROWEL FINISH.
3. S3 FINISH: STEEL TROWEL FINISH FREE FROM TROWEL MARKS. PROVIDE SMOOTH FINISH FREE OF ALL IRREGULARITIES.
4. S4 FINISH: STEEL TROWEL FINISH, WITHOUT LOCAL DEPRESSIONS OR HIGH POINTS, FOLLOWED BY LIGHT HAIR BROOM FINISH. DO NOT USE STIFF BRISTLE BROOMS OR BRUSHES. PERFORM BROOMING PARALLEL TO SLAB-DRAINAGE. PROVIDE RESULTING FINISH THAT IS ROUGH ENOUGH TO PROVIDE NONSKID FINISH. FINISH IS SUBJECT TO REVIEW AND ACCEPTANCE BY THE ENGINEER.
5. S5 FINISH: NONSLIP ABRASIVE: AFTER CONCRETE HAS BEEN SCREEDED LEVEL AND HARDENED ENOUGH TO SUPPORT MAN STANDING ON A BOARD, SPRINKLE ABRASIVE FROM SHAKE SCREEN INTO SURFACE AT UNIFORM RATE OF 25 POUNDS FOR EACH 100 SQUARE FEET OF SURFACE AREA, WOOD FLOAT INTO FINISH, THEN TROWEL ABRASIVE INTO SURFACE WITH STEEL TROWEL PROPERLY EXPOSING ABRASIVE IN SURFACE AS REQUIRED TO PROVIDE NONSLIP SURFACE.
6. S6 FINISH: ROUGHENED FINISH: AFTER CONCRETE HAS BEEN SCREEDED TO GRADE, APPLY A ROUGHENED FINISH BY USE OF A JITTERBUG ROLLER OR SIMILAR DEVICE.
7. FINISH CONCRETE FLOOR SURFACES TO WHICH SURFACING MATERIAL IS APPLIED: FINISH SMOOTH WITH TOLERANCE WITHIN 1/8 INCH IN 10 FEET IN ANY DIRECTION FROM LINES INDICATED ON THE DRAWINGS.

3.02 CONCRETE FINISH SCHEDULE

- A. FINISH CONCRETE SURFACES AS FOLLOWS:
1. F2 FINISH FOR ALL VERTICAL SURFACES.
 2. S2 FINISH FOR ALL HORIZONTAL SURFACES.

END OF SECTION

SECTION 033543 - POLISHED CONCRETE FINISHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Liquid floor treatments.
2. Polished concrete surface finish requirements.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for new concrete designed for polished concrete finishing, including concrete materials, mixture design, placement procedures, initial finishing, and curing.

1.2 DEFINITIONS

- A. Aggregate Exposure Class: Visual observation of polished floor aggregate surface exposure area after grinding and polishing operations. Aggregate exposure class ranges are A, B, and C.
- B. Design Reference Sample: Sample designated by Architect in the Contract Documents that reflects acceptable surface quality and appearance of polished concrete.
- C. Distinctness of Image (DOI): The distinctness (clarity) of images reflected by the glossy coating surface appearance of the polished concrete finish appearance levels. The transmission of this reflection is measured in accordance with ASTM D5767.
- D. Haze: The cloudiness or milky appearance of images from objects produced by reflection in a polished concrete surface. The measurement of this appearance is defined in accordance with ASTM D4039. The test method reading is put into a calculation resulting in a Haze Index value.
- E. Specular Gloss: A reflectance value determined by a single measurement of gloss from shining a known amount of light at a surface within a specific angle of illumination in accordance with ASTM D523.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. An installer experienced in performing polished concrete finishing with a minimum of five previous projects similar in material, design, and extent to that indicated for this Project.

- B. Polished Concrete Standards: Comply with ACI 310.1.

1.4 FIELD CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as needed for other construction activities.
- B. Ambient Conditions: Ensure installation location and Project ambient conditions comply with manufacturers written instructions.

PART 2 - PRODUCTS

2.1 STAIN MATERIALS

2.2 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatments for Polished Concrete Finish: Clear liquid materials for the applications of cleaning solutions, densifiers, and sealers that strengthen or protect polished concrete surfaces.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Ecopoly by Eco Safety Products (Ecoprocote) or comparable product by one of the following:
 - a. [Advanced Floor Products]
 - b. [AmeriPolish]
 - c. [ARDEX Americas]
 - d. [AWRC Corporation]
 - e. [Euclid Chemical Company (The); a subsidiary of RPM International, Inc.]
 - f. [H&C Decorative Concrete Products; a brand of Sherwin-Williams Co.]
 - g. [Laticrete International, Inc.]
 - h. [MAPEI Corporation]
 - i. [Moxie International]
 - j. [NewLook International, Inc.]
 - k. [Nox-Crete Products Group]
 - l. [PROSOCO, Inc]
 - m. [QuestMark]
 - n. [Vexcon Chemicals Inc.]
 - o. <Insert manufacturer's name>
 - 2. Verify products comply with 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."
 - 3. Verify products comply with 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." Verify formaldehyde emissions do not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less.
 - 4. Verify products comply with 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."

PART 3 - EXECUTION

END OF SECTION 033543

**SECTION 036000
GROUTING**

PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. CEMENT GROUT.
2. CEMENT MORTAR.
3. DRY-PACK MORTAR.
4. EPOXY GROUT.
5. GROUT.
6. NON-SHRINK EPOXY GROUT.
7. NON-SHRINK GROUT.

B. RELATED SECTIONS:

1. THE CONTRACT DOCUMENTS ARE COMPLEMENTARY; WHAT IS CALLED FOR BY ONE IS AS BINDING AS IF CALLED FOR BY ALL.
2. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR SCHEDULING AND COORDINATING THE WORK OF SUBCONTRACTORS, SUPPLIERS, AND OTHER INDIVIDUALS OR ENTITIES PERFORMING OR FURNISHING ANY OF CONTRACTOR'S WORK.
3. THE FOLLOWING SECTIONS ARE RELATED TO THE WORK DESCRIBED IN THIS SECTION. THIS LIST OF RELATED SECTIONS IS PROVIDED FOR CONVENIENCE ONLY AND IS NOT INTENDED TO EXCUSE OR OTHERWISE DIMINISH THE DUTY OF THE CONTRACTOR TO SEE THAT THE COMPLETED WORK COMPLIES ACCURATELY WITH THE CONTRACT DOCUMENTS.
 - a. SECTION 033000 - CAST-IN-PLACE CONCRETE.
 - b. SECTION 036301 - EPOXIES.

1.02 REFERENCES

A. ASTM INTERNATIONAL (ASTM):

1. C 109 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF HYDRAULIC CEMENT MORTARS (USING 2-INCH OR [50-MILLIMETER] CUBE SPECIMENS).
2. C 230 - STANDARD SPECIFICATION FOR FLOW TABLE FOR USE IN TESTS OF HYDRAULIC CEMENT.
3. C 531 - STANDARD TEST METHOD FOR LINER SHRINKAGE AND COEFFICIENT OF THERMAL EXPANSION OF CHEMICAL-RESISTANT MORTARS, GROUTS, MONOLITHIC SURFACINGS, AND POLYMER CONCRETES.
4. C 579 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CHEMICAL-RESISTANT MORTARS, GROUTS, AND MONOLITHIC SURFACINGS AND POLYMER CONCRETES.
5. C 939 - STANDARD TEST METHOD FOR FLOW OF GROUT FOR PREPLACED-AGGREGATE CONCRETE (FLOW CONE METHOD).
6. C 942 - STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF GROUTS FOR PREPLACED-AGGREGATE CONCRETE IN THE LABORATORY.
7. C 1107 - STANDARD SPECIFICATION FOR PACKAGED DRY, HYDRAULIC-CEMENT GROUT (NON-

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8. C 1181 – STANDARD TEST METHODS FOR COMPRESSIVE CREEP OF CHEMICAL-RESISTANT POLYMER MACHINERY GROUTS.
- B. INTERNATIONAL CONCRETE REPAIR INSTITUTE (ICRI):
 1. 310.2R - SELECTING AND SPECIFYING CONCRETE SURFACE PREPARATIONS FOR SEALERS, COATINGS, POLYMER OVERLAYS, AND CONCRETE REPAIR.

1.03 SUBMITTALS

- A. CEMENT GROUT:
 1. MIX DESIGN.
 2. MATERIAL SUBMITTALS.
- B. CEMENT MORTAR:
 1. MIX DESIGN.
 2. MATERIAL SUBMITTALS.
- C. NON-SHRINK EPOXY GROUT:
 1. MANUFACTURER'S LITERATURE.
- D. NON-SHRINK GROUT:
 1. MANUFACTURER'S LITERATURE.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. DELIVER MATERIALS TO JOBSITE IN THEIR ORIGINAL, UNOPENED PACKAGES OR CONTAINERS, CLEARLY LABELED WITH MANUFACTURER'S PRODUCT IDENTIFICATION AND PRINTED INSTRUCTIONS.
- B. STORE MATERIALS IN COOL DRY PLACE AND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- C. HANDLE MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

- A. NON-SHRINK EPOXY GROUT:
 1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. FIVE STAR PRODUCTS, INC., FIVE STAR EPOXY GROUT.
 - b. BASF CONSTRUCTION CHEMICALS, MASTERFLOW 648 CP PLUS.
 - c. L&M CONSTRUCTION CHEMICALS, INC., EPOGROUT.
 2. NON-SHRINK EPOXY GROUT SHALL BE 100 PERCENT SOLID, PREMEASURED, PREPACKAGED SYSTEM CONTAINING 2-COMPONENT THERMOSETTING EPOXY RESIN AND INERT AGGREGATE.
 3. MAINTAIN FLOWABLE CONSISTENCY FOR AT LEAST 45 MINUTES AT 70 DEGREES FAHRENHEIT.
 4. SHRINKAGE OR EXPANSION: LESS THAN 0.0006 INCHES PER INCH WHEN TESTED IN ACCORDANCE WITH ASTM C 531.
 5. MINIMUM COMPRESSIVE STRENGTH: 10,000 POUNDS PER SQUARE INCH AT 24 HOURS AND 14,000 POUNDS PER SQUARE INCH AT 7 DAYS WHEN TESTED IN ACCORDANCE WITH ASTM C 579, METHOD B. JUNE 2017 036000-2 160922
 6. COMPRESSIVE CREEP: NOT EXCEED 0.0027 INCHES/PER INCH WHEN TESTED UNDER 400 POUNDS

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PER SQUARE INCH CONSTANT LOAD AT 140 DEGREES FAHRENHEIT IN ACCORDANCE WITH ASTM C 1181.

7. COEFFICIENT OF THERMAL EXPANSION: NOT EXCEED 0.000018 INCHES PER INCH PER DEGREE FAHRENHEIT WHEN TESTED IN ACCORDANCE WITH ASTM C 531, METHOD B.
- B. NON-SHRINK GROUT:
 1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. FIVE STAR PRODUCTS, INC, FIVE STAR GROUT.
 - b. BASF CONSTRUCTION CHEMICALS, MASTERFLOW 928.
 - c. L&M CONSTRUCTION CHEMICALS, INC., CRYSTEX.
 2. IN ACCORDANCE WITH ASTM C 1107.
 3. PREPORTIONED AND PREPACKAGED CEMENT-BASED MIXTURE.
 4. CONTAIN NO METALLIC PARTICLES SUCH AS ALUMINUM POWDER AND NO METALLIC AGGREGATE SUCH AS IRON FILINGS.
 5. REQUIRE ONLY ADDITION OF POTABLE WATER.
 6. WATER FOR PRE-SOAKING, MIXING, AND CURING: POTABLE WATER.
 7. FREE FROM EMERGENCE OF MIXING WATER FROM WITHIN OR PRESENCE OF WATER ON ITS SURFACE.
 8. REMAIN AT MINIMUM FLOWABLE CONSISTENCY FOR AT LEAST 45 MINUTES AFTER MIXING AT 45 DEGREES FAHRENHEIT TO 90 DEGREES FAHRENHEIT WHEN TESTED IN ACCORDANCE WITH ASTM C 230.
 - a. IF AT FLUID CONSISTENCY, VERIFY CONSISTENCY IN ACCORDANCE WITH ASTM C 939.
 9. DIMENSIONAL STABILITY (HEIGHT CHANGE):
 - a. IN ACCORDANCE WITH ASTM C 1107, VOLUME-ADJUSTING GRADE B OR C AT 45 DEGREES FAHRENHEIT TO 90 DEGREES FAHRENHEIT.
 - b. HAVE 90 PERCENT OR GREATER BEARING AREA UNDER BASES.
 10. HAVE MINIMUM COMPRESSIVE STRENGTHS AT 45 DEGREES FAHRENHEIT TO 90 DEGREES FAHRENHEIT IN ACCORDANCE WITH ASTM C 1107 FOR VARIOUS PERIODS FROM TIME OF PLACEMENT, INCLUDING 5,000 POUNDS PER SQUARE INCH AT 28 DAYS WHEN TESTED IN ACCORDANCE WITH ASTM C 109 AS MODIFIED BY ASTM C 1107.

2.02 MIXES

- A. CEMENT GROUT:
 1. USE SAME SAND-TO-CEMENTITIOUS MATERIALS RATIO FOR CEMENT GROUT MIX THAT IS USED FOR CONCRETE MIX.
 2. USE SAME MATERIALS FOR CEMENT GROUT THAT ARE USED FOR CONCRETE.
 3. USE WATER-TO-CEMENTITIOUS MATERIALS RATIO THAT IS NO MORE THAN THAT SPECIFIED FOR CONCRETE.
 4. FOR SPREADING OVER SURFACES OF CONSTRUCTION OR COLD JOINTS.
- B. CEMENT MORTAR:
 1. USE SAME SAND-TO-CEMENTITIOUS MATERIALS RATIO FOR CEMENT MORTAR MIX THAT IS USED FOR CONCRETE MIX.
 2. USE SAME MATERIALS FOR CEMENT MORTAR THAT ARE USED FOR CONCRETE.
 3. USE WATER-TO-CEMENTITIOUS MATERIALS RATIO THAT IS NO MORE THAN THAT SPECIFIED FOR

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CONCRETE BEING REPAIRED.

4. AT EXPOSED CONCRETE SURFACES NOT TO BE PAINTED OR SUBMERGED IN WATER: USE SUFFICIENT WHITE CEMENT TO MAKE COLOR OF FINISHED PATCH MATCH THAT OF SURROUNDING CONCRETE. JUNE 2017 036000-3 160922
- C. DRY-PACK MORTAR:
 1. PROPORTIONS BY WEIGHT: 1 PART PORTLAND CEMENT TO 2 PARTS CONCRETE SAND.
 - a. PORTLAND CEMENT: AS SPECIFIED IN SECTION 033000.
 - b. CONCRETE SAND: AS SPECIFIED IN SECTION 033000.
- D. EPOXY GROUT:
 1. CONSIST OF MIXTURE OF EPOXY OR EPOXY GEL AND SAND.
 - a. EPOXY: AS SPECIFIED IN SECTION 036301.
 - b. EPOXY GEL: AS SPECIFIED IN SECTION 036301.
 - c. SAND: CLEAN, BAGGED, GRADED, AND KILN-DRIED SILICA SAND.
 2. PROPORTIONING:
 - a. FOR HORIZONTAL WORK: CONSIST OF MIXTURE OF 1 PART EPOXY WITH NOT MORE THAN 2 PARTS SAND.
 - b. FOR VERTICAL OR OVERHEAD WORK: CONSIST OF 1 PART EPOXY GEL WITH NOT MORE THAN 2 PARTS SAND.
- E. GROUT:
 1. MIX IN PROPORTIONS BY WEIGHT: 1 PART PORTLAND CEMENT TO 4 PARTS CONCRETE SAND.
 - a. PORTLAND CEMENT: AS SPECIFIED IN SECTION 033000.
 - b. CONCRETE SAND: AS SPECIFIED IN SECTION 033000.
- F. NON-SHRINK EPOXY GROUT:
 1. MIX IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- G. NON-SHRINK GROUT:
 1. MIX IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS SUCH THAT RESULTING MIX HAS FLOWABLE CONSISTENCY AND IS SUITABLE FOR PLACING BY POURING.

PART 3 EXECUTION

3.01 EXAMINATION

- A. INSPECT CONCRETE SURFACES TO RECEIVE GROUT OR MORTAR AND VERIFY THAT THEY ARE FREE OF ICE, FROST, DIRT, GREASE, OIL, CURING COMPOUNDS, PAINTS, IMPREGNATIONS, AND LOOSE MATERIAL OR FOREIGN MATTER LIKELY TO REDUCE BOND OR PERFORMANCE OF GROUT OR MORTAR.

3.02 PREPARATION

- A. SURFACE PREPARATION FOR GROUTING OTHER BASEPLATES:
 1. REMOVE GREASE, OIL, DIRT, DUST, CURING COMPOUNDS, LAITANCE, AND OTHER DELETERIOUS MATERIALS THAT MAY AFFECT BOND TO CONCRETE AND BOTTOMS OF BASEPLATES.
 2. ROUGHEN CONCRETE SURFACES IN CONTACT WITH GROUT TO ICRI CSP-6 SURFACE PROFILE OR ROUGHER.
 - a. REMOVE LOOSE OR BROKEN CONCRETE.

3. METAL SURFACES IN CONTACT WITH GROUT: GRIT BLAST TO WHITE METAL SURFACE.

3.03 INSTALLATION:

A. MIXING:

1. CEMENT GROUT:
 - a. USE MORTAR MIXER WITH MOVING PADDLES. JUNE 2017 036000-4 160922
 - b. PRE-WET MIXER AND EMPTY OUT EXCESS WATER BEFORE BEGINNING MIXING.
2. CEMENT MORTAR:
 - a. USE MORTAR MIXER WITH MOVING PADDLES.
 - b. PRE-WET MIXER AND EMPTY OUT EXCESS WATER BEFORE BEGINNING MIXING.
3. DRY-PATCH MORTAR:
 - a. USE ONLY ENOUGH WATER SO THAT RESULTING MORTAR WILL CRUMBLE TO TOUCH AFTER BEING FORMED INTO BALL BY HAND.
4. NON-SHRINK EPOXY GROUT:
 - a. KEEP TEMPERATURE OF NON-SHRINK EPOXY GROUT FROM EXCEEDING MANUFACTURER'S RECOMMENDATIONS.
5. NON-SHRINK GROUT:
 - a. MAY BE DRYPACKED, FLOWED, OR PUMPED INTO PLACE. DO NOT OVERWORK GROUT.
 - b. DO NOT RETEMPER BY ADDING MORE WATER AFTER GROUT STIFFENS.

B. PLACEMENT:

1. CEMENT GROUT:
 - a. EXERCISE CARE IN PLACING CEMENT GROUT BECAUSE IT IS REQUIRED TO FURNISH STRUCTURAL STRENGTH, IMPERMEABLE WATER SEAL, OR BOTH.
 - b. DO NOT USE CEMENT GROUT THAT HAS NOT BEEN PLACED WITHIN 30 MINUTES AFTER MIXING.
2. CEMENT MORTAR:
 - a. USE MORTAR MIXER WITH MOVING PADDLES.
 - b. PRE-WET MIXER AND EMPTY OUT EXCESS WATER BEFORE BEGINNING MIXING.
3. EPOXY GROUTS:
 - a. WET SURFACES WITH EPOXY FOR HORIZONTAL WORK OR EPOXY GEL FOR VERTICAL OR OVERHEAD WORK PRIOR TO PLACING EPOXY GROUT.
4. NON-SHRINK EPOXY GROUT:
 - a. MIX IN COMPLETE UNITS. DO NOT VARY RATIO OF COMPONENTS OR ADD SOLVENT TO CHANGE CONSISTENCY OF MIX.
 - b. POUR HARDENER INTO RESIN AND MIX FOR AT LEAST 1 MINUTE AND UNTIL MIXTURE IS UNIFORM IN COLOR. POUR EPOXY INTO MORTAR MIXER WHEELBARROW AND ADD AGGREGATE. MIX UNTIL AGGREGATE IS UNIFORMLY WETTED. OVER MIXING WILL CAUSE AIR ENTRAPMENT IN MIX.
5. NON-SHRINK GROUT:
 - a. ADD NON-SHRINK CEMENT GROUT TO PREMEASURED AMOUNT OF WATER THAT DOES NOT EXCEED THE MANUFACTURER'S MAXIMUM RECOMMENDED WATER CONTENT.
 - b. MIX IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS TO UNIFORM CONSISTENCY.

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C. CURING:

1. CEMENT BASED GROUTS AND MORTARS:

- a. KEEP CONTINUOUSLY WET FOR MINIMUM OF 7 DAYS. USE WET BURLAP, SOAKER HOSE, SUN SHADING, PONDING, AND IN EXTREME CONDITIONS, COMBINATION OF METHODS.
- b. MAINTAIN ABOVE 40 DEGREES FAHRENHEIT UNTIL IT HAS ATTAINED COMPRESSIVE STRENGTH OF 3,000 POUNDS PER SQUARE INCH, OR ABOVE 70 DEGREES FAHRENHEIT FOR MINIMUM OF 24 HOURS TO AVOID DAMAGE FROM SUBSEQUENT FREEZING.

2. EPOXY BASED GROUTS:

- a. CURE GROUTS IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS.

3. DO NOT WATER CURE EPOXY GROUTS.

- a. DO NOT ALLOW ANY SURFACE IN CONTACT WITH EPOXY GROUT TO FALL BELOW 50 DEGREES FAHRENHEIT FOR MINIMUM OF 48 HOURS AFTER PLACEMENT. JUNE 2017 036000-5 160922

D. GROUTING EQUIPMENT BASES, BASEPLATES, SOLEPLATES, AND SKIDS.

E. GROUTING OTHER BASEPLATES:

1. GENERAL:

- a. USE NON-SHRINK GROUT AS SPECIFIED IN THIS SECTION.
- b. BASEPLATE GROUTING SHALL TAKE PLACE FROM ONE SIDE OF BASEPLATE TO OTHER IN CONTINUOUS FLOW OF GROUT TO AVOID TRAPPING AIR IN GROUT.
- c. MAINTAIN HYDROSTATIC HEAD PRESSURE BY KEEPING LEVEL OF GROUT IN HEADBOX ABOVE BOTTOM OF BASEPLATE. FILL HEADBOX TO MAXIMUM LEVEL AND WORK GROUT DOWN.
- d. VIBRATE, ROD, OR CHAIN NON-SHRINK GROUT TO FACILITATE GROUT FLOW, CONSOLIDATE GROUT, AND REMOVE TRAPPED AIR.

2. FORMS AND HEADBOXES:

- a. BUILD FORMS USING MATERIAL WITH ADEQUATE STRENGTH TO WITHSTAND PLACEMENT OF GROUTS.
- b. USE FORMS THAT ARE RIGID AND LIQUID TIGHT. CAULK CRACKS AND JOINTS WITH ELASTOMERIC SEALANT.
- c. LINE FORMS WITH POLYETHYLENE FOR EASY GROUT RELEASE. COATING FORMS WITH 2 COATS OF HEAVY-DUTY PASTE WAX IS ALSO ACCEPTABLE.
- d. HEADBOX SHALL BE 4 TO 6 INCHES HIGHER THAN BASEPLATE AND SHALL BE LOCATED ON ONE SIDE OF BASEPLATE.
- e. AFTER GROUT SETS, REMOVE FORMS AND TRIM BACK GROUT AT 45 DEGREE ANGLE FROM BOTTOM EDGES OF BASEPLATE.

3.04 FIELD QUALITY CONTROL

A. NON-SHRINK EPOXY GROUT:

1. TEST FOR 24-HOUR COMPRESSIVE STRENGTH IN ACCORDANCE WITH ASTM C 579, METHOD B.

B. NON-SHRINK GROUT:

1. TEST FOR 24-HOUR COMPRESSIVE STRENGTH IN ACCORDANCE WITH ASTM C 942.

END OF SECTION

**SECTION 036301
EPOXIES**

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES:
 - 1. EPOXY.
 - 2. EPOXY GEL.
 - 3. EPOXY BONDING AGENT.
- B. RELATED SECTIONS:
 - 1. SECTION 013300 - SUBMITTAL PROCEDURES.

1.02 REFERENCES

- A. ASTM INTERNATIONAL (ASTM):
 - 1. C881 - STANDARD SPECIFICATION FOR EPOXY-RESIN-BASE SYSTEMS FOR CONCRETE.
 - 2. C882 - STANDARD TEST METHOD FOR BOND STRENGTH OF EPOXY-RESIN SYSTEMS USED WITH CONCRETE BY SLANT SHEAR.
 - 3. D638 - STANDARD TEST METHOD FOR TENSILE PROPERTIES OF PLASTICS.
 - 4. D695 - STANDARD TEST METHOD FOR COMPRESSIVE PROPERTIES OF RIGID PLASTICS.
- B. NSF INTERNATIONAL (NSF):
 - 1. 61 - DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS.

1.03 SYSTEM DESCRIPTION

- A. PERFORMANCE REQUIREMENTS:
 - 1. PROVIDE EPOXY MATERIALS THAT ARE NEW.
 - 2. STORE AND USE PRODUCTS WITHIN LIMITATIONS SET FORTH BY MANUFACTURER.
 - 3. PERFORM AND CONDUCT WORK OF THIS SECTION IN NEAT ORDERLY MANNER.

1.04 SUBMITTALS

- A. GENERAL: SUBMIT IN ACCORDANCE WITH SECTION 013300.
- B. PRODUCT DATA: SUBMIT MANUFACTURER'S DATA COMPLETELY DESCRIBING EPOXY MATERIALS.
 - 1. SUBMIT EVIDENCE OF CONFORMANCE TO ASTM C881. INCLUDE MANUFACTURER'S DESIGNATIONS OF TYPE GRADE, CLASS, AND COLOR.
 - 2. SUBMIT DOCUMENTATION THAT MATERIALS MEET OR EXCEED THE SPECIFIED STRENGTH AND PERFORMANCE CHARACTERISTICS. INDICATE TEST METHODS AND TEST RESULTS.
 - 3. SUBMIT DOCUMENTATION CONFIRMING CERTIFICATION UNDER NSF-61.
- C. QUALITY CONTROL SUBMITTALS:
 - 1. MANUFACTURER'S INSTALLATION INSTRUCTIONS. JUNE 2017 036301-1 160922

PART 2 PRODUCTS

2.01 MATERIALS

A. GENERAL:

1. MOISTURE TOLERANT, WATER-INSENSITIVE, TWO-COMPONENT EPOXY RESIN ADHESIVE MATERIAL CONTAINING 100 PERCENT SOLIDS, AND MEETING OR EXCEEDING THE PERFORMANCE PROPERTIES SPECIFIED WHEN TESTED IN ACCORDANCE WITH THE STANDARDS SPECIFIED.
2. CERTIFIED NSF-61 FOR USE IN DIRECT CONTACT WITH POTABLE WATER.

B. EPOXY: LOW VISCOSITY PRODUCT IN ACCORDANCE WITH ASTM C881; TYPES I, II AND IV; GRADE 1; CLASS C.

1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. DAYTON SUPERIOR, SURE INJECT J56.
 - b. SIKA CORPORATION, SIKADUR 35 HI-MOD LV.
2. REQUIRED PROPERTIES: TABLE 1: MATERIAL PROPERTIES - EPOXY. PROPERTY TEST METHOD REQUIRED RESULTS ("NEAT") TENSILE STRENGTH (7-DAY) ASTM D638 7,100 POUNDS PER SQUARE INCH, MINIMUM. COMPRESSIVE STRENGTH (7-DAY) ASTM D695 11,000 POUNDS PER SQUARE INCH, MINIMUM. BOND STRENGTH (2-DAY) ASTM C882 1,500 POUNDS PER SQUARE INCH, MINIMUM. CONCRETE FAILURE BEFORE FAILURE OF EPOXY. VISCOSITY (MIXED) 250-550 CENTIPOISE NOTES: TESTING RESULTS ARE FOR MATERIALS INSTALLED AND CURED AT A TEMPERATURE BETWEEN 72 AND 78 DEGREES FAHRENHEIT FOR 7 DAYS, UNLESS OTHERWISE NOTED.

C. EPOXY GEL: NON-SAGGING PRODUCT IN ACCORDANCE WITH ASTM C881, TYPES I AND IV, GRADE 3, CLASS C.

1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. BASF, MASTEREMACO ADH 327.
 - b. SIKA CORPORATION, SIKADUR 31, HI-MOD GEL. JUNE 2017 036301-2 160922
2. REQUIRED PROPERTIES: TABLE 2 - MATERIAL PROPERTIES - EPOXY GEL. PROPERTY TEST METHOD REQUIRED RESULTS ("NEAT") TENSILE STRENGTH (7-DAY) ASTM D638 2,000 POUNDS PER SQUARE INCH, MINIMUM. COMPRESSIVE YIELD STRENGTH (7-DAY) ASTM D695 8,000 POUNDS PER SQUARE INCH, MINIMUM. BOND STRENGTH (14-DAY) ASTM C882 1,500 POUNDS PER SQUARE INCH, MINIMUM. NOTES: TESTING RESULTS ARE FOR MATERIALS INSTALLED AND CURED AT A TEMPERATURE BETWEEN 72 AND 78 DEGREES FAHRENHEIT FOR 7 DAYS, UNLESS OTHERWISE NOTED.

D. EPOXY BONDING AGENT: NON-SAGGING PRODUCT IN ACCORDANCE WITH ASTM C881, TYPE II, GRADE 2, CLASS C.

1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. BASF, MASTEREMACO ADH 326.
 - b. SIKA CHEMICAL CORP., SIKADUR 32 HI-MOD LPL.
2. REQUIRED PROPERTIES. TABLE 3 - MATERIAL PROPERTIES - EPOXY BONDING AGENT PROPERTY TEST METHOD REQUIRED RESULTS TENSILE STRENGTH (7-DAY) ASTM D638 3,300 POUNDS PER SQUARE INCH, MINIMUM. COMPRESSIVE YIELD STRENGTH (7-DAY) ASTM D695 8,300 POUNDS PER SQUARE INCH, MINIMUM. BOND STRENGTH (14-DAYS) ASTM C882 1,800 POUNDS PER SQUARE INCH, MINIMUM. CONCRETE FAILURE BEFORE FAILURE OF EPOXY BONDING AGENT. POT LIFE - MINIMUM __FILL-IN__ MINUTES AT __FILL-IN__ DEGREES FAHRENHEIT. NOTES: TESTING RESULTS ARE FOR MATERIALS INSTALLED AND CURED AT A TEMPERATURE BETWEEN 72 AND 78 DEGREES FAHRENHEIT FOR 7 DAYS, UNLESS OTHERWISE NOTED.

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3. IF INCREASED CONTACT TIME IS REQUIRED FOR CONCRETE PLACEMENT, EPOXY RESIN/PORTLAND CEMENT BONDING AGENT MAY BE USED INSTEAD OF EPOXY BONDING AGENT.

PART 3 EXECUTION

3.01 INSTALLATION

- A. INSTALL AND CURE EPOXY MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- B. EPOXY:
 1. APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- C. EPOXY GEL:
 1. APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 2. USE FOR VERTICAL OR OVERHEAD WORK, OR WHERE HIGH VISCOSITY EPOXY IS REQUIRED.
 3. EPOXY GEL USED FOR VERTICAL OR OVERHEAD WORK MAY BE USED FOR HORIZONTAL WORK.
- D. EPOXY BONDING AGENT:
 1. APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 2. BONDING AGENT WILL NOT BE REQUIRED FOR FIL

END OF SECTION

**SECTION 050526
STEEL WELDING REQUIREMENTS**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Welded field connection material as defined in the AISC "Code of Standard Practice for Steel Building and Bridges," latest edition, including erection.
 2. Steel roof ledgers welded connections.
 3. Welding of connections between reinforcing steel, where such connections include connection plates or angles, and all plates and angles required at such connections.

1.2 REFERENCES

- A. The following references, codes and standards are hereby made a part of this Section. Conform to the applicable requirements therein except as otherwise specified herein or shown on the Drawings. Nothing contained herein shall be construed as permitting work that is contrary to code requirements.
- B. American Institute of Steel Construction, (AISC) latest edition.
1. "The Code of Standard Practices for Steel Buildings and Bridges".
- C. American Iron and Steel Institute (AISI).
1. "Cold Formed Steel Design Manual".
- D. American Society for Testing and Materials (ASTM), latest edition:
1. A435, "Straight Beam Ultrasonic Examination of Steel Plates".
 2. A898, "Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes".
 3. E329; "Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials".
- E. American Welding Society (AWS), latest edition.
1. A2.4: "Standard Symbols for Welding, Brazing and Nondestructive Testing".
 2. A5.1; "Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding".
 3. A5 Series; "Standard Qualification Procedures".
 4. AWS D1.1; "Structural Welding Code-Steel".

1.3 SUBMITTALS

- A. Shop Drawings:
1. Prepare shop drawings under the supervision of a licensed Civil or Structural Engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.
 2. Submit detailed, coordinated and checked shop drawings for all structural steel for review prior to the start of fabrication and erection. (See FEMA-353 Part II, Section 1.4). Include the following:
 - a. Type, size and location of welds.

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- b. Seismic Weld Demand Category and Seismic Weld Consequence Category of welded joints in the Seismic-Force-Resisting System.
 - c. Identification of Welding Procedure Specification (WPS) applicable to each shop weld.
 - d. Welding Procedures: Detail methods, sequence, qualifications and procedures, including preheating in writing and submit for review. Welded joints shown on the Drawings or required for fabrication and erection, which are not designated as pre-qualified in the AWS Code, are subject to all applicable AWS Code provisions and shall be qualified by test in accordance with Section 5 of the AWS Code.
 - 3. Welded Connections: Identify using standard AWS symbols as given in AWS A2.4; clearly distinguish between shop and field welds.
- B. Samples: Provide material samples as requested by the Engineer or Quality Assurance Agency. Routine physical verification of structural steel, fastener, or welding material composition or mechanical properties is not required. (See FEMA-353 Part II, Section 4.5).
- C. Test Reports: Conducted on shop and field welded connections. Include data on type(s) of test conducted and test results.
- D. Erection Drawings:
 - 1. Submit detailed, coordinated and checked erection drawings for all structural steel for review prior to the start of fabrication and erection. (See FEMA-353 Part II, Section 1.4). Include the following:
 - a. Location of all structural material.
 - b. Identification mark of members.
 - c. Orientation and relation of members to appropriate grid lines.
 - d. Setting elevations for column bases.
 - e. Standard and special details for bolted and welded field connections.
 - f. Seismic Weld Demand Category and Seismic Weld Consequence Category for field-welded joints in the Seismic-Force-Resisting System,
 - g. Identification of WPS applicable to each field weld.
 - 2. Welded Connections: Identify using standard AWS symbols as given in AWS A2.4; clearly identify field welds.
- E. Manufacturer's Test Reports:
 - 1. Welding Material:
 - a. The Contractor supplying welding filler metal and shielding gas products shall submit copies of all Manufacturers' Certifications for all electrodes, fluxes and shielding gasses to be used indicating compliance with applicable AWS A5 requirements. The welding material's Manufacturer's Certifications shall be accompanied by a Certificate of Compliance from the Contractor supplying the materials. (See FEMA-353 Part II, Section 5.2.1).
 - b. The Contractor shall also submit the applicable manufacturer's supplemental certifications that the product meets any additional requirements of the project beyond that required by standard AWS A5.1 specification. Should the welding material manufacturer not supply such supplemental certifications as required, the Contractor shall have the necessary testing performed and provide the applicable test reports.
- F. Procedures, General: Procedures shall assign responsibility to a person or position in the organization and shall contain enough detail to be useful to the workforce without reference to governing specifications. The procedures need not act as work instructions. Date procedures and indicate the person or position that has the authority to maintain the procedure.

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- G. Welding Procedure Specifications (WPSs): The Contractor shall submit all Welding Procedure Specifications (WPSs) to be used by the contractor on the project.
1. For WPSs that are not prequalified in accordance with AWS D1.1, the supporting Procedure Qualification Record (PQR) shall also be submitted with the WPS.
 2. The Contractor shall also submit the manufacturer's product data sheets for all welding material to be used, with description of the product, limitations of use, recommended welding parameters, and storage and exposure requirements, including baking and rebaking, if applicable. (See FEMA-353 Part II, Section 5.2.2)
 3. Welding Procedure Specifications (WPSs): Categorized by and specify the following items:
 - a. Steel specifications and grades to be welded.
 - b. Thickness range of material to be joined.
 - c. Type of joint.
 - d. Type of weld (groove, fillet, plug, slot).
 - e. Size of weld.
 - f. Position of welding.
 4. Based upon the application, the WPS shall specify, as a minimum, the following items, as applicable for the welding process:
 - a. Power supply (constant current or constant voltage).
 - b. Welding electrode, flux, and shielding gas classifications.
 - c. Welding electrode and flux manufacturer and trade name.
 - d. Electrode diameter.
 - e. Voltage (except for shielded metal arc welding),.
 - f. Current (amperage) or wire feed speed.
 - g. Electrical stick-out or contact tube-to-work distance (wire fed).
 - h. Travel speed.
 - i. Minimum preheat and interpass temperatures.
 - j. Maximum preheat and interpass temperatures (if applicable),.
 - k. Number and placement of passes.
 - l. Technique (stringer or weave bead).
 - m. Shielding gas flow rate.
 - n. For groove welds, the joint configuration and tolerances.
 - o. Other pertinent information specific to the weld to be made.
 5. Tolerances, or the acceptable range of values, applicable to the various welding parameters shall also be noted in the WPS.
- H. Welding Performance Qualification Records (WPQRs): The Contractor shall submit written Welding Performance Qualification Records (WPQRs) for all welding personnel under the Contractor's supervision who will be performing services on the project.
1. The WPQR shall document the successful completion of the appropriate welding personnel qualification testing as performed in accordance with the current or a previous version of AWS D1.1. Submit additional documentation that the welder has passed all designated supplemental welder qualification testing required for the types of welding to be performed. (See FEMA-353 Section Part II, 5.2.3)
 2. Should the WPQR testing have been performed more than six months prior to the start of the welding by the welder, submit documentation showing that the welder has continued to use the applicable welding process on an ongoing basis since the test was conducted, with no lapse in service exceeding six months.
 3. The Welding Performance Qualification Records shall, as a minimum, provide the following information:
 - a. Welding process.
 - b. Type of weld.,

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- c. Welding position.
 - d. Thickness of test plate.
 - e. Thickness and nominal diameter of tubular test piece, if applicable.
 - f. If vertical position, whether upward or downward progression.
 - g. Electrode group (f-number) classification (if smaw).
 - h. Test results.
 - i. Signature of contractor's individual responsible for the test.
 - j. Date of test.
4. If the supplemental testing in FEMA-353 Appendix B is required, the Contractor shall submit additional WPQRs for those tests.
- I. Inspector Qualifications:
- 1. The Contractor shall submit written qualifications for all inspectors to be assigned Quality Control functions for the structural steel work, including general inspection, bolting inspection, welding inspection, and nondestructive testing. (See FEMA-353 Part II, Section 2.2)

1.4 QUALITY ASSURANCE SUBMITTALS

- A. Qualifications of QA Agency's management and QA personnel designated for the project.
- B. Qualification records for Inspector and NDT technicians designated for the project,
- 1. QA Agency's NDT procedures, equipment calibration records, and personnel training records, and
 - 2. QA Agency's Quality Control Plan for the monitoring and control of the Agency's operations.
- C. Written Practice for Quality Assurance Agencies
- 1. The Quality Assurance Agency shall maintain a Written Practice for the selection and administration of inspection personnel, describing the following:
 - a. Training, experience and examination requirements for qualification and certification of inspection personnel.
 - b. Procedures for determining the acceptability of the structure in accordance with the applicable codes, standards, and specifications.
 - c. Inspection procedures, including general inspection, material controls, visual welding inspection, and bolting inspection.
 - 2. Welding Inspection Procedures
 - a. Welding inspection procedures shall meet the requirements of the AWS D1.1 and the Quality Assurance Plan.
 - 3. Shear Connector (Stud) Inspection Procedures
 - a. Shear connector inspection procedures shall meet the requirements of the AWS D1.1 and the Quality Assurance Plan.
- D. Written Practice for Nondestructive Testing Agencies
- 1. The NDT Agency shall maintain a Written Practice for the control and administration of NDT personnel training, examination and certification, describing the training, experience and examination requirements for each level of certification. The Written Practice shall describe the responsibility of each level of certification for determining the acceptability of material and weldments in accordance with the applicable codes, standards, specifications and procedures.

1.5 QUALITY CONTROL AND QUALITY ASSURANCE

- A. Codes:

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1. Quality Assurance Agency Practices
 - a. ASTM E329 - Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as used in Construction
 - b. ASTM E543 - Standard Practice for Agencies Performing Nondestructive Testing
 - c. ASTM E1212 - Standard Practice for Establishment and Maintenance of Quality Control Systems for Nondestructive Testing Agencies
 2. Magnetic Particle Testing (MT)
 - a. ASTM E709 - Standard Guide for Magnetic Particle Examination
 - b. ASTM E1444 - Standard Practice for Magnetic Particle Examination
 3. Ultrasonic Testing (UT)
 - a. ASTM E587 - Standard Practice for Ultrasonic Angle-Beam Examination by the Contact Method
 - b. ASTM E114 - Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method
 - c. ASTM E164 - Standard Practice for Contact Examination of Weldments
 - d. ASTM A898 - Standard Specification for Straight-Beam Ultrasonic Examination of Rolled Steel Structural Shapes
 - e. ASTM A435 - Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates
 4. Nondestructive Testing Personnel Qualification
 - a. ANSI/ASNT CP-189-1995, ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel; or
 - b. ASNT Recommended Practice No. SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing, 1995
- B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- C. Pre-Fabrication / Pre-Erection Conferences: Prior to performing any fabrication or erection work, the Engineer, Quality Assurance Agency, and Special Inspector, together with Steel Fabricator personnel and Steel Erector personnel supervising the shop, field and Quality Control work shall hold a Pre-Fabrication and Pre-Erection Conference to review the following:
1. Welding procedures.
 2. Inspection requirements for all welding operations. (See FEMA-353 Part II, Section 1.3)

1.6 INSPECTOR QUALIFICATIONS

- A. Special Inspector Qualifications
1. Special Inspectors shall be trained and competent, to the satisfaction of the party responsible for the Quality Assurance Plan, to provide the assigned special inspection tasks.
- B. Welding Inspector Qualifications
1. All Welding Inspectors shall have adequate visual acuity, documented by vision testing performed within the past three years, in accordance with AWS D1.1, Section 6.1.4.4.
 2. All Welding Inspectors shall be trained and thoroughly experienced in inspecting welding operations, and qualified in accordance with AWS D1. 1, Section 6.1.4.
 3. For welds in Seismic Weld Demand Categories A and B, welding inspectors shall be AWS Certified Welding Inspectors (CWI), or Senior Certified Welding Inspectors (SCWI), as defined in AWS QC1, Standard and Guide for Qualification and Certification of Welding Inspectors, latest edition.

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4. For welds in Seismic Weld Demand Category C, welding inspection personnel shall be AWS Certified Associate Welding Inspectors (CAWI) or higher, or otherwise qualified under the provisions of AWS D1.1-98, Section 6.1.4, to the satisfaction of the party responsible for the Quality Assurance Plan.
5. The use of assistants in inspection operations is permitted, provided the assistants are adequately trained in their responsibilities, and are under the close supervision of the inspector responsible for the joint or connection being inspected.
6. The qualification of an inspector previously certified as a CWI is acceptable, although the certification may have expired, provided the inspector has remained active in the inspection of welded steel fabrication

C. NDT Personnel Qualifications

1. Nondestructive testing personnel shall be qualified under either of the American Society for Nondestructive Testing, Inc. (ASNT) documents referenced in Section 3.6A4.
2. NDT may be performed by NDT Level I personnel only under the close, direct supervision of an NDT Level II.
3. For welds in Seismic Weld Demand Categories A and B, UT may be performed only by UT technicians certified as Level II by their employer, or as ASNT Level III certified by examination by the ASNT, and have passed the Supplementary UT Inspector examination as described in Section 3.6C3d.
4. Supplementary NDT Personnel Qualification Testing
 - a. Ultrasonic testing technicians who perform flaw detection or sizing shall be trained in applicable UT procedure and shall demonstrate their competence through testing as prescribed in FEMA-353 Appendix E.

D. Contractor Tasks:

1. The Contractor shall provide the management, personnel, equipment and services necessary to perform the Quality Control functions specified herein.

E. Quality Assurance Agency Tasks:

1. The Quality Assurance Agency shall provide the management, personnel, equipment and services necessary to perform the Quality Assurance functions specified herein.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store welding electrodes in a weather tight and dry place until ready for use. Store packaged materials in their original containers.
1. Clean and relubricate bolts and nuts that become dry or rusty before use, except for ASTM F1852 "twist-off" type assemblies.
 2. Store materials to permit easy access for inspection and identification.

PART 2 - PRODUCTS

2.1 WELDING MATERIAL

- A. General: Provide all-new materials in perfect condition.
- B. Conform to the following AWS specifications, as applicable:
1. ANSI/AWS A5.1-91, Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding

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2. ANSI/AWS A5.5-96, Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding
 3. ANSI/AWS A5.17/A5.17M-97, Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding
 4. ANSI/AWS A5.18-93, Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding
 5. ANSI/AWS A5.20-95, Specification for Carbon Steel Electrodes for Flux-Cored Arc Welding
 6. ANSI/AWS A5.23/A5.23M-97, Specification for Low-Alloy Steel Electrodes and Fluxes for Submerged Arc Welding
 7. ANSI/AWS A5.25/A5.25M-97, Specification for Carbon and Low-Alloy Steel Electrodes and Fluxes for Electroslag Welding
 8. ANSI/AWS A5.26/A5.26M-97, Specification for Carbon and Low-Alloy Steel Electrodes for Electrode Gas Welding
 9. ANSI/AWS A5.28-96, Specification for Low-Alloy Steel Electrodes and Rods for Gas Shielded Arc Welding
 10. ANSI/AWS A5.29-98, Specification for Low-Alloy Steel Electrodes for Flux-Cored Arc Welding
 11. ANSI/AWS A5.32/A5.32M-97, Specification for Welding Shielding Gases
- C. Welding Electrodes: AWS standards for the type of base metal and the welding process used. For field metal-arc welds, E70XX at A-36 steel, E70XX at A242, A441, A572 steel, grades 42 through 60.
1. Obtain Engineer's approval of electrodes at higher strength steels or a full penetration welds. Any group (fast-freeze, fast-fill, fill-freeze or low hydrogen) may be used, depending upon the weld position; use low hydrogen group, EXX18 or EXX28 where structural metals are welded to concrete reinforcing steel or at full penetration welds.
 2. Use E7018 or E7028 electrodes at welds to reinforcing, whether reinforcing is Grade 40 or Grade 60, unless specifically shown otherwise on the Drawings.
 3. Filler Metal: Conform to AWS D1.1 and recommendations by the manufacturers for position and other conditions of actual use.

2.2 SEISMIC-FORCE-RESISTING SYSTEM WELDING

- A. Toughness, Strength and Elongation:
1. All welds on members comprising the Seismic-Force-Resisting System, except as noted below for joining of material conforming to ASTM A913, grade 65, shall employ weld filler metals classified for nominal 70 ksi tensile strength, referred to as E70 electrodes, meeting the following minimum mechanical property requirements:
 - a. CVN Toughness: 20ft-lb at 0°F, using AWS A5 classification test methods.
 - b. CVN Toughness: 40 ft-lb at 70°F, using the test procedures prescribed in FEMA-353 Appendix A.
 - c. Yield Strength: 58 ksi minimum, using both AWS A5 classification test (for E70 classification electrodes) and the test procedures prescribed in FEMA-353 Appendix A
 - d. Tensile Strength: 70 ksi minimum, using both the AWS A5 classification test (for E70 classification electrodes) and the test procedures prescribed in FEMA-353 Appendix A
 - e. Elongation: 22% minimum, using both the AWS A5 classification test and the test procedures prescribed in FEMA-353 Appendix A.
 - f. Make welded joints of ASTM A913, grade 65 material with weld filler metals classified as E80 electrodes with a minimum yield strength of 68 ksi, minimum tensile strength of 80 ksi, and a minimum elongation of 19%. CVN toughness requirements of (1) and (2) above shall apply.

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- B. Hydrogen Level:
 - 1. For welded joints designated as Seismic Weld Demand Category A or B, welding filler metals, as supplied by the manufacturer, meet the requirements for H16 (16 ml diffusible hydrogen per 100 grams deposited weld metal) as tested using the mercury or gas chromatograph method as specified in AWS A4.3. The manufacturer's Certificate of Conformance shall be considered adequate proof that the supplied electrodes meet this requirement, and no additional testing of filler metal samples or of production welds is required.
 - 2. For all other welds on members of the Seismic-Force-Resisting System, the weld filler metals shall be considered classified as low-hydrogen under the provisions of AWS D1.1.
- C. Packaging Requirements:
 - 1. Conform to the requirements of AWS D.1.1. Deliver FCAW electrodes in moisture-resistant packages that are undamaged and protected against contamination and injury during shipment and storage.
 - 2. Maintain electrode packages effectively sealed against moisture until the electrode is required for use.
 - 3. When removed from protective packaging and installed on machines, take care to protect the electrodes and coatings, if present, from deterioration or damage.
 - 4. Modification or lubrication of an electrode after manufacture for any reason is not permitted, dry electrodes only as recommended by the manufacturer.

2.3 WELDED CONSTRUCTION

- A. Assign an identification symbol or mark to each welder working on the project. Each welder shall mark or stamp this identification symbol at each weldment completed. Use the low-stress type where stamps are used.
- B. Make WPSs available to welders and inspectors prior to and during the welding process. Prior to welding, welder shall verify joint fit-up for conformance with the WPS and AWS D1.1.
- C. Accurately identify all CJP and PJP groove welds subjected to UT, with a visible mark, "for UT," on the steel a distance of 4-inches away from the root of the edge preparation.
- D. Perform welding in accordance with the appropriate WPS for the joint.
- E. Make complete joint penetration groove welds, unless specifically designated otherwise on the Drawings. Groove preparation details are at the Contractor's selection, subject to qualification, if required, in accordance with AWS D1.1.
- F. Weld Tabs: In accordance with AWS D1.1, Section 5.31, as modified by section 3.3B of this specification where applicable. Do not use end dams.
- G. Backing Bars: In accordance with AWS D1.1, Section 5.10, as modified by Section 3.3A of this specification where applicable.
- H. Make faces of fillet and groove welds exposed to view reasonably smooth and uniform. Finishing or grinding is only required where clearance or fit of other items may so necessitate, or as preparation for coating.

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- I. Conform to "Standard Code for Welding in Building Construction" of the American Welding Society". All welding except tack welds, shall be done by welders qualified by test, as prescribed in the "Standard Qualification Procedure" of the AWS (A5-1 or A5.5, etc.)
 - 1. Ensure surfaces to be welded are free of scale, slag, grease, paint and all other foreign materials. Rigidly clamp parts while welding. Make finished welds of the size indicated on the Drawings or when not shown, of a size sufficient to insure adequate strength.
 - 2. Grind welds smooth at pipe railings and other locations requiring smooth surfaces.
 - 3. Where butt welds are shown connecting bolts to flat surfaces, grind bolts to a 45 degree bevel (chisel point); weld shall be full penetration. Nelson studs of the same dimensions may be used in place of such anchor bolts if desired.
 - 4. Do not perform welding with T-4 electrodes.
- J. Assemble and weld built-up sections by methods that will produce true alignment of axes without warp.

PART 3 - EXECUTION

3.1 SEISMIC-FORCE-RESISTING SYSTEM WELDING REQUIREMENTS

- A. Welders and welding operators performing work on welds classified as Seismic Weld Demand Categories A or B shall pass Supplemental Welder Qualification Testing, as prescribed in FEMA-353 Appendix B, on special test joint mock-ups.
 - 1. Testing shall be performed using the process to be used in the work, with the WPS set at the highest deposition rate to be used in the work. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification. Tack welders need not perform such Supplemental Testing.
 - 2. Qualification Period: Within 12 months prior to beginning welding on the project
 - a. Should the 12-month period elapse during welding on the project, the Supplemental Welder Qualification remains valid. It is not required to repeat the testing during the course of the project, unless the quality of the workmanship for that welder routinely fails to meet the applicable project weld quality standards.
- B. Intermix of Filler Metals: For welded joints requiring CVN toughness in Seismic Weld Demand Categories A and B, when FCAW-S filler metals will be used in combination with filler metals for other processes, including FCAW-G, conduct supplemental toughness testing as prescribed in FEMA-353 Appendix C.
- C. Electrode Storage and Exposure Limits:
 - 1. FCAW electrodes shall be received and stored in the original, undamaged manufacturer packaging, until ready for use. Electrodes in packages that have had the internal plastic wrapping damaged shall not be used for welds in Seismic Weld Demand Category A or B. Modification or lubrication of an electrode after manufacture is not permitted, except that drying is permitted as recommended by the manufacturer.
 - 2. The exposure time limit for all FCAW electrodes shall be based upon the results of tests as prescribed in FEMA-353 Appendix D. These test may be conducted by the electrode manufacturer or supplier, by the Contractor, or by an independent testing agency or laboratory with suitable equipment.
 - 3. In lieu of testing, when welding is to be suspended for more than 8 hours, electrodes shall be removed from the machines and stored in an electrode wire oven maintained at a temperature between 250° and 550° F, or as recommended by the manufacturer. Electrodes not

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consumed within 24 hours of accumulated exposure outside closed or heated storage shall not be used for welds in Seismic Weld Demand Category A or B. Electrode spools shall be identified to facilitate monitoring of total atmospheric exposure time. FCAW electrodes that have been exposed for periods exceeding an accumulated 24 hours may be dried if manufacturer's testing and recommendations show that drying is effective at removing moisture and restoring electrodes to their designated diffusible hydrogen level.

- D. Wind Velocity Limits:
1. In lieu of AWS D1.1-98, Section 5.12.1, GMAW, FCAW-G, GTAW and EGW shall not be performed when the wind velocity in the immediate vicinity of the weld exceeds three miles hour. Welding performed within an enclosed area, and not subject to drafts may be deemed to satisfy this requirement.
 2. SMAW, FCAW-S, and SAW may be performed without limitation to wind velocity, provided the wind does not affect the appearance of the molten weld puddle.
- E. Minimum Preheat and Interpass Temperature:
1. Minimum preheat and interpass temperatures shall be provided for all welds, including tack welds, in accordance with AWS D1.1, Table 3.2. The Contractor may specify higher minimum temperatures, if desired, as a part of the Contractors WPS for a particular application. In such cases, the WPS minimum preheat and interpass temperatures shall be provided. For welds in Seismic Demand Categories A, B or C, preheat and interpass temperatures shall be in the range tested in accordance with Appendix A.
 2. Preheat and interpass temperatures lower than those required by AWS D1.1, Table 3.2, are permitted provided the WPS has been qualified by test, and the WPS and PQR have been accepted by the Engineer.
 3. Minimum preheat and interpass temperatures shall be verified at a distance of 3-inches from the weld, at the point of arc initiation or for materials over 3-inches in thickness, at a distance equal to the thickness of the part.
- F. Maximum Preheat and Interpass Temperature:
1. The maximum preheat and maximum interpass temperature permitted in 550°F, measured at a distance of 1 in. from the point of arc initiation. This maximum temperature may not be increased by the WPS, regardless of qualification testing.
- G. Nonfusible Backing:
1. The use of nonfusible backing materials, including ceramic and copper, is permitted only with satisfactory welder qualification testing performed using the type of backing proposed for use, using the test plate shown in AWS D1.1-98, Figure 4.21, except that groove dimensions shall be as provided in the WPS and PQR. Should the joint to be welded include welding a beam flange to a column flange through an access hole, the Supplemental Welder Qualification Test of FEMA-353 Appendix B shall be performed using the type of backing proposed for use.
 2. For nonfusible weld tabs and short segments of nonfusible backing bars used at the ends of welds between shear tabs and column faces, or at the ends of continuity plate welds, special welding personnel and welding procedure qualification testing is not required. The welder shall be trained in the proper welding techniques for using such nonfusible weld tabs and backing bars prior to performing such welding on the project.
- H. Peening:
1. The use of peening is permitted at the Contractor's option, but is not required. See AWS D1.1-98, Section 5.27. If the Contractor elects to use peening, a written procedure for performing peening shall be incorporated into the WPS for the joints to be peened.

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I. Controlled Cooling:

1. The use of controlled cooling is permitted at the Contractor's option, but is not required. If the Contractor elects to use controlled cooling, a written procedure for controlling cooling after welding shall be incorporated into the WPS for the joints to receive such treatment. The procedure shall include the method of heating, the maximum temperature permitted, cooling rate range to be provided, and the method and frequency of temperature measurements.
2. The use of insulating blankets after completion of welding, without the addition of heat, is permitted at the Contractor's option, but is not required. For the use of insulating blankets only, a written procedure and temperature measurements are not required.

J. Post Weld Heat Treatment:

1. The use of Post Weld Heat Treatment (PWHT) is permitted at the Contractor's option, but is not required. The use of PWHT shall meet the Stress-Relief Heat Treatment limitations of AWS D1.1-98, Section 5.8. If the Contractor elects to use PWHT, a written procedure for performing PWHT shall be incorporated into the WPS for the joints to be treated.
2. Controlled cooling, or the application of heat immediately following completion of a joint to maintain a nominal temperature at or below 550°F, is not considered PWHT.

- K. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work. Metal decking may be used as safety planking. Cooperate with metal decking contractor as required. Replace any metal decking damaged by its use as a working platform at no additional cost to owner.

3.2 WELDED JOINT DETAILS AT MOMENT FRAMES AND ECCENTRIC BRACED FRAMES THAT ARE PART OF THE SEISMIC-FORCE-RESISTING SYSTEM

A. Backing Bars: Use in accordance with AWS D1.1, Section 5.10.

1. Make tack welds attaching backing bars to the steel prior to the welding of the joint within the joint.
2. Preheat for such tack welds as required by AWS D1.1, Table 3.2, or by the WPS, as applicable.
3. Backing bars may remain in place unless required to be removed as specified herein, by AWS D1.1-98, Section 5.10.4, or by AISC Specification Section J1.5.

B. Heavy Section Splices Requiring Removal of Backing Bars: Remove the backing bars from all welded tension splices of Heavy Sections, as defined herein.

1. Where fusible backing material is used, back-gouge the root pass area after backing bar removal, and back weld until flush or with slight reinforcement.
2. Grind surface smooth, to a surface roughness not to exceed 500 micro-inches. Repair notches and gouges following requirements of AWS D1.1-98, Section 5.15.4.4.

C. Moment Connection Joints Requiring Removal of Backing Bars:

1. Remove backing bars from the joint when required on the Drawings. Following removal of backing, back-gouge the root pass to sound weld metal, and back weld.
2. Backing bar removal may be performed by air carbon arc cutting (CAC-A), commonly referred to as air carbon arc gouging (ACAG), grinding, chipping, or thermal cutting. Control the process to minimize gouging and removal of base metal except for material immediately adjacent to the weld.
3. Following back gouging, back weld the root. Provide a reinforcing fillet weld with a minimum leg size of 5/16-inch or the root opening plus 1/16-inch, whichever is larger. The reinforcing fillet weld need not be ground.

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4. Following completion of the reinforcing fillet weld, perform MT on the fillet weld and the immediately adjacent area.
5. Should these joints be made with nonfusible backing, the backing material shall be as needed, the reinforcing fillet added as described above, and MT performed on the completed fillet weld and the immediately adjacent area.
 - a. If visual inspection of the root shows no unacceptable discontinuities, no back gouging and back welding is required.

3.3 WELD TABS

- A. Use of Weld Tabs: Terminate welds at the end of a joint in a manner that will ensure sound welds. Whenever necessary, use weld tabs, also called extension bars and run-off tabs.
- B. Extend weld tabs beyond the edge of the joint a distance equal to a minimum of the part thickness, but not less than 1-inch. Orient weld tabs parallel to the joint preparation and to the weld direction. No weld dams are allowed.
- C. Except as noted in the following sections, weld tabs shall meet the requirements of AWS D1.1-98, Section 5.31.
 1. Fusible weld tabs may remain in place unless their removal is required by the following sections, by AWS D1.1-98, Section 5.31, or by AISC Specification Section J1.5.
 2. Nonfusible weld tabs may be used in applications and locations where qualified in accordance with AWS D1.1, Section 4.
- D. Heavy Section Joint Weld Tab Removal and Finish:
 1. Remove weld tabs used at all welded tension splices in Heavy Sections, as defined herein, and ground smooth to a finish of 500 micro-inches or better. Repair gouges and notches to satisfy the requirements of AWS D1.1-98, Section 5.15.4.4, or the provisions of AWS D1.1-98, Section 5.15.4.4.
- E. Moment Connection Weld Tab Removal and Finish: Remove weld tabs where indicated on Drawings.
 1. Perform weld tab removal by air carbon arc cutting (CAC-A), grinding, chipping, or thermal cutting to within 1/8-inch of the base metal surface.
 2. For weld tabs used on continuity plates, removal within 1/4-inch of the plate edge is adequate. Control the process to minimize gouging and removal of base metal except for the material immediately adjacent to the weld.
 3. Finish the edges where the weld tabs have been removed to a surface roughness value of 500 micro-inches or better. Grinding to a flush condition is not required.
 4. Gouges and notches are not permitted, and must be removed by grinding. Do not exceed a transitional slope of 1:5 for any area where gouges and notches have been removed.
 5. Fill material removed by grinding that extends more than 1/16-inch below the surface of the base metal with weld metal using approved weld repair procedures.
 6. Contour the weld at the ends to provide a smooth transition, free of notches and sharp corners. A minimum radius at the corner need not be provided.
 7. Following removal and finishing to the required smoothness and contour, and the completion of any necessary repairs, inspect the exposed ends of the weld using magnetic particle testing (MT).
- F. Weld Toes: Install weld toes, whether for groove welds or fillet welds, to provide a smooth transition between the weld and base metal. The as-welded profile is adequate provided it satisfies the criteria of AWS D1.1, Section 5.24. No grinding is required.

3.4 WELD ACCESS HOLES

- A. Weld Access Holes: Meet the dimensional, surface finish, and testing requirements of AISC LRFD Specification Section J1.6 and AWS D1.1-98 Section 5.17.1 and Figures 5.2, except as otherwise required by the Contract Documents. The provisions in AWS D1.1 Section 5.17.2 and Figure 5.2, Note 1 apply to all Heavy Sections as defined herein.
- B. Grind access holes smooth to a surface roughness value not to exceed 500 micro-inches, free of notches and gouges.
 - 1. For this purpose, a notch or gouge is any depression deeper than the overall surface roughness.
- C. Remove notches or gouges present from thermal cutting by grinding, faired to a slope of not more than 1:5 against a straight cut surface, or to a radius of not less than 3/8-inch if in the curved portion of the cut surface.
 - 1. The depth of notches and gouges that may be required by grinding is not limited, provided the required dimensions, including tolerances, of the access hole are maintained.
- D. Notches deeper than can be repaired by grinding (as above) may be repaired by welding. Prior to welding, grind the notch or gouge to provide a smooth contour with a radius not less than 3/8-inch.
 - 1. Preheat the repair area to a temperature between 400°F and 550°F, measured at the point of welding immediately prior to welding.
 - a. Use filler metal meeting the requirements for Seismic Weld Demand Categories A and B.
 - b. Follow a written repair WPS for the application.
 - c. Following completion of welding, grind the area smooth and flush to meet the contour and finish requirements for the access holes, with fairing of the welded surface to adjoining surfaces.
- E. Prior to acceptance, inspect the weld access hole using magnetic particle testing (MT) or liquid penetrant testing (PT) to verify it is free of cracks.
 - 1. Perform magnetic particle testing (MT) if a welded repair has been made.

3.5 WEB WELDING

- A. Unless otherwise shown on the Drawings, shear tabs may be welded to the column using fillet welds, PJP groove welds with reinforcing fillet welds, a combination of fillet weld and PJP groove weld, or a CJP groove weld.
- B. When required by the Drawings, weld the beam web to the shear tab using fillet welds.
 - 1. Provide a minimum clear distance of 1/2-inch between the weld access hole and the toe of the fillet weld connecting the shear tab and beam web.
- C. Terminate fillet welds a distance equal to or greater than the leg size from the beam end.
- D. Doubler Plate Details:
 - 1. Web doubler plates, if required, may be welded using any of the three details of the AISC Seismic Provisions, Figure C-9.3.
 - 2. When Figure C-9.3(a) is used, chamfer the edges of the doubler plate to an adequate bevel to facilitate access to the root of the weld. A square-edge plate and square groove weld between doubler plate and column is not acceptable. No grinding of the completed weld is required.

3. When Figure C-9.3(b) is used, chamfer the plate to miss the radius of the column. As a minimum, make the fillet weld, in both throat and leg size, equal to or larger than the chamfer dimensions used for the doubler plate. No grinding of the completed weld is required.

3.6 COLUMN CONTINUITY PLATE WELDING

- A. Provide clips at continuity plates, also referred to as stiffeners, sized to avoid interference with the radius of the column.
 1. Against the column flange, the size of the clip may exceed the radius (k1 dimension) by no more than 1/2-inch.
 2. Along the web, extend the clip a distance of approximately 1-1/2-inches beyond the published k dimension. Detail the clip to facilitate suitable weld terminations for both the flange weld and the web weld, with a minimum radius of 1/2-inch.
- B. The weld between the continuity plate and the column flange, unless otherwise shown, shall be a CJP groove weld for the full length of the groove preparation.
 1. The joint may use backing bars, or may be made without backing provided the root is back gouged and back welded.
 2. If backing bars are used and remain in place, install a reinforcing fillet weld between the backing bar and column flange. Do not place any fillet welds between backing bar and continuity plate. The fillet weld size need not exceed the minimum size requirements of AWS D1.1, Table 5.8.
- C. Weld terminations near the end of the column flange tips may be completed using weld tabs. Weld tabs, if used, may be steel or nonfusible material. After welding completion, remove weld tabs to within 1/4-inch of the continuity plate edge; finish the surface to a surface roughness not to exceed 500 micro-inches.
 1. Removal or grinding to the flush condition is not required.
 2. Following finishing, inspect the edge using magnetic particle testing (MT).
- D. Column Flange to Continuity Plate Welds: Weld terminations near the radius of the column need not be made using weld tabs. The use of small nonfusible weld tabs to assist in weld terminations is permitted. Remove weld tabs following completion of welding; no grinding is required.
- E. The weld between the continuity plate and column web may be made with groove welds, fillet welds, or a combination of the two. Hold the weld termination back from the end of the joint at each end a distance of approximately 1/4-inch.

3.7 WELDING SEQUENCES FOR MOMENT CONNECTION OF BOTTOM BEAM FLANGE

- A. When welding the bottom flange to the column flange of welded moment-resisting connections, follow the sequence below:
 1. When welding from Side A (one of the beam), begin the root pass beyond the center of the joint on Side B, reaching past the beam web (or web plate, for FF connections) through the weld access hole (or opening, for FF connections). After the arc is initiated, travel shall progress toward the edge of the Side A beam flange, terminating the weld on the Side A weld tab.
 2. Thoroughly clean and visually inspect the Side A root pass, and the root pass deposit on Side B, to ensure fusion, soundness, and freedom from cracks, slag inclusions and excessive porosity.

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- a. The resulting bead profile shall be suitable for obtaining good fusion by the subsequent root pass to be initiated from Side B.
 - b. If the profile is not conducive to good fusion, ground, gouged, chipped, or otherwise prepare the start of the first root pass to ensure adequate profile to achieve fusion.
3. Apply the root pass to the second half of the weld joint, from Side B before any other weld passes are performed. Initiate the arc in the area of the start of the first Side A root pass; travel shall progress to the end of the joint, terminating on the Side B weld tab.
4. Repeat the above sequence for subsequent weld layers; complete each weld layer on both sides of the joint before a new layer is deposited.
 - a. The order of operations (Side A, then Side B, or vice versa) is not restricted and may vary for each weld layer.
- B. Place weld passes in horizontal layers. Thoroughly clean each pass of slag and brush with a wire brush. Visually inspect each pass as described above.
- C. Completely weld both top and bottom beam flanges prior to any supplemental welding to the beam web or shear tab, unless otherwise detailed in the approved erection plan and the WPS.

3.8 IMPROVED WELDED UNREINFORCED FLANGE CONNECTION DETAILS

- A. General: The following provisions are applicable to upgrading existing connections using improvements to the existing beam flange welds only.
- B. Existing Web Connection Materials and Details: Existing web connection and web access holes may remain as constructed.
- C. Replacement of Beam Flange Welds:
 1. Where required on the Drawings, remove the existing beam-to-column flange welds by air carbon arc cutting (CAC-A), chipping or grinding until only base metal remains.
 - a. Prepare the joint for new groove welding, using a joint detail that uses a backing bar. The actual root opening is permitted to exceed the prequalified root opening of AWS D1.1, Figure 3.4, provided a split-layer technique is used for the placement of the root pass.
 - b. The groove angle of the joint shall satisfy the prequalified groove angles of AWS D1.1 Figure 3.4, unless otherwise qualified under the provisions of AWS D1.1, Section 4.
 2. At the top flange, if the backing bar is left in place, apply a 5/16-inch reinforcing fillet between the backing bar and the column. Do not place a weld between the backing bar and beam flange. Remove the backing bar at the bottom flange, following the provisions specified herein, back-gouge the weld root to solid weld metal, and back-weld the area until at least flush. Place a 5/16-inch reinforcing fillet between the weld root and the column at the bottom of the bottom flange.
 3. Continuity plates, if added, shall conform to the requirements of this specification.
- D. New Welding Material: As specified herein. Follow procedures specified for weld tab removal.

3.9 HAUNCHED CONNECTION WELDING

- A. General: The following provisions are applicable to upgrading existing connections with either a bottom haunch or a top and bottom haunch, as shown on the design drawings.
- B. Existing Web Connection Materials and Details

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1. The existing web connection and web access holes may remain as constructed.
- C. Flange Weld Details:
1. Where indicated on Drawings, remove the existing beam-to-column flange welds by air carbon arc cutting (CAC-A), chipping or grinding until only base metal remains.
 - a. Prepare the joint for new groove welding, using a joint detail that uses a backing bar.
 - b. The actual root opening is permitted to exceed the prequalified root opening of AWS D1.1, Figure 3.4, provided a split-layer technique is used for the placement of the root pass.
 - c. The groove angle of the joint shall satisfy the prequalified groove angles of AWS D1.1 Figure 3.4, unless otherwise qualified under the provisions of AWS D1.1, Section 4.
 2. Top Flange: If the backing bar is left in place, place a 5/16-inch reinforcing fillet between the backing bar and the column. Do not place a weld between the backing bar and beam flange.
 3. Bottom Flange: Following the provisions specified herein, remove the backing bar, back-gouge the weld root to solid weld metal, and back weld the area until at least flush.
 - a. Place a 5/16-inch reinforcing fillet between the weld root and the column at the bottom of the bottom flange. Do not place a fillet weld between the backing bar and beam flange.
- D. New Welding Material: As specified herein.
1. Execute welding in conformance with the requirements specified herein. Remove weld tabs as specified herein.
- E. Haunch Welding Requirements:
1. The groove welds between column and WT haunch may be made with or without backing, but if backing is used, use an access hole meeting the minimum dimensional requirements of AWS D1.1, Section 5.17.1 and AWS D1.1 Figure 5.2.
 2. Backing Bars: If used, may remain in place, but if left in place, apply a reinforcing fillet.
 3. Beam Flange: Provide a CJP groove weld at the weld between the WT stem and the beam flange. Backing bars, if used, may remain in place, and no reinforcing fillet is required.
 4. Column Flange: Apply a CJP groove weld at the weld between the WT stem and the column flange. Backing bars, if used, may remain in place, but if left in place, a reinforcing fillet is required.
- F. Continuity Plates and Stiffener Welding Requirements:
1. New continuity plates added to the column shall meet the requirements specified herein. Stiffeners added to the beam web shall meet the requirements specified herein, except that the welds between the stiffener and the beam web may be fillet welds of minimum 5/16-inch in leg size.

3.10 COVER-PLATED MOMENT-CONNECTION WELDING

- A. General: The following provisions are applicable to upgrading existing connections with cover plates when indicated on the Drawings.
- B. Existing Web Connection Materials and Details: The existing web connection and web access holes may remain as constructed.
1. Flange Weld Details:
 - a. Where indicated on Drawings, remove the existing beam-to-column flange welds by CAC-A, chipping or grinding until only base metal remains.
 - b. Prepare the joint for new groove welding, using a joint detail that uses a backing bar.

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- c. The actual root opening is permitted to exceed the prequalified root opening of AWS D1.1, Figure 3.4, provided a split-layer technique is used for the placement of the root pass.
 - d. The groove angle of the joint shall satisfy the prequalified groove angles of AWS D1.1 Figure 3.4, unless otherwise qualified under the provisions of AWS D1.1, Section 4.
- C. New Welding Material:
 - 1. All new welding filler metals shall meet the requirements specified herein. Execute welding in conformance with the requirements specified herein.
 - a. Weld Tab Removal: As specified herein.
 - 2. Sequence of Assembly:
 - a. Following completion of the replacement groove welds between the existing beam flanges and the column flange, the top flange groove welds shall have the cap pass surface of the weld ground flush with the surface of the beam flange to enable the cover plate to fit flat against the beam flange.
 - b. Bottom Flange: Remove the backing bar, back-gouge the weld root to solid weld metal, and back-welded the area until at least flush.
 - 1) Grind the weld at the bottom of the bottom flange flush with the surface of the beam flange to enable the cover plate to fit flat against the beam flange.
 - 2) Care should be used to avoid over-grinding the existing weld below the surface of the beam flange and creating a void between cover plate and flange.
 - c. Test the weld using UT, using the percentage testing required for Seismic Weld Demand Category BH/T joints, prior to placement of the cover plate. MT of the cap pass of this weld is not required.
 - d. After acceptance of the beam flange-to-column flange weld, place the cover plate and weld. Inspect the cover-plate-to-column-flange-weld by UT and MT, using the percentage testing required for Seismic Weld Demand Category BH/T joints.

3.11 END PLATE MOMENT CONNECTIONS

- A. Flange Welds: Detail and weld beam-flange-to-end-plate welds as CJP groove welds, except that in the area of the flange directly above and below the beam web, back gouging and back welding of the weld root is not required.
 - 1. Detail the groove weld detail to locate the root of the weld on the beam web side of the joint.
 - 2. Following back gouging and back welding of the groove weld root, place a 5/16-inch reinforcing fillet weld on the inside portion of the flange weld, at the groove root. Alternatively, the 5/16-inch reinforcing fillet weld located on the beam web side of the beam flanges may serve as a backing weld.
 - 3. Back-gouge the root of the fillet to solid weld metal, and the groove welded in place. No backing is provided in the vicinity of the beam web. Using either method; no MT of the back gouged area is required prior to placement of the back weld or the groove weld.
- B. Web Welds:
 - 1. Fully weld the beam web full length to the end plate using fillet welds on each side of the beam web. Alternatively, groove welds may be substituted for the fillet welds.
 - 2. The weld detail limitations specified herein regarding the k-area are not applicable to this connection, but MT following completion of all welds in this area is required.
- C. Stiffener Welds:

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1. When Bolted Stiffened End Plate (BSEP) connections are used, weld the stiffener to the end plate and the beam flange using CJP groove welds. Provide a stiffener clip (snipe) at the intersection of beam flange and end plate.
- D. Weld Access Holes: Not permitted at the intersection of the beam web, beam flange and end plate.
- E. NDT Requirements:
 1. Inspect the beam flange to end plate welds, and the welds between stiffener and beam flange and end plate, using MT and UT as QC/QA Category AH/T and between stiffener and beam flange BH/L. Discontinuities located at the root of the beam flange weld, at the intersection of the beam web and beam flange, shall not be cause for rejection.
 2. Inspect welds between the beam web and end plate using MT, for QC/QA Category BM/L, for their full length.

3.12 REPAIR OF DISCONTINUITIES IN MAIN MEMBERS

- A. In lieu of AISC Seismic Provisions Section 7.3c, the provisions of this specification shall apply to beams in steel moment frames and only to that portion of the beam between the column flange and the following locations:
 1. Welded Unreinforced Flange (WUF), Welded Free Flange (FF), and Improved Welded Unreinforced Flange (IWURF) Connections: A point away from the column face located a distance equal to one-half the depth of the beam.
 2. Reduced Beam Section (RBS) Connections: A point away from the centerline of the cut radius located distance equal to one-half the depth of the beam, but no closer than the far edge of the radius cut.
 3. Welded Flange Plate (WFP) Connections and Welded Cover Plated Flange (WCPF) Connections: From the end of the flange plate or cover plate, away from the column face, to a point located away from the end of the plate at a distance equal to one-half the depth of the beam.
 4. Welded Bottom Haunch (WBH) Connections and Welded Top and Bottom Haunch (WTBH) Connections: From the intersection of the haunch and beam flange, to a point located away from haunch intersection a distance equal to one-half the depth of the beam.
 5. Bolted Unstiffened End Plate (BUEP) Connections: To a point away from the column face located a distance equal to five-sixths the depth of the beam, plus the thickness of the end plate.
 6. Bolted Stiffened End Plate (BSEP) Connections: From the end of the stiffener, away from the column face, to a point located away from the end of the stiffener a distance equal to one-half the depth of the beam.
 7. Double Split Tee (DST) Connections: From the stem end of the tee to a point located a distance equal to one-half the depth of the beam.
- B. Tack Welds:
 1. Tack welds are permitted if made prior to beginning welding of the joint. Tack welds for backing bars and weld tabs must be made within the groove weld joint. Tack welds for attachment of parts prior to fillet welding are acceptable, provided they are covered by the completed fillet weld.
 2. Tack welds outside these locations must be removed by grinding or chipping. Air carbon arc gouging and thermal cutting to remove tack welds in these areas is not permitted. Following the removal of unacceptable tack welds, grind the weld area to a depth of 1/16-inch, faired to adjacent surfaces on a slope not to exceed 1:5.

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- C. Erection Aids:
1. Unless requested by the Contractor and approved by the Engineer in advance, the use of welded attachments as erection aids within the designated areas is prohibited. If erection aids are placed within the designated area in error, or cannot be avoided, the Engineer's approval of the aids placement, use, and the repair method is required.
 2. Air carbon arc gouging is permitted for the removal of welds to within 1/8-inch of the base metal surface. Remove any remaining weld deposits by grinding to a depth 1/16-inch below the surface, faired to adjacent surfaces on a slope not to exceed 1:5.
- D. Air Carbon Arc Cutting and Thermal Cutting: Air carbon arc cutting (CAC-A) and thermal cutting is permitted within the above regions when required for the removal of backing bars and weld tabs, as specified herein. The use of these processes for repairs to or removal of base metal or welds in the above region is permitted only with the prior approval of the Engineer.

3.13 AREA WELDING LIMITATIONS

- A. After welding of continuity plates and doubler plates, test column webs for cracking using liquid penetrant (PT) or magnetic particle testing (MT) over a zone 3-inches above and below the continuity plate or doubler plate welds. Testing may be performed after the weld has cooled to ambient temperature.

3.14 WELD ACCEPTANCE CRITERIA

- A. Engineer's Authority: Repair or replace welds or portions of welds that fail to meet the acceptance criteria of AWS D1.1. The Contractor may request acceptance by the Engineer of a weld discontinuity, without repair or replacement, when it can be determined that the effect of the discontinuity will not be detrimental to the performance of the structure. The Engineer is the final authority for acceptance of such welds.
- B. Magnetic Particle Testing (MT):
1. If a surface discontinuity or near-surface discontinuity, within 1/8-inch of the surface, is detected, the discontinuity shall be rejected and removed. If the separation from the surface cannot be determined, the discontinuity shall be categorized as a surface flaw, rejected and removed.
 2. Identify and record regions of the welds that cannot be inspected; notify the Engineer.
- C. Ultrasonic Testing – Flaw Detection: When ultrasonic testing is required, scan the joint for flaw detection purposes following the procedures prescribed in AWS D1.1, Annex K, with exceptions as noted below.
1. Joints that fail the acceptance criteria described below may be inspected using the Ultrasonic Testing - Flaw Sizing methods as specified herein, or, at the Contractor's option, may be excavated for further investigation and repaired, then reinspected using these Flaw Detection procedures.
 2. When ultrasonic testing is required, scan CJP and PJP groove welds in Seismic Weld Demand Categories A, B and C for flaw detection. Acceptance criteria shall be as for statically loaded welds in Annex K, Table K- 1, of AWS D1.1.
 3. Joints with backing bars remaining in place shall not be rejected on the basis of indication ratings (db values) from the interfaces between backing bar and base metal or backing bar and weld. The UT Procedure shall prescribe methods for distinguishing between backing bar indications and root discontinuities.

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4. PJP groove weld joints shall not be rejected on the basis of indication ratings (db values) from the root area of the weld. Scan notches within the weld, located a distance more than 1/8-inch from the as-welded root, for acceptance using the criteria above.
 5. Identify and record regions of welds that cannot be inspected; notify the Engineer.
 6. Regions of welds adjacent to cope holes may be inspected with multiple probe techniques.
- D. Ultrasonic Testing – Flaw Sizing: Perform ultrasonic testing for flaw sizing following written procedures as required by AWS D1.1, Annex K. When flaw-sizing techniques are implemented, the following acceptance criteria applies to groove welds:
1. If a surface flaw or near-surface flaw (within 1/8-inch of the surface) is detected, the flaw shall be rejected and removed. If the separation from the surface cannot be measured, the flaw shall be categorized as a surface flaw, rejected and removed.
 2. When backing bars remain in place, the position of notch tips that extend into the weld metal shall be determined. The notch shall be rejected if it extends greater than 1/8-inch into the thickness of the weld. The weld present between the backing bar and column face shall not be considered a part of the weld thickness in determining the depth of notch or thickness of weld.
 3. Embedded flaws, defined as those that do not come within 1/8-inch of the surface, shall be rejected if their height exceeds 1/4-inch.
 4. Embedded flaws shall be rejected if their area, as calculated by multiplying the maximum discontinuity height by the maximum discontinuity length, exceeds the thickness of the thinner parent metal multiplied by the thickness of the thicker parent metal.
 5. Embedded flaws, either individually or as a group within a length of weld 12-inches or less, shall be rejected if they exceed a total area (the sum of the areas of individual discontinuities) equal to 10% of the thickness of the thinner parent metal multiplied by the weld length. The weld length used for this calculation shall not exceed 12-inches, with longer welds being evaluated in multiple parts.
 6. Aligned discontinuities of lengths L1 and L2 separated by less than $(L1+L2)/2$ shall be evaluated as continuous.
 7. Parallel discontinuities of heights H1 and H2 separated by less than $(H1+H2)/2$ shall be evaluated as continuous.

3.15 WELDING INSPECTION:

- A. The welder, QC Welding Inspector, and QA Welding Inspector, as appropriate, shall perform the QC and QA tasks indicated in the following list, as amplified by Tables 3.6-1 and 3.6-2. This list shall not be considered exclusive of any additional inspection tasks that may be necessary to meet the requirements of the codes or the Quality Assurance Plan.
1. Review and understand the applicable portions of the specifications, the Contract Documents and the shop drawings for the project.
 2. Verify that all applicable welder qualifications, welding operator qualifications and tack welder qualifications are available, current and accurate.
 3. Require requalification of any welder, welding operator or tack welder who has, for a period of six months, not used the process for which the person was qualified
 4. Verify welder identification and qualification. Verify that any required supplemental welder qualification testing, if required for the joint, has been executed and that the welder has passed.
 5. Verify that each welder has a unique identification mark or die stamp to identify welds.
 6. Verify that all applicable Welding Procedure Specifications (WPSs), with Procedure Qualification Records (PQRs) as needed, are available, current and accurate.

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7. Verify that an approved Welding Procedure Specification (WPS) has been provided and that each welder performing the weld has reviewed the WPS. A copy of the appropriate WPSs shall be available for each joint, although need not be present at each joint location.
 8. Review mill test reports for all main member and designated connection base material for compliance with the project requirements.
 9. Verify base material identification with the approved shop drawings and specifications.
 10. Verify the electrode, flux and shielding gas certifications for compliance with the Contract Documents.
 11. Verify welding consumables with the approved shop drawings and approved WPSs.
 12. Verify that electrodes are used only in the permitted positions and within the welding parameters specified in the WPS.
 13. Verify that electrodes and fluxes are properly stored, and that exposure limits for the welding materials are satisfied.
 14. At suitable intervals, observe joint preparation, assembly practice, preheat temperatures, interpass temperatures, welding techniques, welder performance and any post weld controlled cooling or heat treatment to ensure that the applicable requirements of the WPS and Code are satisfied.
 15. At suitable intervals, verify proper current and voltage of the welding equipment in application of the WPS, if needed, by using a hand held calibrated amp and voltmeter. Current and voltage shall be measured near the arc with this equipment.
 16. Inspect the work to ensure compliance with AWS D1.1 or the specified weld acceptance criteria. Size and contour of welds shall be measured with suitable gauges. A strong light, magnifiers, or other devices as needed may be used to aid visual inspection.
 17. Schedule NDT technicians in a timely manner, after the visual inspection is complete and the assembly has cooled. The final NDT on a specific weld shall not be performed sooner than 24 hours after the welding has been completed. See Section 3.6G3.
 18. Mark the welds, parts, and joints that have been inspected, and accepted, with a distinguishing mark or die stamp, or maintain records indicating the specific welds inspected by each inspector.
 19. Document the accepted and rejected items in a written report. Transmit the report to the designated recipients in a timely manner.
- B. Table 3.6-1 assigns a Process and Visual Inspection Welding Category for each welded joint, depending on the Seismic Weld Demand and Consequence Categories for the joint indicated on the design drawings. Table 3.6-2 indicates the specific actions required of the welder, QC Welding Inspector and QA Welding Inspector for joints of each Process and Visual Inspection Welding Category.

Table 3.6-1 Process and Visual Welding Inspection Categories

Seismic Weld Consequence Category	Seismic Weld Demand Category		
	A	B	C
H	1	1	2
M	1	2	3
L	2	3	3

3.16 NONDESTRUCTIVE TESTING OF WELDED JOINTS

- A. The Quality Assurance Agency shall conduct the following tests at the frequencies designated in the Tables below in accordance with the requirements of AWS D1.1, ASTM standards referenced herein and the provisions of FEMA-353 Appendix F.
1. Magnetic Particle Testing: Conduct for welds classified into Seismic Weld Demand Categories in the design documents at the frequency designated in Table 3.6-3.
 2. Ultrasonic Testing: Conduct for welds classified into Seismic Weld Demand Categories in the design documents for the percentage of joints designated in Table 3.6-3.

Table 3.6-2 Process and Visual Welding Inspection Tasks

Process and Visual Welding Inspection Category:				1				2				3			
Inspection Tasks	Welder	Inspector													
		QC		QA		QC		QA		QC		QA			
		H	O	H	O	H	O	H	O	H	O	H	O		
Inspection Prior to Welding															
Proper WPS selected for joint detail	•	•		•		•			•		•		•		
Proper welding materials selected	•	•		•		•			•		•		•		
WPS settings (voltage, polarity, current, wire feed speed) on welding equipment verified	•	•			••		•		•		•		•		
Shielding gas type (if used) verified	•	•			•		•		•		•		•		
Shielding gas flow rate setting verified	•	•			•		•		•		•		•		
Fit of backing bar (if used) acceptable	•	•			•		•		•		•		•		
Measure root opening	•		•		•		•		•		•		•		
Measure groove angle	•		•		•		•		•		•		•		
Verify above dimensions within joint tolerance and WPS tolerance	•	•			•		•		•		•		•		
Process and Visual Welding Inspection Category:	1	2	3												
		Insp ecto r													
Inspection	W e l d e r	QC	QA	QC	QA	QC	QA								

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Tasks													
		H	O	H	O	H	O	H	O	H	O	H	O
Inspection During Welding													
Mark root edge location on beam flange for UT inspection (if required)	•	•			•		•		•		•		•
Condition of steel surface acceptable	•	•			•		•		•		•		•
Existing tack welds clean and of adequate quality	•	•			•		•		•		•		•
Wind velocity within limits	•		•		•		•		•		•		•
Weld joint surfaces free of discontinuities	•		•		•		•		•		•		•
Minimum preheat required applied and verified	•		••		••		•		•		•		•
Maximum preheat verified	•		••		••		•		•		•		•
Observation of welder's inspection	•		••		•		•		•		•		•
Observation of QC inspection					••		•		•				•
WPS followed (voltage, current, wire feed speed, travel speed, stick out, gas flow rate, pass location)	•		••		••		••		•		•		•
Welding materials exposure control maintained	•		••		••		••		•		•		•
Minimum interpass temperature maintained and verified	•		••		••		••		•		•		•
Maximum interpass temperature verified	•		••		••		••		•		•		•
No detrimental change in environmental conditions	•		•		•		•		•		•		•
Tack welds do not crack during welding	•		•		•		•		•		•		•
Each pass cleaned	•		•		•		•		•		•		•
Each pass within profile limitations	•		•		•		•		•		•		•
Each pass meets quality requirements	•		•		•		•		•		•		•
Proper technique used (electrode angle, stringer beads)	•		•		•		•		•		•		•
NDT in process, when required	•	•		•		•		•		•		•	
Observation of welder's inspection			•		•		•		•		•		•
Observation of QC process					•				•				•

See Legend and Notes at the end of the table.

Table 3.6-2 Process and Visual Welding Inspection Tasks (Continued)

Process and Visual Welding Inspection Category:		1		2		3	
Inspection Tasks	Welder	Inspector					
		QC	QA	QC	QA	QC	QA

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		H	O	H	O	H	O	H	O	H	O	H	O
Inspection After Welding													
Welder identification legible	•	•		•		•		•		•			•
Inspection delay period satisfied		•		•		•		•		•		•	
Weld cleaned	•	•		•		•		•		•		•	
Weld size and length verified	•	•			•	•			•	•			•
Weld within profile limitations	•	•			•	•			•	•			•
Weld appearance indicates thorough fusion	•	•		•		•		•		•			•
Weld craters acceptable	•	•			•	•			•	•			•
Undercut within limitations	•	•		•		•		•		•			•
Porosity within limitations	•	•			•	•			•	•			•
Weld free of cracks	•	•		•		•		•		•			•
Backing bars removed (if required)	•	•		•		•		•		•			•
Weld tabs removed (if required)	•	•		•		•		•		•			•
Surface finish (grind, contour) as required	•	•		•		•		•		•			•
Observation of welder's inspection			•		•	•	•		•		•		•
Observation of QC process					•				•				•
NDT completed		•		•		•		•		•		•	

See Legend and Notes at the end of the table.

Table 3.6-2 Process and Visual Welding Inspection Tasks (Continued)

Notes:

1. The precise level and frequency of observation by either QC or QA is not specified. Inspection frequency shall be adequate to provide reasonable confidence in the control of the welding process and the quality of the completed welds. Consideration shall be made of the consistency achieved in satisfying the required welding parameters, and the effect of the welding parameter upon weld quality and performance.
2. As a minimum, the observation inspection tasks listed shall be performed on a daily basis.
3. Hold point inspections for WPS selection and welding materials need be performed only when changed by the welder.
4. This list shall not be considered exclusive of any additional inspection tasks that may be necessary to meet the requirements of the codes or the Quality Assurance Plan.

B. NDT Delay Periods

1. Final visual inspection may take place immediately upon cooling to ambient temperature. Final nondestructive testing, either MT or UT, may not begin until 24 hours after the completion of welding. If delayed cooling such as insulating blankets or PWHT has been used, the 24-hour delay period shall begin after the steel has reached ambient temperature.
2. At the Contractor's option, Contractor Quality Control NDT may be performed before the delay period has expired, but shall not be used for final acceptance. In-process MT, such as for verifying the removal of cracks and other discontinuities when back gouging or repairing thermal cut surfaces, may be performed immediately upon completion of the welding or back gouging. No cooling period is necessary. Final MT and UT of the joint or repair shall not be

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performed until the 24-hour delay period is met. Final MT of weld tabs may be performed immediately upon completion.

- C. Nondestructive Testing Requirements, General: The NDT technician shall perform the following:
1. All NDT, other than visual, required by the Quality Assurance Plan, Contract Documents and Building Code. Perform NDT in a timely manner, so as not to hinder production, and to detect welding problems soon after occurrence so that corrective measures may be taken by the Contractor to rectify such problems.
 2. Mark the welds, parts, or joints that have been inspected and accepted with a distinguishing mark or die stamp, or maintain records indicating the specific welds inspected.
 3. Document the accepted and rejected items in a written report. Transmit the report to the designated recipients in a timely manner.
- D. Nondestructive Testing of Heavy Sections:
1. Ultrasonically examine Heavy Section column flanges located at welded moment-resisting connections prior to welding, for evidence of laminations, inclusions or other discontinuities in accordance with ASTM A435 or ASTM A898, as applicable.
 - a. Test Zone: 3-inches above and below each beam flange connection.
 - b. For plates, any discontinuity causing a total loss of back reflection that cannot be contained within a circle the diameter of which is 3-inches, or one-half the plate thickness, whichever is greater, shall be rejected.
 - c. For shapes, ASTM 898 Level I criteria is applicable.
 - d. If moment connections are made to the weak axis of a wide flange column, the column web shall be similarly examined to the above criteria.
 2. Lamellar Tearing:
 - a. After joint completion, base metal thicker than 1-1/2-inches, in Seismic Force Resisting System joints where subject to through-thickness shrinkage strains from welding, and where UT is required by Table 3.6-3, shall be ultrasonically tested for discontinuities behind and adjacent to such welds. Any lamellar tearing discontinuities shall be accepted or rejected on the basis of criteria established by the Engineer or designated registered design professional in responsible charge of the work for that specific joint.
 3. Column Splices:
 - a. CJP and PJP groove welded column splices that are a part of the Seismic-Force-Resisting System, and are subject to applied tension under lateral loading, shall be ultrasonically tested as a QA Category BH/T weld. Those splices not subjected to applied tension from lateral loading, need not be ultrasonically tested.

Table 3.6-3 Nondestructive Testing Requirements

Seismic Weld Consequence Category	Seismic Weld Demand Category		
	A	B	C

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	H	<p>CJP MT 100% of joints, full length</p> <p>UT 100% of joints, full length</p> <p>PJP, fillets MT 100% of joints, full length</p>	<p>CJP MT 100% of joints, full length if transversely loaded, partial length if longitudinally loaded</p> <p>UT 100% of joints, full length if transversely loaded, partial length if longitudinally loaded</p> <p>(Reduce UT to 25 % of joints, of length as above, with low reject rate)</p> <p>PJP, fillets MT 25% of joints, full length if transversely loaded, partial length if longitudinally loaded</p>	<p>CJP UT 10% of joints, full length if transversely loaded, partial length if longitudinally loaded</p> <p>PJP, fillets MT 10% of joints, 6" spot at random</p>
	M	<p>CJP MT 100% of joints, full length</p> <p>UT 100% of joints, full length</p> <p>(Reduce UT to 25% of joints, full length, with high acceptance rate)</p> <p>PJP, fillets MT 100% of joints, full length</p>	<p>CJP MT 100% of joints, full length if transversely loaded, partial length if longitudinally loaded</p> <p>UT 100% of joints, full length if transversely loaded, partial length if longitudinally loaded</p> <p>(Reduce UT to 25 % of joints, of length as above, with low reject rate)</p> <p>PJP, fillets MT 25% of joints, full length if transversely loaded, partial length if longitudinally loaded</p>	No NDT required
	L	<p>CJP MT 25% of joints, full length</p> <p>UT 25% of joints, full length</p> <p>PJP, fillets MT 10% of joints, 6" spot at random</p>	<p>CJP UT 10% of joints, full length</p> <p>PJP, fillets MT 10% of joints, 6" spot at random</p>	No NDT required

Notes:

- UT is required only when the weld throat is 5/16" or greater.
- Reduce the rate of UT, where noted, if after 40 welds have been inspected, an individual welder's reject rate is less than 5%.
- Partial length testing is applicable for longitudinally loaded welds when over 24-inches in length. Inspect the beginning and end of each weld for a 6-inch length, plus any location along the length of the weld where a start and restart is visually noted for a distance of 6-inches on either side of the stop/start location, and a 6-inch length for every 10 feet for a given weld.
- For column splices, see Section 3.6G 4 d iv.

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4. Column Webs at Continuity Plates:
 - a. After welding continuity plates, test column webs for cracking using liquid penetrant testing (PT) or magnetic particle testing methods over a 3-inch minimum zone above and below continuity plates.
 5. Column Webs at Doubler Plates:
 - a. Doubler plates that are welded to the column at the intersection of the column web and flange, either on the radius or in the column "k-area", shall have the weld termination areas and adjacent column web inspected using magnetic particle testing or liquid penetrant testing (PT).
 - b. Column doubler plates that are welded only to the column flange need not have the column web inspected using nondestructive testing.
 6. Weld Access Holes:
 - a. Weld access holes shall be inspected using magnetic particle testing or liquid penetrant testing (PT) for base metal cracks and cracks from thermal cutting if the member is a part of the Seismic Force Resisting System framing, regardless of member size, or designated as a Heavy Section.
 - b. If a welded repair has been performed, magnetic particle testing shall be performed in the area immediately adjacent to the welded repair area.
 7. Reduced Beam Section Repairs
 - a. If repairs to the Reduced Beam Section cut surface are performed by welding, the repair weld and immediately adjacent area shall be inspected using magnetic particle testing.
- E. Inspection of shop and field welding shall be in accord with Section 6 of AWS Code and Chapter 17 of California Building Code. The use of liquid penetrant, magnetic particle, radiographic or ultrasonic testing or any other aid to visual inspection will be made by the inspecting agency when such use is considered advisable to assure adequacy of welds. Contractor shall be responsible for cleaning of weld splatter ("dingle berries") where such may interfere with non-destructive testing procedures.
- F. Material required for laboratory tests shall be furnished by Contractor, free of additional charges, FOB the testing laboratory. Fully cooperate with and permit access to the inspection agency for required inspections and tests in shop and field including special access required for non-destructive testing procedures. Provide samples to be cut from otherwise satisfactorily completed work to the testing agency when requested. Owner will pay the costs of removing and replacing such samples.
- G. Owner will engage an independent testing and inspection agency to inspect welded connections and to perform test reports. Selected agency will follow requirements of ASTM E329.
1. Testing agency will conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations thereof.
 2. Materials and work shall be subject to inspection at fabricating plant, and building site. Material or workmanship not complying fully with drawings and specifications will not be accepted. Give Architect reasonable notice when ready for inspection. No additional compensation will be paid for any work required to prepare for testing and inspection.
 3. Testing Agency will inspect all shop and field welding. Welding will be performed under full-time inspection. Agency will furnish inspectors, and comply with regulations of the local Building Code and certify in writing, upon completion of the work, that welding and high strength bolting has been performed in accordance with drawings and specifications.
 4. Testing Agency will check welder qualifications prior to the start of work and verify that all approved welding procedures are being strictly adhered to.

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5. Testing Agency will inspect all full and partial penetration butt welds, which include, but are not limited to, column-to-column, column to plate, column to girder, and girder connections by ultrasonic or other approved non-destructive tests.
 6. Multi-pass shop and field welds will be continuously inspected.
- H. Materials Testing:
1. Identify steel by heat or melt numbers and supply mill analysis test reports.
 2. Use of steel ordered from the mill without further local tests may be permitted, provided an affidavit is given that materials conform to specifications requirements. In case of controversy, tensions and bend tests will be required, performed either locally or at the mill and accordance with requirements for testing local stock.
 3. Local stock structural steel may be used, provided one tension and one bend test is made for each 50 tons, or fractional part thereof, of such stock used in the work. Complete 4-sided surface inspection may be required. Each piece of high-strength local stock steel shall be tested and stamped.
 4. Make arrangements to machine test required specimens under direction of Testing Agency; provide specimens of dimensions required by applicable ASTM Standard Specifications.
- I. Test and Inspection Costs:
1. Cost of testing identified structural steel, except hereunder, will be paid for by the Owner.
 - a. In the event that steel will be fabricated outside the State in which the project is being constructed, pay all transportation costs and per diem living costs for inspection at fabricators' plants outside of the State.
 - b. In the event that fabrication will take place in more than one shop location, pay all additional inspection costs resulting from fabrication.
 2. Contractor shall pay cost of testing and inspection of unidentified steel; costs of tests and inspections for all work and materials proved faulty; and all required retesting and inspection, and repairs.
- J. Ultrasonic Weld Testing: Ultrasonic testing shall be by a specifically trained, qualified technician, who shall operate equipment, examine welds and maintain a record of all welds examined, defects found and disposition of each defect. All defective welds shall be repaired and re-tested with ultrasonic equipment.
1. When ultrasonic indications arising from weld root can be interpreted as either a weld defect or the backing strip, backing strip shall be removed at no additional cost to Owner, and if no root defect is visible the weld shall be re-tested.
 2. Ultrasonic instrumentation shall be calibrated to evaluate quality of welds in accordance with AWS D1.1, Section 6 Part C.
 3. Cooperate with Testing Agency if other methods of inspections, for example, X-ray, gamma ray, magnetic particle, or dye penetrant, are deemed necessary by inspection agency for use on welds.
- K. Inspector Requirements and Procedures:
1. The lead welding inspector shall be a Certified Welding Inspector (CWI) per AWS-QC-1 Standards. Other welding inspectors performing visual inspection under the supervision of the lead welding inspector shall hold an active and appropriate certification. Not more than four non-CWI's shall be under the supervision of a CWI.
 2. All welding shall be inspected visually as required by AWS D1.1.
 3. All complete penetration welds and all partial joint penetration welds at column splices shall be inspected ultrasonically as required by AWS D1.1 after the weld is completed and has cooled down. The inspector and NTD technician shall perform the following tasks for each weld.

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- a. Verify material identification per approved shop drawings and specifications.
- b. Perform a UT lamination check of the column and beam as required by AWS D1.1 or at least within a 6-in radius around the weld in accordance with ASTM A578, Level II.
- c. Verify that an approved welding procedure specification (WPS) has been provided and that the WPS has been reviewed with each welder performing the weld. A copy of the appropriate WPS's shall be at each joint. Welds not executed in conformance with WPS shall be considered rejectable.
- d. Identify welding consumables per approved shop drawings and approved WPS.
- e. Verify welder identification and certification. Verify that required supplemental qualification tests have been passed.
- f. Verify proper amperage and voltage of the welding process by using a hand-held calibrated amp and voltmeter to take required measurements at the arc. (Similar equipment should also be used by the fabricator.)
- g. Visually inspect all required welds in accordance with AWS D1.1. Verify and document the fabrication sequence including the following per approved shop drawings and approved WSP:
 - 1) Fit-up.
 - 2) Preheat and interpass temperatures.
 - 3) Welding machine settings. Voltage shall be determined at the arc and amperage on the cable. Welds executed outside of the parameters contained in the approved WPS shall be considered rejectable.
 - 4) Weld sequence.
 - 5) Weld pass sequence and size weld bead.
 - 6) Peening, if required.
 - 7) Removal of backup and weld (extension) tabs, preparatory grinding and cleaning, and execution or reinforcing fillet weld, as required by the WPS.
 - 8) Application and maintenance of post heat or insulation to completed weld as required by the WPS.
- h. Ultrasonically inspect in accordance with AWS D1.1. Attempt to pass sound through the entire weld volume from two crossing directions where possible. In particular, inspect the beam bottom flange from both "A" and "B" faces. Provide adequate staging to permit safe access by the inspector.

END OF SECTION

SECTION 050524
MECHANICAL ANCHORING AND FASTENING TO CONCETE AND MASONRY

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES:
 - 1. CAST-IN ANCHORS AND FASTENERS:
 - a. ANCHOR BOLTS.
 - b. ANCHOR RODS.
 - 2. POST-INSTALLED STEEL ANCHORS AND FASTENERS:
 - a. CONCRETE ANCHORS.
 - 3. APPURTENANCES FOR ANCHORING AND FASTENING:
 - a. ANCHOR BOLT SLEEVES.
 - b. ISOLATING SLEEVES AND WASHERS.
 - c. THREAD COATING FOR THREADED STAINLESS STEEL FASTENERS.
- B. RELATED SECTIONS:
 - 1. SECTION 013300 - SUBMITTALS.
 - 2. SECTION 014000 - QUALITY REQUIREMENTS.
 - 3. SECTION 014524 - SPECIAL TESTS AND INSPECTIONS.
 - 4. SECTION 018101 - PROJECT DESIGN CRITERIA.
 - 5. SECTION 032117 - ADHESIVE-BONDED REINFORCING BARS AND ALL THREAD RODS.
 - 6. SECTION 036000 - GROUTING.
 - 7. SECTION 040518 - ADHESIVE BONDING REINFORCING BARS AND ALL THREAD RODS IN MASONRY.

1.02 REFERENCES

- A. AMERICAN CONCRETE INSTITUTE (ACI):
 - 1. 355.2 - QUALIFICATION OF POST-INSTALLED MECHANICAL ANCHORS IN CONCRETE & COMMENTARY.
- B. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI):
 - 1. B212.15 - CUTTING TOOLS - CARBIDE-TIPPED MASONRY DRILLS AND BLANKS FOR CARBIDE-TIPPED MASONRY DRILLS.
- C. AMERICAN WELDING SOCIETY (AWS):
 - 1. D1.1 - STRUCTURAL WELDING CODE - STEEL.
 - 2. D1.6 - STRUCTURAL WELDING CODE - STAINLESS STEEL.
- D. ASTM INTERNATIONAL (ASTM):
 - 1. A36 - STANDARD SPECIFICATION FOR CARBON STRUCTURAL STEEL.
 - 2. A53 - STANDARD SPECIFICATION FOR PIPE, STEEL, BLACK AND HOT-DIPPED, ZINC-COATED, WELDED AND SEAMLESS.
 - 3. A108 - STANDARD SPECIFICATION FOR STEEL BARS, CARBON AND ALLOY, COLD FINISHED.

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4. A123 - STANDARD SPECIFICATION FOR ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS.
 5. A153 - STANDARD SPECIFICATION FOR ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE.
 6. A240 - STANDARD SPECIFICATION FOR CHROMIUM AND CHROMIUM NICKEL STAINLESS STEEL PLATE, SHEET, AND STRIP FOR PRESSURE VESSELS AND FOR GENERAL APPLICATIONS.
 7. A308 - STANDARD SPECIFICATION FOR STEEL SHEET, TERNE (LEAD-TIN ALLOY) COATED BY THE HOT-DIP PROCESS.
 8. A496 - STANDARD SPECIFICATION FOR STEEL WIRE, DEFORMED, FOR CONCRETE REINFORCEMENT.
 9. A563 - STANDARD SPECIFICATION FOR CARBON AND ALLOY STEEL NUTS.
 10. B633 - STANDARD SPECIFICATION FOR ELECTRODEPOSITED COATINGS OF ZINC ON IRON AND STEEL.
 11. B695 - STANDARD SPECIFICATION FOR COATINGS OF ZINC MECHANICALLY DEPOSITED ON IRON AND STEEL.
 12. E488 - STANDARD TEST METHODS FOR STRENGTH OF ANCHORS IN CONCRETE ELEMENTS.
 13. F436 - STANDARD SPECIFICATION FOR HARDENED STEEL WASHERS.
 14. F593 - STANDARD SPECIFICATION FOR STAINLESS STEEL BOLTS, HEX CAP SCREWS AND STUDS.
 15. F594 - STANDARD SPECIFICATION FOR STAINLESS STEEL NUTS.
 16. F1554 - STANDARD SPECIFICATION FOR ANCHOR BOLTS, STEEL, 36, 55 AND 105-KSI YIELD STRENGTH.
 17. F2329 - STANDARD SPECIFICATION FOR ZINC COATING, HOT-DIP, REQUIREMENTS FOR APPLICATION TO CARBON AND ALLOY STEEL BOLTS, SCREWS, WASHERS, NUTS, AND SPECIAL THREADED FASTENERS.
- E. INTERNATIONAL CODE COUNCIL EVALUATION SERVICE, INC. (ICC-ES):
1. AC01 - ACCEPTANCE CRITERIA FOR EXPANSION ANCHORS IN MASONRY ELEMENTS.
 2. AC193 - ACCEPTANCE CRITERIA FOR MECHANICAL ANCHORS IN CONCRETE ELEMENTS.

1.03 DEFINITIONS

- A. BUILT-IN ANCHOR: HEADED BOLT OR ASSEMBLY INSTALLED IN POSITION BEFORE FILLING SURROUNDING MASONRY UNITS WITH GROUT.
- B. CAST-IN ANCHOR: HEADED BOLT OR ASSEMBLY INSTALLED IN POSITION BEFORE PLACING PLASTIC CONCRETE AROUND.
- C. OVERHEAD INSTALLATIONS: FASTENERS INSTALLED ON OVERHEAD SURFACES WHERE THE LONGITUDINAL AXIS OF THE FASTENER IS MORE THAN 60 DEGREES ABOVE A HORIZONTAL LINE SO THAT THE FASTENER RESISTS SUSTAINED TENSION LOADS.
- D. PASSIVATION: CHEMICAL TREATMENT OF STAINLESS STEEL WITH A MILD OXIDANT FOR THE PURPOSE OF ENHANCING THE SPONTANEOUS FORMATION OF THE STEEL'S PROTECTIVE PASSIVE FILM.
- E. POST-INSTALLED ANCHOR: FASTENER OR ASSEMBLY INSTALLED IN HARDENED CONCRETE OR FINISHED MASONRY CONSTRUCTION, TYPICALLY BY DRILLING INTO THE STRUCTURE AND INSERTING A STEEL ANCHOR ASSEMBLY.
- F. TERMS RELATING TO STRUCTURES OR BUILDING ENVIRONMENTS AS USED WITH REFERENCE TO ANCHORS AND FASTENERS:
 1. CORROSIVE LOCATIONS: DESCRIBES INTERIOR AND EXTERIOR LOCATIONS AS FOLLOWS:

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- a. LOCATIONS USED FOR DELIVERY, STORAGE, TRANSFER, OR CONTAINMENT (INCLUDING SPILL CONTAINMENT) OF CHEMICALS USED FOR PLANT TREATMENT PROCESSES.
- b. EXTERIOR AND INTERIOR LOCATIONS AT THE FOLLOWING TREATMENT STRUCTURES:
 - 1) WATER STORAGE FACILITIES:
 - a) WATER STORAGE TANKS.
2. WET AND MOIST LOCATIONS: DESCRIBES LOCATIONS, OTHER THAN "CORROSIVE LOCATIONS," THAT ARE SUBMERGED, ARE IMMEDIATELY ABOVE LIQUID CONTAINMENT STRUCTURES, OR ARE SUBJECT TO FREQUENT WETTING, SPLASHING, OR WASH DOWN. INCLUDES:
 - a. EXTERIOR PORTIONS OF BUILDINGS AND STRUCTURES.
 - b. LIQUID-CONTAINING STRUCTURES:
 - 1) LOCATIONS AT AND BELOW THE MAXIMUM OPERATING LIQUID SURFACE ELEVATION.
 - 2) LOCATIONS ABOVE THE MAXIMUM OPERATING LIQUID SURFACE ELEVATION AND:
 - a) BELOW THE TOP OF THE WALLS CONTAINING THE LIQUID.
 - b) AT THE INSIDE FACES AND UNDERSIDE SURFACES OF A STRUCTURE ENCLOSING OR SPANNING OVER THE LIQUID (INCLUDING WALLS, ROOFS, SLABS, BEAMS, OR WALKWAYS ENCLOSING THE OPEN TOP OF THE STRUCTURE).
 - c. LIQUID HANDLING EQUIPMENT:
 - 1) BASES OF PUMPS AND OTHER EQUIPMENT THAT HANDLES LIQUIDS.
 - d. INDOOR LOCATIONS EXPOSED TO MOISTURE, SPLASHING, OR ROUTINE WASH DOWN DURING NORMAL OPERATIONS, INCLUDING FLOORS WITH SLOPES TOWARD DRAINS OR GUTTERS.
 - e. OTHER LOCATIONS INDICATED ON THE DRAWINGS.
3. OTHER LOCATIONS:
 - a. INTERIOR DRY AREAS WHERE THE SURFACES ARE NOT EXPOSED TO MOISTURE OR HUMIDITY IN EXCESS OF TYPICAL LOCAL ENVIRONMENTAL CONDITIONS.

1.04 SUBMITTALS

- A. GENERAL:
 1. SUBMIT AS SPECIFIED IN SECTION 013300.
 2. SUBMIT INFORMATION LISTED FOR EACH TYPE OF ANCHOR OR FASTENER TO BE USED.
- B. ACTION SUBMITTALS:
 1. PRODUCT DATA:
 - a. CAST-IN ANCHORS:
 - 1) MANUFACTURER'S DATA INCLUDING CATALOG CUTS SHOWING ANCHOR SIZES AND CONFIGURATION, MATERIALS, AND FINISHES.
 - b. POST-INSTALLED ANCHORS:
 - 1) FOR EACH ANCHOR TYPE, MANUFACTURER'S DATA INCLUDING CATALOG CUTS SHOWING ANCHOR SIZES AND CONSTRUCTION, MATERIALS AND FINISHES, AND LOAD RATINGS.
 2. SAMPLES:
 - a. SAMPLES OF EACH TYPE OF ANCHOR, INCLUDING REPRESENTATIVE DIAMETERS AND LENGTHS, IF REQUESTED BY THE ENGINEER.
 3. CERTIFICATES:
 - a. CAST-IN ANCHORS:

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- 1) MILL CERTIFICATES FOR STEEL ANCHORS THAT WILL BE SUPPLIED TO THE SITE.
- b. POST-INSTALLED ANCHORS:
 - 1) MANUFACTURER'S STATEMENT OR CERTIFIED TEST REPORTS DEMONSTRATING THAT ANCHORS THAT WILL BE SUPPLIED TO THE SITE COMPLY WITH THE MATERIALS PROPERTIES SPECIFIED.
4. TEST REPORTS:
 - a. POST-INSTALLED ANCHORS: FOR EACH ANCHOR TYPE USED FOR THE WORK:
 - 1) CURRENT ICC-ES REPORT (ESR) DEMONSTRATING:
 - a) ACCEPTANCE OF THAT ANCHOR FOR USE UNDER THE 2022 CALIFORNIA BUILDING CODE.
 - b) THAT TESTING OF THE CONCRETE ANCHOR INCLUDED THE SIMULATED SEISMIC TENSION AND SHEAR TESTS OF AC193, AND THAT THE ANCHOR IS ACCEPTED FOR USE IN SEISMIC DESIGN CATEGORIES C, D, E, OR F AND WITH CRACKED CONCRETE.
 - b. CONCRETE ANCHOR PRE-INSTALLATION TEST REPORT.
5. MANUFACTURER'S INSTRUCTIONS:
 - a. REQUIREMENTS FOR STORAGE AND HANDLING.
 - b. RECOMMENDED INSTALLATION PROCEDURES INCLUDING DETAILS ON DRILLING, HOLE SIZE (DIAMETER AND DEPTH), HOLE CLEANING AND PREPARATION PROCEDURES, ANCHOR INSERTION, AND ANCHOR TIGHTENING.
 - c. REQUIREMENTS FOR INSPECTION OR OBSERVATION DURING INSTALLATION.
6. QUALIFICATION STATEMENTS:
 - a. POST-INSTALLED ANCHORS: INSTALLER QUALIFICATIONS:
 - 1) SUBMIT LIST OF PERSONNEL PERFORMING INSTALLATIONS AND INCLUDE DATE OF MANUFACTURER'S TRAINING FOR EACH.

1.05 QUALITY ASSURANCE

- A. QUALIFICATIONS:
 1. POST INSTALLED ANCHORS SHALL BE IN ACCORDANCE WITH THE 2022 CALIFORNIA BUILDING CODE.
 2. INSTALLERS: POST-INSTALLED MECHANICAL ANCHORS:
 - a. INSTALLATIONS SHALL BE PERFORMED BY TRAINED INSTALLERS HAVING AT LEAST 3 YEARS OF EXPERIENCE PERFORMING SIMILAR INSTALLATIONS WITH SIMILAR TYPES OF ANCHORS.
- B. SPECIAL INSPECTION:
 1. PROVIDE SPECIAL INSPECTION OF POST-INSTALLED ANCHORS AS SPECIFIED IN SECTION 014524 AND THIS SECTION.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. DELIVER POST-INSTALLED ANCHORS IN MANUFACTURER'S STANDARD PACKAGING WITH LABELS VISIBLE AND INTACT. INCLUDE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- B. HANDLE AND STORE ANCHORS AND FASTENERS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED TO PREVENT DAMAGE.
- C. PROTECT ANCHORS FROM WEATHER AND MOISTURE UNTIL INSTALLATION.

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1.07 PROJECT CONDITIONS

- A. AS SPECIFIED IN SECTION 018101.
- B. SEISMIC DESIGN CATEGORY (SDC) FOR STRUCTURES IS INDICATED ON THE DRAWINGS

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. GENERAL:
 - 1. FURNISH THREADED FASTENERS WITH FLAT WASHERS AND HEX NUTS FABRICATED FROM MATERIALS CORRESPONDING TO THE MATERIAL USED FOR THREADED PORTION OF THE ANCHOR.
 - a. CAST-IN ANCHORS: PROVIDE FLAT WASHERS AND NUTS AS LISTED IN THE ASTM STANDARD FOR THE ANCHOR MATERIALS SPECIFIED.
 - b. POST-INSTALLED ANCHORS: PROVIDE FLAT WASHERS AND NUTS SUPPLIED FOR THAT PRODUCT BY THE MANUFACTURER OF EACH ANCHOR.
 - 2. SIZE OF ANCHORS AND FASTENERS, INCLUDING DIAMETER AND LENGTH OR MINIMUM EFFECTIVE EMBEDMENT DEPTH: AS INDICATED ON THE DRAWINGS OR AS SPECIFIED IN THIS SECTION. IN THE EVENT OF CONFLICTS, CONTACT ENGINEER FOR CLARIFICATION.
 - 3. WHERE ANCHORS AND CONNECTIONS ARE NOT SPECIFICALLY INDICATED ON THE DRAWINGS OR SPECIFIED, THEIR MATERIAL, SIZE AND FORM SHALL BE EQUIVALENT IN QUALITY AND WORKMANSHIP TO ITEMS SPECIFIED.
- B. MATERIALS:
 - 1. PROVIDE AND INSTALL ANCHORS OF MATERIALS AS IN THIS SECTION.

2.02 CAST-IN ANCHORS AND FASTENERS

- A. ANCHOR BOLTS:
 - 1. DESCRIPTION:
 - a. STRAIGHT STEEL ROD HAVING ONE END WITH AN INTEGRALLY FORGED HEAD, AND ONE THREADED END. EMBEDDED INTO CONCRETE WITH THE HEADED END CAST INTO CONCRETE AT THE EFFECTIVE EMBEDMENT DEPTH INDICATED ON THE DRAWINGS OR SPECIFIED, AND WITH THE THREADED END LEFT TO PROJECT CLEAR OF CONCRETE FACE AS REQUIRED FOR THE CONNECTION TO BE MADE.
 - b. FURNISH ANCHOR BOLTS WITH HEAVY HEX FORGED HEAD OR EQUIVALENT ACCEPTABLE TO ENGINEER.
 - 1) RODS OR BARS WITH ANGLE BEND FOR EMBEDMENT IN CONCRETE (I.E., "L" OR "J" SHAPED ANCHOR BOLTS) ARE NOT PERMITTED IN THE WORK.
 - 2. MATERIALS:
 - a. SHIP ANCHOR BOLTS WITH PROPERLY FITTING NUTS ATTACHED.
 - b. TYPE 316 STAINLESS STEEL:
 - 1) SURFACES DESCALED, PICKLED, AND PASSIVATED IN ACCORDANCE WITH ASTM A308.
 - 2) BOLTS: ASTM F593, GROUP 2, CONDITION CW, COARSE THREADS.
 - 3) NUTS: ASTM F594. MATCH ALLOY (GROUP AND UNS DESIGNATION) AND THREADS OF BOLTS.
 - 4) WASHERS: TYPE 316 STAINLESS STEEL.

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- c. TYPE 304 STAINLESS STEEL:
 - 1) SURFACES DESCALED, PICKLED, AND PASSIVATED IN ACCORDANCE WITH ASTM A308.
 - 2) BOLTS: ASTM F593, GROUP 1, CONDITION CW, COARSE THREADS.
 - 3) NUTS: ASTM F594. MATCH ALLOY (GROUP AND UNS DESIGNATION) AND THREADS OF BOLTS.
 - 4) WASHERS: TYPE 304 STAINLESS STEEL.
 - d. GALVANIZED STEEL:
 - 1) HOT-DIP GALVANIZED COATING IN ACCORDANCE WITH ASTM F2329.
 - 2) BOLT: ASTM F1554, GRADE 36, HEAVY HEX, COARSE THREAD.
 - 3) NUTS: ASTM A563, GRADE A, HEAVY HEX, THREADS TO MATCH BOLT.
 - 4) WASHERS: ASTM F436, TYPE 1.
- B. ANCHOR RODS:
- 1. DESCRIPTION: STRAIGHT STEEL ROD HAVING THREADS ON EACH END OR CONTINUOUSLY THREADED FROM END TO END. ONE THREADED END IS FITTED WITH NUTS OR PLATES AND EMBEDDED IN CONCRETE TO THE EFFECTIVE DEPTH INDICATED ON THE DRAWINGS, LEAVING THE OPPOSITE THREADED END TO PROJECT CLEAR OF THE CONCRETE FACE AS REQUIRED FOR THE CONNECTION TO BE MADE AT THAT LOCATION.
 - 2. MATERIALS:
 - a. STAINLESS STEEL: TYPE 316:
 - 1) SURFACES DESCALED, PICKLED, AND PASSIVATED IN ACCORDANCE WITH ASTM A308.
 - 2) ROD: ASTM F593, GROUP 2, CONDITION CW, COARSE THREADS.
 - 3) NUTS: ASTM F594. MATCH ALLOY (GROUP AND UNS DESIGNATION) AND THREADS OF RODS.
 - 4) WASHERS: TYPE 316 STAINLESS STEEL.
 - 5) PLATES (EMBEDDED): ASTM A240.
 - b. STAINLESS STEEL: TYPE 304:
 - 1) SURFACES DESCALED, PICKLED, AND PASSIVATED IN ACCORDANCE WITH ASTM A308.
 - 2) ROD: ASTM F593, GROUP 1, CONDITION CW, COARSE THREADS.
 - 3) NUTS: ASTM F594. MATCH ALLOY (GROUP AND UNS DESIGNATION) AND THREADS OR RODS.
 - 4) WASHERS: TYPE 304 STAINLESS STEEL.
 - 5) PLATES (EMBEDDED): ASTM A240.
 - c. GALVANIZED: STEEL:
 - 1) HOT-DIP GALVANIZED WITH COATING IN ACCORDANCE WITH ASTM F2329.
 - 2) ROD: ASTM F1554, GRADE 36, COARSE THREAD.
 - 3) NUTS: ASTM A563, GRADE A, THREADS TO MATCH ROD.
 - 4) WASHERS: ASTM F436, TYPE 1.
 - 5) PLATES (EMBEDDED): ASTM A36.

2.03 POST-INSTALLED ANCHORS AND FASTENERS - ADHESIVE

- A. EPOXY BONDING OF REINFORCING BARS, ALL THREAD RODS, AND THREADED INSERTS IN CONCRETE: AS SPECIFIED IN SECTION 032117.
- B. EPOXY BONDING OF REINFORCING BARS, ALL THREAD RODS, AND THREADED INSERTS IN MASONRY: AS SPECIFIED IN SECTION 040518.

2.04 POST-INSTALLED ANCHORS AND FASTENERS - MECHANICAL

- A. GENERAL:
 - 1. POST-INSTALLED ANCHORS USED FOR THE WORK SHALL HOLD A CURRENT ICC EVALUATION SERVICE REPORT DEMONSTRATING ACCEPTANCE FOR USE UNDER THE 2022 CALIFORNIA BUILDING CODE.
 - a. CONDITIONS OF USE: THE ACCEPTANCE REPORT SHALL INDICATE ACCEPTANCE OF THE PRODUCT FOR USE UNDER THE FOLLOWING CONDITIONS:
 - 1) IN REGIONS OF CONCRETE WHERE CRACKING HAS OCCURRED OR MAY OCCUR.
 - 2) TO RESIST SHORT-TERM LOADS DUE TO WIND FORCES.
 - 3) TO RESIST SHORT-TERM LOADING DUE TO SEISMIC FORCES FOR THE SEISMIC DESIGN CATEGORY OF THE STRUCTURE WHERE THE PRODUCT WILL BE USED.
 - 2. SUBSTITUTIONS: WHEN REQUESTING PRODUCT SUBSTITUTIONS, SUBMIT CALCULATIONS, INDICATING THE DIAMETER, EFFECTIVE EMBEDMENT DEPTH AND SPACING OF THE PROPOSED ANCHORS, AND DEMONSTRATING THAT THE SUBSTITUTED PRODUCT WILL PROVIDE LOAD RESISTANCE THAT IS EQUAL TO OR GREATER THAN THAT PROVIDED BY THE ANCHORS LISTED IN THIS SECTION.
 - a. CALCULATIONS SHALL BE PREPARED BY AND SHALL BEAR THE SIGNATURE AND SEAL OF A CIVIL OR STRUCTURAL ENGINEER LICENSED IN THE STATE OF CALIFORNIA.
 - b. DECISIONS REGARDING THE ACCEPTABILITY OF PROPOSED SUBSTITUTIONS SHALL BE AT THE DISCRETION OF THE ENGINEER.
- B. CONCRETE ANCHORS:
 - 1. DESCRIPTION. POST-INSTALLED ANCHOR ASSEMBLY CONSISTING OF A THREADED STUD AND A SURROUNDING WEDGE EXPANSION SLEEVE THAT IS FORCED OUTWARD BY TORQUEING THE CENTER STUD TO TRANSFER LOADS FROM THE STUD TO THE CONCRETE THROUGH BEARING, FRICTION, OR BOTH. (SOMETIMES REFERRED TO AS "EXPANSION ANCHORS" OR "WEDGE ANCHORS.")
 - a. DO NOT USE SLUG-IN, LEAD CINCH, AND SIMILAR SYSTEMS RELYING ON DEFORMATION OF LEAD ALLOY OR SIMILAR MATERIALS TO DEVELOP HOLDING POWER.
 - 2. CONCRETE ANCHORS FOR ANCHORAGE TO CONCRETE:
 - a. ACCEPTANCE CRITERIA:
 - 1) CONCRETE ANCHORS SHALL HAVE A CURRENT ICC-ES REPORT DEMONSTRATING THAT THE ANCHORS HAVE BEEN TESTED AND QUALIFIED FOR PERFORMANCE IN BOTH CRACKED AND UN-CRACKED CONCRETE, AND FOR SHORT-TERM LOADING DUE TO WIND AND SEISMIC FORCES FOR SEISMIC DESIGN CATEGORIES A THROUGH F IN ACCORDANCE WITH ACI 355.2 AND WITH ICC-ES AC193 (INCLUDING ALL MANDATORY TESTS AND OPTIONAL TESTS FOR SEISMIC TENSION AND SHEAR IN CRACKED CONCRETE).
 - 2) CONCRETE ANCHOR PERFORMANCE IN THE CURRENT ICC-ES REPORT SHALL BE "CATEGORY 1" AS DEFINED IN ACI 355.2.

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- b. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - 1) HILTI: KWIK BOLT TZ2 EXPANSION ANCHOR.
 - 2) POWERS FASTENERS: POWERSTUD+ SD2.
 - 3) SIMPSON STRONG-TIE: TITEN HD ANCHOR.
 - c. MATERIALS. INTEGRALLY THREADED STUD, WEDGE, WASHER, AND NUT:
 - 1) STAINLESS STEEL: TYPE 316.
 - a) TYPE 304 STAINLESS STEEL ACCEPTABLE FOR USE AT WET AND MOIST LOCATIONS WHEN ACCEPTED IN WRITING BY THE ENGINEER.
 - 2) GALVANIZED: CARBON STEEL, ZINC PLATED IN ACCORDANCE WITH ASTM B633, MINIMUM 5 MICRONS (FE/ZN 5).
3. CONCRETE ANCHORS FOR ANCHORAGE TO CONCRETE MASONRY (FULLY GROUTED CELLS):
- a. ACCEPTANCE CRITERIA: CONCRETE ANCHORS SHALL HAVE A CURRENT ICC-ES REPORT DEMONSTRATING THAT THE ANCHORS HAVE BEEN TESTED AND QUALIFIED IN ACCORDANCE WITH ICC-ES AC01, INCLUDING ALL MANDATORY TESTS AND OPTIONAL SEISMIC TESTS.
 - b. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - 1) HILTI: KWIK BOLT TZ2 EXPANSION ANCHOR.
 - 2) POWERS FASTENERS: POWER-STUD+ SD1.
 - 3) SIMPSON STRONG-TIE: WEDGE-ALL ANCHOR.
 - c. MATERIALS. INTEGRALLY THREADED STUD, WEDGE, WASHER, AND NUT:
 - 1) STAINLESS STEEL: TYPE 316.
 - a) TYPE 304 STAINLESS STEEL ACCEPTABLE FOR USE AT WET AND MOIST LOCATIONS WHEN ACCEPTED IN WRITING BY THE ENGINEER.
 - 2) GALVANIZED: CARBON STEEL, ZINC PLATED IN ACCORDANCE WITH ASTM B633, MINIMUM 5 MICRONS (FE/ZN 5) OR MECHANICALLY GALVANIZED IN ACCORDANCE WITH ASTM B695, CLASS 55, TYPE 1.
- C. FLUSH SHELLS:
- 1. DESCRIPTION: POST-INSTALLED ANCHOR ASSEMBLY CONSISTING OF AN INTERNALLY THREADED MANDREL THAT IS FORCED INTO A PRE-DRILLED CONCRETE HOLE WITH A SETTING TOOL UNTIL THE TOP OF THE ANCHOR IS FLUSH WITH THE FACE OF THE CONCRETE. ONCE INSTALLED, A REMOVABLE THREADED BOLT IS INSTALLED IN THE MANDREL.
 - 2. FLUSH SHELL ANCHORS ARE NOT PERMITTED IN THE WORK.

2.05 APPURTENANCES FOR ANCHORING AND FASTENING

- A. ANCHOR BOLT SLEEVES:
- 1. HAVING INSIDE DIAMETER APPROXIMATELY 2 INCHES GREATER THAN BOLT DIAMETER AND MINIMUM 10-BOLT DIAMETERS LONG.
 - 2. PLASTIC SLEEVES:
 - a. HIGH-DENSITY POLYETHYLENE, CORRUGATED SLEEVE, THREADED TO PROVIDE ADJUSTMENT OF LOCATION ON THE ANCHOR BOLT.
 - 3. FABRICATED STEEL SLEEVES:
 - a. FABRICATE TO THE FOLLOWING DIMENSIONS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
 - 1) INSIDE DIAMETER: AT LEAST 2 INCHES GREATER THAN BOLT DIAMETER.

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- 2) INSIDE LENGTH: NOT LESS THAN 10 BOLT DIAMETERS.
- 3) BOTTOM PLATE:
 - a) SQUARE PLATE WITH DIMENSIONS EQUAL TO THE OUTSIDE DIAMETER OF THE SLEEVE PLUS 1/2 INCH EACH SIDE.
 - b) THICKNESS EQUAL TO OR GREATER THAN ONE-HALF OF THE ANCHOR BOLT DIAMETER.
- b. CARBON STEEL ANCHOR BOLTS:
 - 1) FABRICATED FROM ASTM A 36 PLATE AND ASTM A 53, GRADE B PIPE.
 - 2) WELDED CONNECTIONS: CONFORM TO REQUIREMENTS OF AWS D1.1.
 - 3) HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A 153.
- c. STAINLESS STEEL ANCHOR BOLTS:
 - 1) FABRICATED FROM ASTM A 240 PLATE AND PIPE. TYPE 304L OR TYPE 316L TO MATCH TYPE OF THE ANCHOR BOLT.
 - 2) WELDED CONNECTIONS: IN ACCORDANCE WITH AWS D1.6.
- B. ISOLATING SLEEVES AND WASHERS:
 - 1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. CENTRAL PLASTICS COMPANY, SHAWNEE, OKLAHOMA.
 - b. CORROSION CONTROL PRODUCTS, PSI INC., GARDENA, CA.
 - 2. SLEEVES: MYLAR, 1/32-INCH THICK, 4,000 VOLTS PER MIL DIELECTRIC STRENGTH, OF PROPER SIZE TO FIT BOLTS AND EXTENDING HALF WAY INTO BOTH STEEL WASHERS.
 - 3. ONE SLEEVE REQUIRED FOR EACH BOLT.
 - 4. WASHERS: THE INSIDE DIAMETER OF ALL WASHERS SHALL FIT OVER THE ISOLATING SLEEVE, AND BOTH THE STEEL AND ISOLATING WASHERS SHALL HAVE THE SAME INSIDE DIAMETER AND OUTSIDE DIAMETER.
 - a. PROPER SIZE TO FIT BOLTS.
 - b. TWO 1/8-INCH THICK STEEL WASHERS FOR EACH BOLT.
 - c. G3 PHENOLIC: 2 INSULATING WASHERS ARE REQUIRED FOR EACH BOLT:
 - 1) THICKNESS: 1/8 INCH.
 - 2) BASE MATERIAL: GLASS.
 - 3) RESIN: PHENOLIC.
 - 4) WATER ABSORPTION: 2 PERCENT.
 - 5) HARDNESS (ROCKWELL): 100.
 - 6) DIELECTRIC STRENGTH: 450 VOLTS PER MIL.
 - 7) COMPRESSION STRENGTH: 50,000 POUNDS PER SQUARE INCH.
 - 8) TENSILE STRENGTH: 20,000 POUNDS PER SQUARE INCH.
 - 9) MAXIMUM OPERATING TEMPERATURE: 350 DEGREES FAHRENHEIT.
- C. COATING FOR REPAIR OF GALVANIZED SURFACES:
 - 1. MANUFACTURERS: ONE OF THE FOLLOWING OR APPROVED EQUAL:
 - a. GALVINOX.
 - b. GALVO-WELD.
- D. THREAD COATING: FOR USE WITH THREADED STAINLESS STEEL FASTENERS:

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1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. NEVER SEEZ COMPOUND CORPORATION, NEVER-SEEZ.
 - b. OIL RESEARCH, INC., WLR NO. 111

PART 3 EXECUTION

3.01 EXAMINATION

- A. EXAMINE WORK IN PLACE TO VERIFY THAT IT IS SATISFACTORY TO RECEIVE THE WORK OF THIS SECTION. IF UNSATISFACTORY CONDITIONS EXIST, DO NOT BEGIN THIS WORK UNTIL SUCH CONDITIONS HAVE BEEN CORRECTED.

3.02 INSTALLATION: GENERAL

- A. WHERE ANCHORS AND FASTENERS ARE NOT SPECIFICALLY INDICATED ON THE DRAWINGS OR SPECIFIED, MAKE ATTACHMENTS WITH MATERIALS SPECIFIED IN THIS SECTION.
- B. SUBSTITUTION OF ANCHOR TYPES:
 1. POST-INSTALLED ANCHORS MAY NOT BE USED AS AN ALTERNATIVE TO CAST-IN/BUILT-IN ANCHORS AT LOCATIONS WHERE THE LATTER ARE INDICATED ON THE DRAWINGS.
 2. CAST-IN/BUILT-IN ANCHORS MAY BE USED AS AN ALTERNATIVE TO POST-INSTALLED MECHANICAL ANCHORS AT LOCATIONS WHERE THE LATTER ARE INDICATED ON THE DRAWINGS.
- C. PROTECT PRODUCTS FROM DAMAGE DURING INSTALLATION. TAKE SPECIAL CARE TO PROTECT THREADS AND THREADED ENDS.
- D. ACCURATELY LOCATE AND POSITION ANCHORS AND FASTENERS:
 1. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, INSTALL ANCHORS PERPENDICULAR TO THE SURFACES FROM WHICH THEY PROJECT.
 2. INSTALL ANCHORS SO THAT AT LEAST 2 THREADS, BUT NOT MORE THAN 1/2 INCH OF THREADED ROD, PROJECTS PAST THE TOP NUT.
- E. INTERFACE WITH OTHER PRODUCTS:
 1. WHERE STEEL ANCHORS COME IN CONTACT WITH DISSIMILAR METALS (ALUMINUM, STAINLESS STEEL, ETC.), USE STAINLESS STEEL ANCHORS AND SEPARATE OR ISOLATE DISSIMILAR METALS USING ISOLATING SLEEVES AND WASHERS.
 2. PRIOR TO INSTALLING NUTS, COAT THREADS OF STAINLESS STEEL FASTENERS WITH THREAD COATING TO PREVENT GALLING OF THREADS.

3.03 INSTALLATION: CAST-IN ANCHORS

- A. GENERAL:
 1. ACCURATELY LOCATE CAST-IN AND BUILT-IN ANCHORS.
 - a. PROVIDE ANCHOR SETTING TEMPLATES TO LOCATE ANCHOR BOLTS AND ANCHOR RODS. SECURE TEMPLATES TO FORMWORK.
 - b. BRACE OR TIE OFF EMBEDMENTS AS NECESSARY TO PREVENT DISPLACEMENT DURING PLACEMENT OF PLASTIC CONCRETE OR OF SURROUNDING MASONRY CONSTRUCTION.
 - c. POSITION AND TIE CAST-IN AND BUILT-IN ANCHORS IN PLACE BEFORE BEGINNING PLACEMENT OF CONCRETE OR GROUT. DO NOT "STAB" ANCHORS INTO PLASTIC CONCRETE, MORTAR, OR GROUT.
 - d. DO NOT ALLOW CAST-IN ANCHORS TO TOUCH REINFORCING STEEL. WHERE CAST-IN ANCHORS ARE WITHIN 1/4 INCH OF REINFORCING STEEL, ISOLATE THE METALS BY

WRAPPING THE ANCHORS WITH A MINIMUM OF 4 WRAPS OF 10-MIL POLYVINYL CHLORIDE TAPE IN AREA ADJACENT TO REINFORCING STEEL.

2. FOR ANCHORING AT MACHINERY BASES SUBJECT TO VIBRATION, USE 2 NUTS, WITH 1 SERVING AS A LOCKNUT.
 3. WHERE ANCHOR BOLTS OR ANCHOR RODS ARE INDICATED ON THE DRAWINGS AS BEING FOR FUTURE USE, THOROUGHLY COAT EXPOSED SURFACES THAT PROJECT FROM CONCRETE OR MASONRY WITH NON-OXIDIZING WAX. TURN NUTS DOWN FULL LENGTH OF THE THREADS, AND NEATLY WRAP THE EXPOSED THREAD AND NUT WITH A MINIMUM OF 4 WRAPS OF 10-MIL WATERPROOF POLYVINYL TAPE.
- B. ANCHOR BOLTS:
1. MINIMUM EFFECTIVE EMBEDMENT: 10-BOLT DIAMETERS, UNLESS A LONGER EMBEDMENT IS INDICATED ON THE DRAWINGS.
 2. WHERE INDICATED ON THE DRAWINGS, SET ANCHOR BOLTS IN PLASTIC, GALVANIZED STEEL OR STAINLESS STEEL SLEEVES TO ALLOW FOR ADJUSTMENT. FILL SLEEVES WITH GROUT WHEN A MACHINE OR OTHER EQUIPMENT IS GROUTED IN PLACE.
- C. ANCHOR RODS:
1. INSTALL AS SPECIFIED FOR ANCHOR BOLTS.

3.04 INSTALLATION: POST-INSTALLED ADHESIVE ANCHORS

- A. EPOXY AND ACRYLIC ADHESIVE BONDING OF REINFORCING BARS, ALL THREAD RODS, AND INTERNALLY THREADED INSERTS IN CONCRETE: AS SPECIFIED IN SECTION 032117.
- B. EPOXY AND ACRYLIC ADHESIVE BONDING OF REINFORCING BARS, ALL THREAD RODS, AND INTERNALLY THREADED INSERTS IN MASONRY: AS SPECIFIED IN SECTION 040518.

3.05 INSTALLATION: POST-INSTALLED MECHANICAL ANCHORS

- A. GENERAL:
1. INSTALL ANCHORS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS, ACI 355.2, THE ANCHOR'S ICC-ES REPORT. WHERE CONFLICT EXISTS BETWEEN THE ICC-ES REPORT AND THE REQUIREMENTS IN THIS SECTION, THE REQUIREMENTS OF THE ICC-ES REPORT SHALL CONTROL.
 2. WHERE ANCHOR MANUFACTURER RECOMMENDS THE USE OF SPECIAL TOOLS AND/OR SPECIFIC DRILL BITS FOR INSTALLATION, PROVIDE AND USE SUCH TOOLS.
 3. AFTER ANCHORS HAVE BEEN POSITIONED AND INSERTED INTO CONCRETE OR MASONRY, DO NOT:
 - a. REMOVE AND REUSE/REINSTALL ANCHORS.
 - b. LOOSEN OR REMOVE BOLTS OR STUDS.
- B. HOLES DRILLED INTO CONCRETE AND MASONRY:
1. DO NOT DRILL HOLES IN CONCRETE OR MASONRY UNTIL THE MATERIAL HAS ACHIEVED ITS MINIMUM SPECIFIED COMPRESSION STRENGTH (F'C OR F'M).
 2. ACCURATELY LOCATE HOLES:
 - a. BEFORE DRILLING HOLES, USE A REINFORCING BAR LOCATOR TO IDENTIFY THE POSITION OF ALL REINFORCING STEEL, CONDUIT, AND OTHER EMBEDDED ITEMS WITHIN A 6-INCH RADIUS OF EACH PROPOSED HOLE.
 - b. IF THE HOLE DEPTH EXCEEDS THE RANGE OF DETECTION FOR THE REBAR LOCATOR, THE ENGINEER MAY REQUIRE RADIOGRAPHS OF THE AREA DESIGNATED FOR INVESTIGATION

BEFORE DRILLING COMMENCES.

3. EXERCISE CARE TO AVOID DAMAGING EXISTING REINFORCEMENT AND OTHER ITEMS EMBEDDED IN CONCRETE AND MASONRY.
 - a. IF EMBEDMENTS ARE ENCOUNTERED DURING DRILLING, IMMEDIATELY STOP WORK AND NOTIFY THE ENGINEER. AWAIT ENGINEER'S INSTRUCTIONS BEFORE PROCEEDING.
4. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, DRILL HOLES PERPENDICULAR TO THE CONCRETE SURFACE INTO WHICH THEY ARE PLACED.
5. DRILL USING ANCHOR MANUFACTURER'S RECOMMENDED EQUIPMENT AND PROCEDURES.
 - a. UNLESS OTHERWISE RECOMMENDED BY THE MANUFACTURER, DRILL IN ACCORDANCE WITH THE FOLLOWING:
 - 1) DRILLING EQUIPMENT: ELECTRIC OR PNEUMATIC ROTARY TYPE WITH LIGHT OR MEDIUM IMPACT. WHERE EDGE DISTANCES ARE LESS THAN 2 INCHES, USE LIGHTER IMPACT EQUIPMENT TO PREVENT MICRO-CRACKING AND CONCRETE SPALLING DURING DRILLING PROCESS.
 - 2) DRILL BITS: CARBIDE-TIPPED IN ACCORDANCE WITH ANSI B212-15. HOLLOW DRILLS WITH FLUSHING AIR SYSTEMS ARE PREFERRED.
6. DRILL HOLES AT MANUFACTURE'S RECOMMENDED DIAMETER AND TO DEPTH REQUIRED TO PROVIDE THE EFFECTIVE EMBEDMENT INDICATED.
7. CLEAN AND PREPARE HOLES AS RECOMMENDED BY THE MANUFACTURER AND AS REQUIRED BY THE ICC-ES REPORT FOR THAT ANCHOR.
 - a. UNLESS OTHERWISE RECOMMENDED BY ANCHOR MANUFACTURER, REMOVE DUST AND DEBRIS USING BRUSHES AND CLEAN COMPRESSED AIR.
 - b. REPEAT CLEANING PROCESS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 - c. WHEN CLEANING HOLES FOR STAINLESS STEEL ANCHORS, USE ONLY STAINLESS STEEL OR NON-METALLIC BRUSHES.
- C. INSERT AND TIGHTEN (OR TORQUE) ANCHORS IN FULL COMPLIANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 1. ONCE ANCHOR IS TIGHTENED (TORQUE), DO NOT ATTEMPT TO LOOSEN OR REMOVE ITS BOLT OR STUD.
- D. CONCRETE ANCHORS: MINIMUM EFFECTIVE EMBEDMENT LENGTHS UNLESS OTHERWISE INDICATED ON THE DRAWINGS:

CONCRETE ANCHORS			
NOMINAL DIAMETER	MINIMUM EFFECTIVE EMBEDMENT LENGTH		MINIMUM MEMBER THICKNESS
	IN CONCRETE	IN GROUTED MASONRY	
3/8 INCH	2 1/2 INCH	2 5/8 INCH	8 INCH
1/2 INCH	3 1/2 INCH	3 1/2 INCH	8 INCH
5/8 INCH	4 1/2 INCH	4 1/2 INCH	10 INCH
3/4 INCH	5 INCH	5 1/4 INCH	12 INCH

- E. FLUSH SHELL ANCHORS:
 1. FLUSH SHELL ANCHORS ARE NOT PERMITTED IN THE WORK.

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2. IF EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS RECOMMEND THE USE OF FLUSH SHELL ANCHORS, CONTACT ENGINEER FOR INSTRUCTIONS BEFORE PROCEEDING.

3.06 FIELD QUALITY CONTROL

- A. CONTRACTOR SHALL PROVIDE QUALITY CONTROL OVER THE WORK OF THIS SECTION AS SPECIFIED IN SECTION 014000.
 1. EXPENSES ASSOCIATED WITH WORK DESCRIBED BY THE FOLLOWING PARAGRAPHS SHALL BE PAID BY THE CONTRACTOR.
- B. POST-INSTALLED ANCHORS:
 1. REVIEW ANCHOR MANUFACTURER'S INSTALLATION INSTRUCTIONS AND REQUIREMENTS OF THE EVALUATION SERVICE REPORT (HEREAFTER REFERRED TO AS "INSTALLATION DOCUMENTS") FOR EACH ANCHOR TYPE AND MATERIAL.
 2. OBSERVE HOLE-DRILLING AND CLEANING OPERATIONS FOR CONFORMANCE WITH THE INSTALLATION DOCUMENTS.
 3. CERTIFY IN WRITING TO THE ENGINEER THAT THE DEPTH AND LOCATION OF ANCHOR HOLES, AND THE TORQUE APPLIED FOR SETTING THE ANCHORS CONFORMS TO THE REQUIREMENTS OF THE INSTALLATION DOCUMENTS.

3.07 FIELD QUALITY ASSURANCE

- A. THE OWNER WILL PROVIDE ON-SITE OBSERVATION AND FIELD QUALITY ASSURANCE FOR THE WORK OF THIS SECTION.
 1. EXPENSES ASSOCIATED WITH WORK DESCRIBED BY THE FOLLOWING PARAGRAPHS SHALL BE PAID BY THE OWNER.
- B. FIELD INSPECTIONS AND SPECIAL INSPECTIONS:
 1. REQUIRED INSPECTIONS: OBSERVE CONSTRUCTION FOR CONFORMANCE TO THE APPROVED CONTRACT DOCUMENTS, THE ACCEPTED SUBMITTALS, AND MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR THE PRODUCTS USED.
 2. RECORD OF INSPECTIONS:
 - a. MAINTAIN RECORD OF EACH INSPECTION.
 - b. SUBMIT COPIES TO ENGINEER UPON REQUEST.
 3. STATEMENT OF SPECIAL INSPECTIONS: AT THE END OF THE PROJECT, PREPARE AND SUBMIT TO THE ENGINEER AND THE AUTHORITY HAVING JURISDICTION INSPECTOR'S STATEMENT THAT THE WORK WAS CONSTRUCTED IN GENERAL CONFORMANCE WITH THE APPROVED CONTRACT DOCUMENTS, AND THAT DEFICIENCIES OBSERVED DURING CONSTRUCTION WERE RESOLVED.
- C. SPECIAL INSPECTIONS: ANCHORS CAST INTO CONCRETE AND BUILT INTO MASONRY.
 1. PROVIDE SPECIAL INSPECTION DURING POSITIONING OF ANCHORS AND PLACEMENT OF CONCRETE OR MASONRY (INCLUDING MORTAR AND GROUT) AROUND THE FOLLOWING ANCHORS:
 - a. ANCHOR BOLTS.
 - b. ANCHOR RODS.
 2. DURING PLACEMENT, PROVIDE CONTINUOUS SPECIAL INSPECTION AT EACH ANCHOR LOCATION TO VERIFY THAT THE FOLLOWING ELEMENTS OF THE INSTALLATION CONFORM TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.
 - a. ANCHOR:

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- 1) TYPE AND DIMENSIONS.
 - 2) MATERIAL: GALVANIZED STEEL, TYPE 304 STAINLESS STEEL, OR TYPE 316 STAINLESS STEEL AS SPECIFIED IN THIS SECTION OR INDICATED ON THE DRAWINGS.
 - 3) POSITIONING: SPACING, EDGE DISTANCES, EFFECTIVE EMBEDMENT, AND PROJECTION BEYOND THE SURFACE OF THE CONSTRUCTION.
 - 4) REINFORCEMENT AT ANCHOR: PRESENCE, POSITIONING, AND SIZE OF ADDITIONAL REINFORCEMENT AT ANCHORS INDICATED ON THE DRAWINGS.
3. FOLLOWING HARDENING AND CURING OF THE CONCRETE OR MASONRY SURROUNDING THE ANCHORS, PROVIDE PERIODIC SPECIAL INSPECTION TO OBSERVE AND CONFIRM THE FOLLOWING:
- a. BASE MATERIAL (CONCRETE OR GROUTED MASONRY):
 - 1) SOLID AND DENSE CONCRETE OR GROUTED MASONRY MATERIAL WITHIN REQUIRED DISTANCES SURROUNDING ANCHOR.
 - 2) MATERIAL ENCAPSULATING EMBEDMENT IS DENSE AND WELL-CONSOLIDATED.
- D. SPECIAL INSPECTIONS: POST-INSTALLED MECHANICAL ANCHORS PLACED IN HARDENED CONCRETE AND IN GROUTED MASONRY.
1. PROVIDE SPECIAL INSPECTION DURING INSTALLATION OF THE FOLLOWING ANCHORS:
 - a. CONCRETE ANCHORS.
 2. UNLESS OTHERWISE NOTED, PROVIDE PERIODIC SPECIAL INSPECTION DURING POSITIONING, DRILLING, PLACING, AND TORQUING OF ANCHORS.
 - a. PROVIDE CONTINUOUS SPECIAL INSPECTION FOR POST-INSTALLED ANCHORS IN "OVERHEAD INSTALLATIONS" AS DEFINED IN THIS SECTION.
 3. REQUIREMENTS FOR PERIODIC SPECIAL INSPECTION:
 - a. VERIFY ITEMS LISTED IN THE FOLLOWING PARAGRAPHS FOR CONFORMANCE TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND THE EVALUATION REPORT FOR THE ANCHOR BEING USED. OBSERVE THE INITIAL INSTALLATION OF EACH TYPE AND SIZE OF ANCHOR, AND SUBSEQUENT INSTALLATION OF THE SAME ANCHOR AT INTERVALS OF NOT MORE THAN 4 HOURS.
 - 1) ANY CHANGE IN THE ANCHORS USED, IN THE PERSONNEL PERFORMING THE INSTALLATION, OR IN PROCEDURES USED TO INSTALL A GIVEN TYPE OF ANCHOR SHALL REQUIRE A NEW "INITIAL INSPECTION."
 - b. SUBSTRATE: CONCRETE OR MASONRY SURFACES RECEIVING THE ANCHOR ARE SOUND AND OF A CONDITION THAT WILL DEVELOP THE ANCHOR'S RATED STRENGTH.
 - c. ANCHOR:
 - 1) MANUFACTURER, TYPE, AND DIMENSIONS (DIAMETER AND LENGTH).
 - 2) MATERIAL (GALVANIZED, TYPE 304 STAINLESS STEEL, OR TYPE 316 STAINLESS STEEL).
 - d. HOLE:
 - 1) POSITIONING: SPACING AND EDGE DISTANCES.
 - 2) DRILL BIT TYPE AND DIAMETER.
 - 3) DIAMETER, AND DEPTH.
 - 4) HOLE CLEANED IN ACCORDANCE WITH MANUFACTURER'S REQUIRED PROCEDURES. CONFIRM MULTIPLE REPETITIONS OF CLEANING WHEN RECOMMENDED BY THE MANUFACTURER.

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- 5) ANCHOR'S MINIMUM EFFECTIVE EMBEDMENT.
- 6) ANCHOR TIGHTENING/INSTALLATION TORQUE.
- 4. REQUIREMENTS FOR CONTINUOUS SPECIAL INSPECTION:
 - a. THE SPECIAL INSPECTOR SHALL OBSERVE ALL ASPECTS OF ANCHOR INSTALLATION, EXCEPT THAT HOLES MAY BE DRILLED IN HIS/HER ABSENCE PROVIDED THAT HE/SHE CONFIRMS THE USE OF ACCEPTABLE DRILL BITS BEFORE DRILLING, AND LATER CONFIRMS THE DIAMETER, DEPTH, AND CLEANING OF DRILLED HOLES.
- E. FIELD TESTS:
 - 1. OWNER'S REPRESENTATIVE MAY, AT ANY TIME, REQUEST TESTING TO CONFIRM THAT MATERIALS BEING DELIVERED AND INSTALLED CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS.
 - a. IF SUCH ADDITIONAL TESTING SHOWS THAT THE MATERIALS DO NOT CONFORM TO THE SPECIFIED REQUIREMENTS, THE CONTRACTOR SHALL PAY THE COSTS OF THESE TESTS.
 - b. IF SUCH ADDITIONAL TESTING SHOWS THAT THE MATERIALS DO CONFORM TO THE SPECIFIED REQUIREMENTS, THE OWNER SHALL PAY THE COSTS OF THESE TESTS.

3.08 NON-CONFORMING WORK

- A. REMOVE MISALIGNED OR NON-PERFORMING ANCHORS.
- B. FILL EMPTY ANCHOR HOLES AND REPAIR FAILED ANCHOR LOCATIONS AS SPECIFIED IN SECTION 036000 USING HIGH-STRENGTH, NON-SHRINK, NON-METALLIC GROUT.
- C. IF MORE THAN 10 PERCENT OF ALL TESTED ANCHORS OF A GIVEN DIAMETER AND TYPE FAIL TO ACHIEVE THEIR SPECIFIED TORQUE OR PROOF LOAD, THE ENGINEER WILL PROVIDE DIRECTIONS FOR REQUIRED MODIFICATIONS. MAKE SUCH MODIFICATIONS, UP TO AND INCLUDING REPLACEMENT OF ALL ANCHORS, AT NO ADDITIONAL COST TO THE OWNER.

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3.09 SCHEDULES

A. PROVIDE AND INSTALL ANCHOR MATERIALS AS SCHEDULED IN THE FOLLOWING TABLE.

TABLE- REQUIRED ANCHORING MATERIALS BY LOCATION		
LOCATION/ EXPOSURE	MATERIALS	NOTES
1. ANCHORS INTO CONCRETE AND GROUTED MASONRY FOR ATTACHMENT OF CARBON STEEL, INCLUDING STRUCTURAL STEEL AND OTHER STEEL FABRICATIONS:		
A) INTERIOR DRY AREAS	CARBON STEEL- GALVANIZED	
B) LOCATIONS WITH GALVANIZED STEEL STRUCTURES OR FABRICATIONS	STAINLESS STEEL- TYPE 304 OR 316	1
C) EXTERIOR AND INTERIOR WET AND MOIST LOCATIONS	STAINLESS STEEL- TYPE 316	1
D) CORROSIVE LOCATIONS	STAINLESS STEEL- TYPE 316	1
2. ANCHORS INTO CONCRETE AND GROUTED MASONRY FOR ATTACHMENT OF ALUMINUM, STAINLESS STEEL, OR FIBER-REINFORCED PLASTIC (FRP) SHAPES AND FABRICATIONS:		
A) INTERIOR DRY AREAS	STAINLESS STEEL- TYPE 304 OR 316	1
B) EXTERIOR AND INTERIOR WET AND MOIST LOCATIONS	STAINLESS STEEL- TYPE 316	1
C) CORROSIVE LOCATIONS	STAINLESS STEEL- TYPE 316	1
3. ANCHORS FOR ATTACHING EQUIPMENT AND ITS APPURTENANCES:		
A) ALL LOCATIONS	STAINLESS STEEL- TYPE 316 (UNLESS TYPE 304 IS SPECIFICALLY INDICATED IN THE SPECIFICATIONS FOR THE EQUIPMENT.)	1
NOTES: (1) WHERE ANCHORS ARE IN CONTACT WITH A METAL THAT DIFFERS FROM THAT OF THE ANCHOR, PROVIDE ISOLATION SLEEVES AND WASHERS.		

END OF SECTION

**SECTION 051200
STRUCTURAL STEEL**

PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. STRUCTURAL STEEL SHAPES AND PLATE.
2. FASTENERS AND STRUCTURAL HARDWARE:
 - a. ALL THREAD RODS.
 - b. HIGH-STRENGTH BOLTS.
3. WELDING.
4. BOLTING.

B. RELATED SECTIONS:

1. SECTION 014000 - QUALITY REQUIREMENTS.
2. SECTION 014524 - SPECIAL INSPECTION, SPECIAL TESTS, AND STRUCTURAL OBSERVATION.
3. SECTION 032117 - ADHESIVE-BONDED REINFORCING BARS AND ALL THREAD RODS IN CONCRETE.
4. SECTION 040518 - ADHESIVE BONDING REINFORCING BARS AND ALL THREAD RODS IN MASONRY.
5. SECTION 050524 - MECHANICAL ANCHORING AND FASTENING TO CONCRETE AND MASONRY.
6. SECTION 050526 – STEEL WELDING REQUIREMENTS
7. SECTION 099000 – PAINTING AND COATING.

1.02 REFERENCES

A. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):

1. 303 - CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES.
2. 360 - SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.

B. AMERICAN IRON AND STEEL INSTITUTE (AISI):

1. STEEL ALLOYS ("TYPES") AS INDICATED.

C. AMERICAN WELDING SOCIETY (AWS):

1. A5.1 - SPECIFICATION FOR CARBON STEEL ELECTRODES FOR SHIELDED METAL ARC WELDING.
2. A5.17 - SPECIFICATION FOR CARBON STEEL ELECTRODES AND FLUXES FOR SUBMERGED ARC WELDING.
3. A5.20 - SPECIFICATION FOR CARBON STEEL ELECTRODES FOR FLUX CORED ARC WELDING.
4. D1.1 - STRUCTURAL WELDING CODE - STEEL.

D. ASTM INTERNATIONAL (ASTM):

1. A6 - STANDARD SPECIFICATION FOR GENERAL REQUIREMENTS FOR ROLLED STRUCTURAL STEEL BARS, PLATES, SHAPES, AND SHEET PILING.
2. A36 - STANDARD SPECIFICATION FOR CARBON STRUCTURAL STEEL.
3. A53 - STANDARD SPECIFICATION FOR PIPE, STEEL, BLACK AND HOT-DIPPED, ZINC-COATED, WELDED, AND SEAMLESS.

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4. A123 - STANDARD SPECIFICATION FOR ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS.
 5. A153 - STANDARD SPECIFICATION FOR ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE.
 6. A194 - STANDARD SPECIFICATION FOR CARBON AND ALLOY STEEL NUTS FOR BOLTS FOR HIGH PRESSURE OR HIGH TEMPERATURE SERVICE, OR BOTH.
 7. A325 - STANDARD SPECIFICATION FOR STRUCTURAL BOLTS, STEEL, HEAT TREATED, 120/105 KSI MINIMUM TENSILE STRENGTH.
 8. A500 - STANDARD SPECIFICATION FOR COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
 9. A501 - STANDARD SPECIFICATION FOR HOT-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING.
 10. A563 - STANDARD SPECIFICATION FOR CARBON AND ALLOY STEEL NUTS.
 11. A992 - STANDARD SPECIFICATION FOR STRUCTURAL STEEL SHAPES.
 12. F436 - STANDARD SPECIFICATION FOR HARDENED STEEL WASHERS.
 13. F959 - STANDARD SPECIFICATION FOR COMPRESSIBLE-WASHER-TYPE DIRECT TENSION INDICATORS FOR USE WITH STRUCTURAL FASTENERS.
 14. F2329 - STANDARD SPECIFICATION FOR ZINC COATING, HOT-DIP, REQUIREMENTS FOR APPLICATION TO CARBON AND ALLOY STEEL BOLTS, SCREWS, WASHERS, NUTS, AND SPECIAL THREADED FASTENERS.
- E. RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC):
1. SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS (RCSC SPECIFICATION).

1.03 DEFINITIONS

- A. SNUG-TIGHT: AT BOLTED JOINTS, THE TIGHTNESS ATTAINED WITH A FEW IMPACTS OF AN IMPACT WRENCH, OR BY THE FULL EFFORT OF AN IRONWORKER USING A SPUD WRENCH TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.

1.04 SUBMITTALS

- A. PRODUCT DATA:
1. WELDING ELECTRODES FOR FIELD WELDS: ELECTRODE MANUFACTURER'S DATA.
- B. SHOP DRAWINGS:
1. FABRICATION AND ERECTION DRAWINGS.
- C. QUALITY CONTROL SUBMITTALS:
1. WELDING PROCEDURE SPECIFICATIONS (WPS) IN ACCORDANCE WITH AWS D1.1.
 - a. SUBMIT WPS FOR EACH TYPE OF WELDED JOINT USED, WHETHER PREQUALIFIED OR QUALIFIED BY TESTING.
 - 1) STATE ELECTRODE MANUFACTURER AND SPECIFIC ELECTRODES USED.
 - 2) INDICATE REQUIRED AWS QUALIFICATION FOR JOINT.
 - b. SUBMIT WPS WITH SHOP DRAWINGS THAT INDICATE THOSE WELDS.
 - c. SUBMIT PROCEDURE QUALIFICATION RECORD (PQR) IN ACCORDANCE WITH AWS D1.1 FOR WELDING PROCEDURES QUALIFIED BY TESTING.
 2. WELDER QUALIFICATIONS: FOR EACH WELDING PROCESS AND POSITION:

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- a. WELDER'S QUALIFICATION CERTIFICATES.
- b. CONTRACTOR'S STATEMENT THAT CERTIFICATE WILL BE "IN EFFECT" AT THE TIME(S) WELDING WILL BE PERFORMED BASED ON THE "PERIOD OF EFFECTIVENESS" PROVISIONS OF AWS D1.1.
- 3. STEEL FABRICATOR'S AISC CERTIFICATION.
- D. TEST REPORTS:
 - 1. CERTIFIED COPIES OF MILL TESTS AND ANALYSES MADE IN ACCORDANCE WITH APPLICABLE ASTM STANDARDS, OR REPORTS FROM A RECOGNIZED COMMERCIAL LABORATORY, INCLUDING CHEMICAL AND TENSILE PROPERTIES OF EACH SHIPMENT OF STRUCTURAL STEEL OR PART THEREOF HAVING COMMON PROPERTIES.

1.05 QUALITY ASSURANCE

- A. CERTIFICATION:
 - 1. STEEL FABRICATORS SHALL BE CERTIFIED BY THE AISC OR OTHER CERTIFICATION ACCEPTABLE TO THE ENGINEER AND THE BUILDING OFFICIAL HAVING JURISDICTION.
- B. WELDING:
 - 1. PERFORM WELDING OF STRUCTURAL METALS IN ACCORDANCE WITH AWS D1.1 USING WELDERS WHO HAVE CURRENT AWS QUALIFICATION CERTIFICATE FOR THE PROCESS, POSITION, AND JOINT CONFIGURATION TO BE WELDED.
 - 2. MAKE WELDING PROCEDURE SPECIFICATIONS AVAILABLE AT THE LOCATIONS WHERE WELDING IS PERFORMED.
 - 3. NOTIFY ENGINEER AT LEAST 24 HOURS BEFORE STARTING SHOP OR FIELD WELDING.
 - 4. ENGINEER MAY CHECK MATERIALS, EQUIPMENT, AND QUALIFICATIONS OF WELDERS.
 - 5. REMOVE WELDERS PERFORMING UNSATISFACTORY WORK, OR REQUIRE REQUALIFICATION.
 - 6. ENGINEER MAY USE GAMMA RAY, MAGNETIC PARTICLE, DYE PENETRANT, TREPANNING, OR OTHER AIDS TO VISUAL INSPECTION TO EXAMINE ANY PART OF WELDS OR ALL WELDS.
 - 7. CONTRACTOR SHALL BEAR COSTS OF RETESTS ON DEFECTIVE WELDS.
 - 8. CONTRACTOR SHALL ALSO BEAR COSTS IN CONNECTION WITH QUALIFYING WELDERS.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. PACKING AND SHIPPING: DELIVER STRUCTURAL STEEL FREE FROM MILL SCALE, RUST, AND PITTING.
- B. STORAGE AND PROTECTION: UNTIL ERECTION AND PAINTING, PROTECT FROM WEATHER ITEMS NOT GALVANIZED OR PROTECTED BY A SHOP COAT OF PAINT

PART 2 PRODUCTS

2.01 MATERIALS

- A. UNLESS OTHERWISE SPECIFIED OR INDICATED ON THE DRAWINGS, MATERIALS SHALL CONFORM TO THE FOLLOWING:

ITEM	ASTM STANDARD	CLASS, GRADE, TYPE, OR ALLOY NUMBER
CARBON STEEL		
PLATE, BARS, ROLLED SHAPES (EXCEPT W AND WT SHAPES), AND MISCELLANEOUS ITEMS	A36	--
ROLLED W AND WT SHAPES	A992	GRADE 50
HOLLOW STRUCTURAL SECTIONS (HSS): ROUND, SQUARE, OR RECTANGULAR	A500	GRADE C
ROUND HSS	A500	GRADE B
STEEL PIPE	A53	GRADE B
STAINLESS STEEL		
PLATE, SHEET, AND STRIP	A240	TYPE 304* OR 316**
BARs AND SHAPES	A276	TYPE 304* OR 316**
* USE TYPE 304L (LOW-CARBON STAINLESS STEEL) IF MATERIAL WILL BE WELDED.		
** USE TYPE 316L (LOW-CARBON STAINLESS STEEL) IF MATERIAL WILL BE WELDED.		

2.02 FASTENERS AND STRUCTURAL HARDWARE

- A. GENERAL:
- MATERIALS: OF DOMESTIC MANUFACTURE.
 - WHERE FASTENERS AND HARDWARE ARE SPECIFIED TO BE GALVANIZED, GALVANIZE IN ACCORDANCE WITH ASTM A153 OR ASTM F2329.
- B. ALL THREAD RODS:
- CARBON STEEL:
 - IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
 - NUTS: ASTM A194.
 - WASHERS: ASTM F436.
 - GALVANIZED CARBON STEEL:
 - IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE INDICATED ON THE DRAWINGS, AND HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A153.
 - NUTS: ASTM A194, HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A153.
 - WASHERS: ASTM F436, HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A153.
- C. ANCHOR BOLTS, ANCHOR RODS, AND POST-INSTALLED STEEL ANCHORS: AS INDICATED ON THE DRAWINGS AND AS SPECIFIED IN SECTION 050524.
- D. HIGH-STRENGTH BOLTS:
- PROVIDE HIGH-STRENGTH BOLT ASSEMBLY, WITH NUTS, HARDENED FLAT WASHERS, AND COMPRESSIBLE-WASHER-TYPE DIRECT TENSION INDICATORS. PROVIDE UNCOATED COMPONENTS UNLESS GALVANIZED COATING IS INDICATED ON THE DRAWINGS.

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2. CARBON STEEL - UNCOATED:
 - a. BOLTS: PLAIN HEAVY HEX STRUCTURAL BOLTS IN ACCORDANCE WITH ASTM A325 TYPE 1.
 - b. NUTS: HEAVY HEX NUTS IN ACCORDANCE WITH ASTM A563, GRADE C.
 - c. WASHERS: FLAT:
 - 1) ADJACENT TO NORMAL, OVERSIZED, AND SHORT-SLOTTED HOLES: CIRCULAR AND SQUARE OR RECTANGULAR BEVELED WASHERS IN ACCORDANCE WITH ASTM F436.
 - 2) ADJACENT TO LONG SLOTTED HOLES: 5/16-INCH THICK PLATE WASHER FABRICATED FROM STEEL IN ACCORDANCE WITH ASTM A36.
 - d. WASHERS: TENSION INDICATING: IN ACCORDANCE WITH ASTM F959.
 3. CARBON STEEL - GALVANIZED:
 - a. BOLT AND NUT ASSEMBLIES FABRICATED, GALVANIZED, TESTED FOR ROTATIONAL CAPACITY, AND SHIPPED ACCORDANCE WITH THE PROVISIONS ASTM A325 AND THE RCSC SPECIFICATION.
 - b. BOLTS, NUTS, AND WASHERS: HOT-DIP GALVANIZED AND IN ACCORDANCE WITH ASTM A153, CLASS C OR ASTM F2329.
 - c. BOLTS: PLAIN HEAVY HEX STRUCTURAL BOLTS IN ACCORDANCE WITH ASTM A325 TYPE 1 AND GALVANIZED AS SPECIFIED.
 - d. NUTS: HEAVY HEX NUTS IN ACCORDANCE WITH ASTM A563, GRADE DH, GALVANIZED AS SPECIFIED, AND LUBRICATED IN ACCORDANCE WITH ASTM A563, SUPPLEMENTARY REQUIREMENT S1 TO MINIMIZE GALLING.
 - e. WASHERS:
 - 1) ADJACENT TO NORMAL, OVERSIZED, AND SHORT-SLOTTED HOLES: CIRCULAR AND SQUARE OR RECTANGULAR BEVELED WASHERS IN ACCORDANCE WITH ASTM F436 AND GALVANIZED AS SPECIFIED.
 - 2) ADJACENT TO LONG SLOTTED HOLES: 5/16-INCH THICK PLATE WASHER FABRICATED FROM STEEL IN ACCORDANCE WITH ASTM A36, AND GALVANIZED IN ACCORDANCE WITH ASTM A123.
- 2.03 ISOLATING SLEEVES AND WASHERS**
- A. AS INDICATED ON THE DRAWINGS AND AS SPECIFIED IN SECTION 050524.
- 2.04 GALVANIZED SURFACE REPAIR**
- A. MANUFACTURERS: ONE OF THE FOLLOWING OR APPROVED EQUAL:
1. GALVINOX.
 2. GALVO-WELD.
- 2.05 THREAD COATING**
- A. MANUFACTURERS: ONE OF THE FOLLOWING OR APPROVED EQUAL:
1. NEVER SEEZ COMPOUND CORPORATION, NEVER-SEEZ.
 2. OIL RESEARCH, INC., WLR NO. 111.
- 2.06 SUPPLEMENTARY PARTS**
- A. FURNISH AS REQUIRED FOR COMPLETE STRUCTURAL STEEL ERECTION, WHETHER OR NOT SUCH
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PARTS AND WORK ARE SPECIFIED OR INDICATED ON THE DRAWINGS.

2.07 FABRICATION

A. SHOP ASSEMBLY:

1. FABRICATE STRUCTURAL STEEL IN ACCORDANCE WITH AISC 360 AND AISC 303 UNLESS OTHERWISE SPECIFIED OR MODIFIED BY APPLICABLE REGULATORY REQUIREMENTS.
2. WHERE ANCHORS, CONNECTIONS, OR OTHER DETAILS OF STRUCTURAL STEEL ARE NOT SPECIFICALLY INDICATED ON THE DRAWINGS OR SPECIFIED, THEIR MATERIAL, SIZE AND FORM SHALL BE EQUIVALENT IN QUALITY AND WORKMANSHIP TO ITEMS SPECIFIED.
3. ROUND OFF SHARP AND HAZARDOUS PROJECTIONS AND GRIND SMOOTH.
4. TAKE MEASUREMENTS NECESSARY TO PROPERLY FIT WORK IN THE FIELD. TAKE RESPONSIBILITY FOR AND BE GOVERNED BY THE MEASUREMENTS AND PROPER WORKING OUT OF ALL THE DETAILS.
5. TAKE RESPONSIBILITY FOR CORRECT FITTING OF METALWORK.
6. WELDED CONNECTIONS:
 - a. COMPLY WITH AWS REQUIREMENTS FOR THE METALS TO BE WELDED.
 - b. WELD ONLY IN ACCORDANCE WITH APPROVED WELDING PROCEDURE SPECIFICATIONS.
 - c. KEEP WELDING PROCEDURE SPECIFICATIONS READILY AVAILABLE FOR WELDERS AND INSPECTORS DURING FABRICATION PROCESSES.

B. GALVANIZED CARBON STEEL:

1. WHERE GALVANIZING IS REQUIRED, HOT-DIP STRUCTURAL STEEL AFTER FABRICATION IN ACCORDANCE WITH ASTM A123:
2. DO NOT ELECTRO-GALVANIZE OR MECHANICALLY-GALVANIZE UNLESS SPECIFIED OR ACCEPTED BY ENGINEER.
3. RE-STRAIGHTEN GALVANIZED ITEMS THAT BEND OR TWIST DURING GALVANIZING.

PART 3 EXECUTION

3.01 EXAMINATION

- #### **A. VERIFICATION OF CONDITIONS:** EXAMINE WORK IN PLACE TO VERIFY THAT IT IS SATISFACTORY TO RECEIVE THE WORK OF THIS SECTION. IF UNSATISFACTORY CONDITIONS EXIST, DO NOT BEGIN THIS WORK UNTIL SUCH CONDITIONS HAVE BEEN CORRECTED.

3.02 ERECTION

A. GENERAL:

1. FABRICATE STRUCTURAL AND FOUNDRY ITEMS TO TRUE DIMENSIONS WITHOUT WARP OR TWIST.
2. FORM WELDED CLOSURES NEATLY, AND GRIND OFF SMOOTH WHERE WELD MATERIAL INTERFERES WITH FIT OR IS UNSIGHTLY.
3. INSTALL STRUCTURAL ITEMS ACCURATELY AND SECURELY, TRUE TO LEVEL, PLUMB, IN CORRECT ALIGNMENT AND GRADE, WITH ALL PARTS BEARING OR FITTING STRUCTURE OR EQUIPMENT FOR WHICH INTENDED.
4. DO NOT SHIFT OUT OF ALIGNMENT, RE-DRILL, RE-SHAPE, OR FORCE FIT FABRICATED ITEMS.
5. PLACE ANCHOR BOLTS OR OTHER ANCHORING DEVICES ACCURATELY AND MAKE SURFACES

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THAT BEAR AGAINST STRUCTURAL ITEMS SMOOTH AND LEVEL.

6. RIGIDLY SUPPORT AND BRACE STRUCTURAL ITEMS NEEDING SPECIAL ALIGNMENT TO PRESERVE STRAIGHT, LEVEL, EVEN, AND SMOOTH LINES. KEEP STRUCTURAL ITEMS BRACED UNTIL CONCRETE, GROUT, OR DRY PACK MORTAR HAS HARDENED FOR 48 HOURS MINIMUM.
 7. ERECT STRUCTURAL STEEL IN ACCORDANCE WITH AISC 303 UNLESS OTHERWISE SPECIFIED OR MODIFIED BY APPLICABLE REGULATORY REQUIREMENTS.
 8. WHERE ANCHORS, CONNECTIONS, AND OTHER DETAILS OF STRUCTURAL STEEL ERECTION ARE NOT SPECIFICALLY INDICATED ON THE DRAWINGS OR SPECIFIED, FORM, LOCATE, AND ATTACH WITH EQUIVALENT IN QUALITY AND WORKMANSHIP TO ITEMS SPECIFIED.
 9. ROUND OFF SHARP OR HAZARDOUS PROJECTIONS AND GRIND SMOOTH.
 10. PAINT OR COAT STEEL ITEMS AS SPECIFIED IN SECTIONS 099000.
- B. WELDING: GENERAL:
1. MAKE WELDS FULL PENETRATION TYPE, UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
 2. REMOVE BACKING BARS AND WELD TABS AFTER COMPLETION OF WELD. REPAIR DEFECTIVE WELDS OBSERVED AFTER REMOVAL OF BACKING BARS AND WELD TABS.
- C. WELDING - CARBON STEEL:
1. GENERAL: IN ACCORDANCE WITH AWS D1.1:
 - a. WELD ASTM A36 AND A992 STRUCTURAL STEEL, ASTM A500 AND A501
 2. STRUCTURAL TUBING, AND ASTM A53 PIPE WITH ELECTRODES IN ACCORDANCE WITH AWS A5.1, USING E70XX ELECTRODES; AWS A5.17, USING F7X-EXXX ELECTRODES; OR AWS A5.20, USING E7XT-X ELECTRODES:
 3. FIELD REPAIR CUT OR OTHERWISE DAMAGED GALVANIZED SURFACES TO EQUIVALENT ORIGINAL CONDITION USING A GALVANIZED SURFACE REPAIR.
- D. INTERFACE WITH OTHER PRODUCTS:
1. WHERE STEEL MEMBERS AND FASTENERS COME IN CONTACT WITH DISSIMILAR METALS (ALUMINUM, STAINLESS STEEL, ETC), SEPARATE OR ISOLATE THE DISSIMILAR METALS WITH ISOLATING SLEEVES AND WASHERS AS SPECIFIED IN SECTION 050524.
- E. FASTENERS: GENERAL:
1. INSTALL BOLTS TO PROJECT 2 THREADS MINIMUM, BUT 1/2 INCH MAXIMUM BEYOND NUT.
 2. ANCHOR BOLTS AND ANCHOR RODS: INSTALL AS SPECIFIED IN SECTION 050524.
 - a. UNLESS OTHERWISE SPECIFIED, TIGHTEN NUTS ON ANCHOR BOLTS AND ANCHOR RODS SPECIFIED IN SECTION 050524 TO THE "SNUG-TIGHT" CONDITION.
 3. ALL THREAD RODS IN DRILLED HOLES BONDED TO CONCRETE WITH ADHESIVE: INSTALL AS SPECIFIED IN SECTION 032117.
 4. ALL THREAD RODS IN DRILLED HOLES BONDED TO MASONRY WITH ADHESIVE: INSTALL AS SPECIFIED IN SECTION 040518.
- F. FASTENERS: HIGH-STRENGTH CARBON STEEL BOLTS:
1. CONNECTIONS WITH HIGH-STRENGTH BOLTS SHALL IN ACCORDANCE WITH RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS.
 2. PROVIDE SNUG-TIGHT CONNECTIONS.
 3. JOINTS: SNUG-TIGHT:
 - a. INSTALL BOLTS WITH WASHERS WHERE REQUIRED IN ACCORDANCE WITH RCSC SPECIFICATION.

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- b. TIGHTEN BOLTS TO BRING THE CONNECTED PLIES INTO FIRM CONTACT. TIGHTENING SHALL PROGRESS SYSTEMATICALLY BEGINNING WITH THE MOST RIGID PART OF THE JOINT. MORE THAN 1 CYCLE THROUGH THE BOLT PATTERN MAY BE REQUIRED TO ACHIEVE THIS CONDITION.
- c. VERIFY ADEQUATE TIGHTENING OF BOLTS BY VISUAL OBSERVATION TO CONFIRM THAT WASHERS HAVE BEEN INSTALLED AT LOCATIONS REQUIRED IN ACCORDANCE WITH RCSC SPECIFICATION, AND THAT THE PLIES OF THE CONNECTED PARTS HAVE BEEN BROUGHT INTO FIRM CONTACT.

3.03 FIELD QUALITY CONTROL

- A. PROVIDE QUALITY CONTROL AS SPECIFIED IN SECTION 014000.

3.04 FIELD QUALITY ASSURANCE

- A. PROVIDE QUALITY ASSURANCE AS SPECIFIED IN SECTION 014000.
- B. SPECIAL INSPECTIONS, SPECIAL TESTS, AND STRUCTURAL OBSERVATION:
 - 1. PROVIDE AS SPECIFIED IN SECTION 014524.

END OF SECTION

**SECTION 055000
METAL FABRICATIONS**

PART 1 GENERAL

1.01 SUMMARY

A. SECTION INCLUDES:

1. ALUMINUM GRATING STAIR TREAD.
2. ALUMINUM STAIR NOSING.
3. HANDRAILS AND GUARDRAILS.
4. LADDERS.
5. MANHOLE FRAMES AND COVERS.
6. METAL GRATINGS.
7. METAL TREAD PLATE.
8. PREFORMED CHANNEL PIPE SUPPORTS.
9. STAIRS.
10. ELEVATOR MACHINE BEAMS, HOISTWAYS AND DOOR SILLS.
11. GALVANIZED STEEL BOLLARDS.
12. MISCELLANEOUS METALS.
13. ASSOCIATED ACCESSORIES TO THE ABOVE ITEMS.

B. RELATED SECTIONS:

1. SECTION 051200 – STRUCTURAL STEEL FRAMING
2. SECTION 050524 - MECHANICAL ANCHORING AND FASTENING TO CONCRETE AND MASONRY.
3. SECTION 055100 – METAL STAIRS AND RAILINGS.
4. SECTION 099000 - PAINTING AND COATING.
5. SECTION 323100 - METAL MESH FENCES AND GATES.
6. SECTION 323119 - DECORATIVE METAL FENCES.

1.02 REFERENCES

A. ALUMINUM ASSOCIATION (AA):

1. DAF-45: DESIGNATIONS FROM START TO FINISH.
2. M12-C22-A41.

B. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO):

1. STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.

C. ASTM INTERNATIONAL (ASTM):

1. A 36 - STANDARD SPECIFICATION FOR CARBON STRUCTURAL STEEL.
2. A 48 - STANDARD SPECIFICATION FOR GRAY IRON CASTINGS.
3. A 53 - STANDARD SPECIFICATION FOR PIPE, STEEL, BLACK AND HOT-DIPPED, ZINC- COATED, WELDED, AND SEAMLESS.
4. A 123 - STANDARD SPECIFICATION FOR ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND

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STEEL PRODUCTS.

5. A 240 - STANDARD SPECIFICATION FOR CHROMIUM AND CHROMIUM-NICKEL STAINLESS STEEL PLATE, SHEET, AND STRIP FOR PRESSURE VESSELS FOR GENERAL APPLICATIONS.
 6. A 276 - STANDARD SPECIFICATION FOR STAINLESS STEEL BARS AND SHAPES.
 7. A 307 - STANDARD SPECIFICATION FOR CARBON STEEL BOLTS AND STUDS, 60,000 PSI TENSILE STRENGTH.
 8. A 325 - STANDARD SPECIFICATION FOR STRUCTURAL BOLTS, STEEL, HEAT TREATED, 120/105 KSI MINIMUM TENSILE STRENGTH.
 9. A 380 - STANDARD PRACTICE FOR CLEANING, DESCALING, AND PASSIVATION OF STAINLESS STEEL PARTS, EQUIPMENT, AND SYSTEMS.
 10. A 489 - STANDARD SPECIFICATION FOR CARBON STEEL LIFTING EYES.
 11. A 490 - STANDARD SPECIFICATION FOR STRUCTURAL BOLTS, ALLOY STEEL, HEAT-TREATED, 150 KSI MINIMUM TENSILE STRENGTH.
 12. A 500 - STANDARD SPECIFICATION FOR COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES.
 13. A 501 - STANDARD SPECIFICATION FOR HOT-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING.
 14. A 635 - STANDARD SPECIFICATION FOR STEEL, SHEET AND STRIP, HEAVY-THICKNESS COILS, HOT-ROLLED, ALLOY, CARBON, STRUCTURAL, HIGH-STRENGTH LOW-ALLOY, AND HIGH-STRENGTH LOW-ALLOY WITH IMPROVED FORMABILITY, GENERAL REQUIREMENTS FOR.
 15. A 653 - STANDARD SPECIFICATION FOR STEEL SHEET, ZINC-COATED (GALVANIZED) OR ZINC-IRON ALLOY-COATED (GALVANNEALED) BY THE HOT-DIP PROCESS.
 16. A 992 - STANDARD SPECIFICATION FOR STRUCTURAL STEEL SHAPES.
 17. B 209 - STANDARD SPECIFICATION FOR ALUMINUM AND ALUMINUM-ALLOY SHEET AND PLATE.
 18. B 221 - STANDARD SPECIFICATION FOR ALUMINUM AND ALUMINUM-ALLOY EXTRUDED BARS, RODS, WIRE, PROFILES, AND TUBES.
 19. B 308 - STANDARD SPECIFICATION FOR ALUMINUM-ALLOY 6061-T6 STANDARD STRUCTURAL PROFILES.
 20. B 429 - STANDARD SPECIFICATION FOR ALUMINUM-ALLOY EXTRUDED STRUCTURAL PIPE AND TUBE.
 21. F 593 - STANDARD SPECIFICATION FOR STAINLESS STEEL BOLTS, HEX CAP SCREWS AND STUDS.
- D. AMERICAN WELDING SOCIETY (AWS):
1. A2.4 - STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION.
- E. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA).

1.03 DEFINITIONS

- A. PASSIVATION: REMOVAL OF EXOGENOUS IRON OR IRON COMPOUNDS FROM THE SURFACE OF A STAINLESS STEEL BY MEANS OF CHEMICAL DISSOLUTION RESULTING FROM TREATMENT WITH AN ACID SOLUTION THAT REMOVES THE SURFACE CONTAMINATION BUT DOES NOT SIGNIFICANTLY AFFECT THE STAINLESS STEEL ITSELF.

1.04 PERFORMANCE REQUIREMENTS

- A. DELEGATED DESIGN: DESIGN LADDERS AND MISCELLANEOUS FRAMING AND SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING

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PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

- B. STRUCTURAL PERFORMANCE OF LADDERS: PROVIDE LADDERS CAPABLE OF WITHSTANDING THE EFFECTS OF LOADS AND STRESSES WITH LIMITS AND UNDER CONDITIONS SPECIFIED IN ANSI A14.3.
 - 1. FOR LADDERS EXCEEDING 24 FEET, INCLUDE LOADS IMPOSED BY FALL ARREST SYSTEM
- C. THERMAL MOVEMENTS: PROVIDE EXTERIOR METAL FABRICATIONS THAT ALLOW FOR THERMAL MOVEMENTS RESULTING FROM THE FOLLOWING MAXIMUM CHANGE (RANGE) IN AMBIENT AND SURFACE TEMPERATURES BY PREVENTING BUCKLING, OPENING OF JOINTS, OVERSTRESSING OF COMPONENTS, FAILURE OF CONNECTIONS, AND OTHER DETRIMENTAL EFFECTS. BASE ENGINEERING CALCULATION ON SURFACE TEMPERATURES OF MATERIALS DUE TO BOTH SOLAR HEAD GAIN AND NIGHTTIME-SKY HEAT LOSS.
 - 1. TEMPERATURE CHANGE (RANGE): 120 DEG F (67 DEG C), AMBIENT; 180 DEG F (100 DEG C), MATERIAL SURFACES.

1.05 SUBMITTALS

- A. PRODUCT DATA:
 - 1. ALUMINUM GRATING STAIR TREAD.
 - 2. ALUMINUM STAIR NOSING.
 - 3. HANDRAIL AND GUARDRAIL.
 - 4. MANHOLE FRAMES AND COVERS.
 - 5. METAL GRATING.
- B. SHOP DRAWINGS:
 - 1. HANDRAILS AND GUARDRAILS:
 - a. INCLUDING DETAILS ON CONNECTION ATTACHMENTS, GATES, KICK PLATES, LADDERS, AND ANGLES.
 - b. INDICATE PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS, AND ACCESSORIES.
 - c. INCLUDE ERECTION DRAWINGS, ELEVATIONS, AND DETAILS WHERE APPLICABLE.
 - d. INDICATE WELDED CONNECTIONS USING STANDARD AWS A2.4 WELDING SYMBOLS. INDICATE NET WELD LENGTHS.
 - 2. LADDERS.
 - 3. METAL GRATING.
 - 4. METAL TREAD PLATE.
 - 5. STAIRS.
 - 6. MISCELLANEOUS METALS.
- C. SAMPLES:
 - 1. GUARDRAILS WITH SPECIFIED FINISHES.
- D. QUALITY CONTROL SUBMITTALS:
 - 1. DESIGN DATA.
 - 2. TEST REPORTS:
 - a. GUARDRAILS: 3 COPIES OF CERTIFIED TESTS PERFORMED BY AN INDEPENDENT TESTING LABORATORY CERTIFYING THAT GUARDRAILS MEET CURRENT STATE AND OSHA STRENGTH REQUIREMENTS.

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b. GRATINGS:

- 1) GRATING MANUFACTURERS' CALCULATIONS SHOWING THAT GRATINGS WILL MEET SPECIFIED DESIGN LOAD, STRESS, AND DEFLECTION REQUIREMENTS FOR EACH SIZE GRATING FOR EACH SPAN.
- 2) REPORTS OF TESTS PERFORMED.

PART 2 PRODUCTS

2.01 MATERIALS

- A. GENERAL: UNLESS OTHERWISE SPECIFIED OR INDICATED ON THE DRAWINGS, STRUCTURAL AND MISCELLANEOUS METALS IN ACCORDANCE WITH THE STANDARDS OF THE ASTM, INCLUDING THE FOLLOWING:

ITEM	ASTM STANDARD NO.	CLASS, GRADE TYPE OR ALLOY NO.
STEEL		
GALVANIZED SHEET IRON OR STEEL	A 653	COATING G90
COIL (PLATE)	A635	--
STRUCTURAL PLATE, BARS, ROLLED SHAPES, AND MISCELLANEOUS ITEMS (EXCEPT W SHAPES).	A 36	--
ROLLED W SHAPES	A 992	GRADE 50
STANDARD BOLTS, NUTS, AND WASHERS	A 307	--
HIGH STRENGTH BOLTS, NUTS, AND HARDENED FLAT WASHERS	A 325 A 490	--
EYEBOLTS	A 489	TYPE 1
TUBING, COLD-FORMED	A 500	--
TUBING, HOT-FORMED	A 501	--
STEEL PIPE	A 53	GRADE B
STAINLESS STEEL		
PLATE, SHEET, AND STRIP	A 240	TYPE 304* OR 316**
BARs AND SHAPES	A 276	TYPE 304* OR 316**
BOLTS (TYPE 304)	F 593	GROUP 1 CONDITION CW
BOLTS (TYPE 316)	F 593	GROUP 2 CONDITION CW
ALUMINUM		
FLASHING SHEET ALUMINUM	B 209	ALLOY 5005-H14, 0.032 INCHES MINIMUM THICKNESS
STRUCTURAL SHEET	B 209	ALLOY 6061-T6

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ALUMINUM-		
STRUCTURAL ALUMINUM	B 209 B 308	ALLOY 6061-T6
EXTRUDED ALUMINUM	B 221	ALLOY 6063-T42
*USE TYPE 304L IF MATERIAL WILL BE WELDED.		
**USE TYPE 316L IF MATERIAL WILL BE WELDED.		

1. STAINLESS STEELS ARE DESIGNATED BY TYPE OR SERIES DEFINED BY ASTM.
2. WHERE STAINLESS STEEL IS WELDED, USE LOW-CARBON STAINLESS STEEL.

2.02 MANUFACTURED UNITS

A. ALUMINUM GRATING STAIR TREAD:

1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. IKG BORDEN INDUSTRIES, ALUMINUM GRATING STAIR TREAD WITH MEBAC NOSING.
 - b. MCNICHOLS CO., TYPE A-STANDARD WITH CORRUGATED ANGLE NOSING.
2. MATERIAL: WELDED ALUMINUM GRATING TREAD WITH NON-SLIP NOSING AND INTEGRAL END PLATES FOR BOLT ON ATTACHMENT TO STAIR STRINGERS
3. SIZE:
 - a. TREAD WIDTH: TO EQUAL TREAD SPACING PLUS 1 INCH MINIMUM.
 - b. TREAD LENGTH: LENGTH TO SUIT STRINGER-TO-STRINGER DIMENSION INDICATED ON THE DRAWINGS.
 - c. DEPTH: 1-3/4 INCHES.
4. BOLTS: TYPE 316 STAINLESS STEEL.

B. ALUMINUM STAIR NOSING:

1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. WOOSTER PRODUCTS, INC., TYPE 101 NOSING.
 - b. AMERICAN SAFETY TREAD CO., INC., STYLE 801 NOSING.
2. MATERIAL: CAST ALUMINUM ABRASIVE NOSINGS WITH ALUMINUM OXIDE GRANULES INTEGRALLY CAST INTO METAL, FORMING PERMANENT, NONSLIP, LONG-WEARING SURFACE.
3. FOR INSTALLATION IN CAST-IN-PLACE STAIRS.
4. CONFIGURATION: 4 INCHES WIDE, FABRICATED WITH INTEGRALLY CAST STAINLESS STEEL ANCHORS AT APPROXIMATELY 12-INCH CENTERS. LENGTH TO EXTEND WITHIN 3 INCHES OF STAIR EDGE ON EACH SIDE.

C. HANDRAILS AND GUARDRAILS:

1. GENERAL:
 - a. DESIGN AND FABRICATE ASSEMBLIES TO CONFORM TO CURRENT LOCAL, STATE, AND OSHA STANDARDS AND REQUIREMENTS.
 - b. COORDINATE LAYOUT OF ASSEMBLIES AND POST SPACINGS TO AVOID CONFLICTS WITH EQUIPMENT AND EQUIPMENT OPERATORS.
 - 1) INDICATE ON THE SHOP DRAWINGS LOCATIONS OF SUCH EQUIPMENT.
 - 2) HIGHLIGHT LOCATIONS WHERE RAILINGS CANNOT BE MADE CONTINUOUS, AND OBTAIN ENGINEER'S DIRECTIONS ON HOW TO PROCEED BEFORE FABRICATING OR INSTALLING RAILINGS.

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2. ALUMINUM HANDRAILS AND GUARDRAILS (NONWELDED PIPE):
 - a. RAILS, POSTS, AND FITTING-ASSEMBLY SPACERS:
 - 1) IN ACCORDANCE WITH ASTM B 429, 6005, 6063 OR 6105, MINIMUM SCHEDULE 40, EXTRUDED ALUMINUM PIPE OF MINIMUM 1.89-INCH OUTSIDE DIAMETER AND 0.14-INCH WALL THICKNESS.
 - b. KICK PLATES: 6061 OR 6105 ALUMINUM ALLOY.
 - c. FASTENINGS AND FASTENERS: AS RECOMMENDED OR FURNISHED BY THE MANUFACTURER.
 - d. OTHER PARTS: 6063 EXTRUDED ALUMINUM, OR F214 OR F514.0 ALUMINUM CASTINGS:
 - 1) FABRICATIONS: IN ACCORDANCE WITH ASTM B 209 OR ASTM B 221 EXTRUDED BARS:
 - a) BASES: 6061 OR 6063 EXTRUDED ALUMINUM ALLOY.
 - 2) PLUG SCREWS OR BLIND RIVETS: TYPE 305 STAINLESS STEEL.
 - a) OTHER PARTS: TYPE 300 SERIES STAINLESS STEEL.
 - e. FINISH OF ALUMINUM COMPONENTS:
 - 1) ANODIZED FINISH, 0.7 MIL THICK, APPLIED TO EXPOSED SURFACES AFTER CUTTING. ALUMINUM ASSOCIATION SPECIFICATION M12-C22-A41, MECHANICAL FINISH NON SPECULAR AS FABRICATED, CHEMICAL FINISH-MEDIUM MATTE, ANODIC COATING-CLEAR CLASS I ARCHITECTURAL.
 - 2) PRETREAT ALUMINUM FOR CLEANING AND REMOVING MARKINGS BEFORE ANODIZING.
 - f. FABRICATION AND ASSEMBLY:
 - 1) FABRICATE POSTS IN SINGLE, UNSPLICED PIPE LENGTH.
 - 2) PERFORM WITHOUT WELDING.
 - 3) DO NOT EPOXY BOND THE PARTS.
 - 4) MAXIMUM CLEAR OPENING BETWEEN ASSEMBLED RAILING COMPONENTS AS INDICATED ON THE DRAWINGS.
 - g. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - 1) MOULTRIE MANUFACTURING COMPANY, WESRAIL.
 - 2) GOLDEN RAILINGS, GOLDEN, CO, RIVETED SYSTEM.
 - 3) CRANEVEYOR CORPORATION ENERCO METALS, C-V RAIL.
 3. FASTENINGS AND FASTENERS: AS RECOMMENDED OR FURNISHED BY GUARDRAIL MANUFACTURER FOR USE WITH THIS SYSTEM.
- D. LADDERS:
1. GENERAL:
 - a. TYPE: SAFETY TYPE CONFORMING TO LOCAL, STATE, AND OSHA STANDARDS AS MINIMUM. FURNISH GUARDS FOR LADDER WELLS.
 - b. SIZE: 18 INCHES WIDE BETWEEN SIDE RAILS OF LENGTH, SIZE, SHAPE, DETAIL, AND LOCATION INDICATED ON THE DRAWINGS.
 2. ALUMINUM LADDERS:
 - a. MATERIALS: 6063-T5 ALUMINUM ALLOY.
 - b. RUNGS:
 - 1) 1-INCH MINIMUM SOLID SQUARE BAR WITH 1/8-INCH GROOVES IN TOP AND DEEPLY SERRATED ON ALL SIDES.
 - 2) CAPABLE OF WITHSTANDING 1,000 POUND LOAD WITHOUT FAILURE.

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- c. SIDE RAILS: MINIMUM 4-INCH BY 1/2-INCH FLAT BARS.
 - d. FINISH OF ALUMINUM COMPONENTS:
 - 1) ANODIZED FINISH, 0.7 MIL THICK, APPLIED TO EXPOSED SURFACES AFTER CUTTING. ALUMINUM ASSOCIATION SPECIFICATION M12-C22-A41, MECHANICAL FINISH NON SPECULAR AS FABRICATED, CHEMICAL FINISH-MEDIUM MATTE, ANODIC COATING-CLEAR CLASS I ARCHITECTURAL.
 - 2) PRETREAT ALUMINUM FOR CLEANING AND REMOVING MARKINGS BEFORE ANODIZING.
 - e. FABRICATION:
 - 1) WELDED CONSTRUCTION, OF SIZE, SHAPE, LOCATION, AND DETAILS INDICATED ON THE DRAWINGS.
 - 2) FOR LADDERS OVER 20 FEET HIGH, FURNISH STANDARD LADDER CAGES OR FALL PREVENTION SYSTEM DESIGNED IN ACCORDANCE WITH STATE AND OSHA REQUIREMENTS.
 - f. FALL PREVENTION SYSTEM: INCLUDE BUT NOT LIMIT TO RAILING, BRACKETS, CLAMPS, 2 SLEEVES, AND 2 BELTS, SATISFYING OSHA SAFE CLIMBING REQUIREMENTS:
 - 1) MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a) NORTH CONSUMER PRODUCTS, SAF-T-CLIMB.
 - b) SWAGER COMMUNICATIONS, CLIMBERS BUDDY SYSTEM.
- E. MANHOLE FRAMES AND COVERS:
- 1. MATERIAL: GRAY IRON CASTINGS, IN ACCORDANCE WITH ASTM A 48, CLASS 30-B.
 - 2. TYPE: HEAVY-DUTY TRAFFIC TYPE, WITH COMBINED MINIMUM SET WEIGHT OF 265 POUNDS.
 - 3. MACHINE HORIZONTAL AND VERTICAL BEARING SURFACES TO FIT NEATLY, WITH EASILY
 - 4. REMOVABLE COVER BEARING FIRMLY IN FRAME WITHOUT ROCKING.
 - 5. FRAME:
 - a. BOTTOM FLANGE TYPE.
 - b. APPROXIMATELY 4-1/2 INCHES FRAME HEIGHT.
 - c. DIMENSIONS AS INDICATED ON THE DRAWINGS.
 - 1) MINIMUM INSIDE CLEAR DIMENSION MAY NOT BE SMALLER THAN NOMINAL DIAMETER MINUS 2 INCHES.
 - 6. COVER:
 - a. SKID-RESISTANT GRID PATTERN DESIGN STAMPED WITH NAME OF UTILITY SERVICE PROVIDED BY MANHOLE, SUCH AS "ELECTRICAL," "SEWER," "TELEPHONE," OR "WATER."
 - b. SOLID TYPE WITHOUT VENTILATION HOLES.
 - 7. FINISH: UNPAINTED.
- F. METAL GRATINGS:
- 1. GENERAL:
 - a. FABRICATE GRATING TO COVER AREAS INDICATED ON THE DRAWINGS.
 - b. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, GRATING OVER AN OPENING SHALL COVER ENTIRE OPENING.
 - c. MAKE CUTOUTS IN GRATING WHERE REQUIRED FOR EQUIPMENT ACCESS OR PROTRUSION, INCLUDING VALVE OPERATORS OR STEMS, AND GATE FRAMES.
 - d. BAND ENDS OF GRATING AND EDGES OF CUTOUTS IN GRATING:

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- 1) END BANDING: 1/4 INCH LESS THAN HEIGHT OF GRATING, WITH TOP OF GRATING AND TOP EDGE OF BANDING FLUSH.
 - 2) CUTOUT BANDING: FULL-HEIGHT OF GRATING.
 - 3) USE BANDING OF SAME MATERIAL AS GRATING.
 - 4) PANEL LAYOUT: ENABLE INSTALLATION AND SUBSEQUENT REMOVAL OF GRATING AROUND PROTRUSIONS OR PIPING.
 - 5) OPENINGS 6 INCHES AND LARGER: LAY OUT GRATING PANELS WITH EDGES OF 2 ADJACENT PANELS LOCATED ON CENTERLINE OF OPENING.
 - 6) OPENINGS SMALLER THAN 6 INCHES: LOCATE OPENING AT EDGE OF SINGLE PANEL.
 - 7) WHERE AN AREA REQUIRES MORE THAN 1 GRATING SECTION TO COVER AREA, CLAMP ADJACENT GRATING SECTIONS TOGETHER AT 1/4-POINTS WITH FASTENERS ACCEPTABLE TO ENGINEER.
 - 8) FABRICATE METAL GRATING SECTIONS IN UNITS WEIGHING NOT MORE THAN 50 POUNDS EACH.
 - 9) GAPS BETWEEN ADJACENT GRATING SECTIONS SHALL NOT BE MORE THAN THE CLEAR SPACING BETWEEN BEARING BARS.
 - e. WHEN REQUESTED BY ENGINEER, TEST 1 SECTION OF EACH SIZE GRATING FOR EACH SPAN LENGTH INVOLVED ON THE JOB UNDER FULL LOAD:
 - 1) FURNISH A SUITABLE DIAL GAUGE FOR MEASURING DEFLECTIONS.
 - f. GRATING SHALL BE ALUMINUM, UNLESS OTHERWISE SPECIFIED OR INDICATED ON THE DRAWINGS.
2. ALUMINUM GRATING:
- a. MATERIAL FOR GRATINGS, SHELF ANGLES, AND REBATES: 6061-T6 OR 6063-T6 ALUMINUM ALLOY, EXCEPT CROSSBARS MAY BE 6063-T5 ALUMINUM ALLOY.
 - b. SHELF ANGLE CONCRETE ANCHORS: TYPE 304 OR TYPE 316 STAINLESS STEEL.
 - c. GRATING REBATE ROD ANCHORS: 6061-T6 OR 6063-T6 ALUMINUM ALLOY.
 - d. BAR SIZE AND SPACING: AS DETERMINED BY MANUFACTURER TO ENABLE GRATING TO SUPPORT DESIGN LOAD.
 - e. DESIGN LIVE LOAD: A MINIMUM OF 100 POUNDS PER SQUARE FOOT UNIFORM LIVE LOAD ON ENTIRE GRATING AREA, BUT NOT LESS THAN THE LIVE LOAD INDICATED ON THE DRAWINGS FOR THE AREA WHERE GRATING IS LOCATED.
 - f. MAXIMUM FIBER STRESS FOR DESIGN LOAD: 12,000 POUNDS PER SQUARE INCH.
 - g. MAXIMUM DEFLECTION DUE TO DESIGN LOAD: 1/240 OF GRATING CLEAR SPAN.
 - h. MAXIMUM SPACING OF MAIN GRATING BARS: 1-1/8 INCHES CLEAR BETWEEN BARS.
 - i. MINIMUM GRATING HEIGHT: 1-1/2 INCHES.
 - j. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - 1) IKG BORDEN INDUSTRIES, GROOVED ALUMINUM I-BAR.
 - 2) BRODHEAD STEEL PRODUCTS, INC., GROOVED ALUMINUM I-BAR.
3. HEAVY-DUTY STEEL GRATING:
- a. HEAVY-DUTY TYPE, FABRICATED FROM STRUCTURAL STEEL AND DESIGNED IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, USING H-20 LOADING.
 - b. HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A 123.
 - c. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:

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- 1) RELIANCE STEEL PRODUCTS COMPANY, HEAVY-DUTY STEEL GRATING.
 - 2) SEIDELHUBER METAL PRODUCTS, INC., EQUIVALENT PRODUCT.
- G. METAL TREAD PLATE:
1. PLATE HAVING A RAISED FIGURED PATTERN ON 1 SURFACE TO PROVIDE IMPROVED TRACTION.
- H. PREFORMED CHANNEL PIPE SUPPORTS:
1. PREFORMED CHANNEL PIPE SUPPORTS FOR PIPE SUPPORTS AND OTHER APPLICATIONS.
- I. STAIRS:
1. ALUMINUM STAIRS:
 - a. STRINGERS: 6061-T6 ALUMINUM ALLOY.
 - b. STAIR TREADS:
 - 1) ALUMINUM OF SAME TYPE SPECIFIED UNDER ALUMINUM GRATING.
 - 2) OF SIZES INDICATED ON THE DRAWINGS, AND 1-3/4 INCH MINIMUM DEPTH WITH CAST ABRASIVE TYPE SAFETY NOSINGS.
 - c. HANDRAILS AND GUARDRAILS: ALUMINUM PIPE SPECIFIED UNDER ALUMINUM HANDRAILS AND GUARDRAILS (NONWELDED PIPE).
 - d. FASTENERS: TYPE 304 OR TYPE 316 STAINLESS STEEL.
- J. MISCELLANEOUS ALUMINUM:
1. FABRICATE ALUMINUM PRODUCTS, NOT COVERED SEPARATELY IN THIS SECTION, IN ACCORDANCE WITH THE BEST PRACTICES OF THE TRADE AND FIELD ASSEMBLY BY RIVETING OR BOLTING.
 2. DO NOT WELD OR FLAME CUT.
- K. MISCELLANEOUS STAINLESS STEEL:
1. PROVIDE MISCELLANEOUS STAINLESS STEEL ITEMS NOT SPECIFIED IN THIS SECTION AS INDICATED ON THE DRAWINGS OR SPECIFIED ELSEWHERE.
 - a. FABRICATE AND INSTALL IN ACCORDANCE WITH THE BEST PRACTICES OF THE TRADE.
 2. CLEANING AND PASSIVATION:
 - a. FOLLOWING SHOP FABRICATION OF STAINLESS STEEL MEMBERS, CLEAN AND PASSIVATE FABRICATIONS.
 - b. FINISH REQUIREMENTS: REMOVE FREE IRON, HEAT TINT OXIDES, WELD SCALE AND OTHER IMPURITIES, AND OBTAIN A PASSIVE FINISHED SURFACE.
 - c. PROVIDE QUALITY CONTROL TESTING TO VERIFY EFFECTIVENESS OF CLEANING AGENTS AND PROCEDURES AND TO CONFIRM THAT FINISHED SURFACES ARE CLEAN AND PASSIVATED.
 - 1) CONDUCT SAMPLE RUNS USING TEST SPECIMENS WITH PROPOSED CLEANING AGENTS AND PROCEDURES AS REQUIRED TO AVOID ADVERSE EFFECTS ON SURFACE FINISHES AND BASE MATERIALS.
 - d. PRE-CLEAN, CHEMICALLY DESCALE (PICKLE), AND FINAL CLEAN FABRICATIONS IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A 380 TO REMOVE DEPOSITED CONTAMINANTS BEFORE SHIPPING.
 - 1) PASSIVATION BY CITRIC ACID TREATMENT IS NOT ALLOWED.
 - a) IF DEGREASING IS REQUIRED BEFORE CLEANING TO REMOVE SCALE OR IRON OXIDE, CLEANING (PICKLING) TREATMENTS WITH CITRIC ACID ARE PERMISSIBLE; HOWEVER, THESE TREATMENTS SHALL BE FOLLOWED BY INORGANIC CLEANERS SUCH AS

NITRIC-HYDROFLUORIC ACID.

- 2) PROVIDE ACID DESCALING (PICKLING) IN ACCORDANCE WITH TABLE A1.1 OF ANNEX A1 OF ASTM A 380.
 - 3) AFTER PICKLING, FINAL CLEANING OF STAINLESS STEEL SHALL CONFORM TO PART II OF TABLE A2.1 OF ANNEX A2 OF ASTM A 380.
 - e. AFTER CLEANING, INSPECT USING METHODS SPECIFIED FOR "GROSS INSPECTION" IN ASTM A 380.
 - f. IMPROPERLY OR POORLY CLEANED AND PASSIVATED MATERIALS SHALL NOT BE SHIPPED AND WILL NOT BE ACCEPTED AT THE JOB SITE.
- L. MISCELLANEOUS STRUCTURAL STEEL:
1. PROVIDE MISCELLANEOUS STEEL ITEMS NOT SPECIFIED IN THIS SECTION AS INDICATED ON THE DRAWINGS OR SPECIFIED ELSEWHERE.
 - a. FABRICATE AND INSTALL IN ACCORDANCE WITH THE BEST PRACTICES OF THE TRADE.
- M. ISOLATING SLEEVES AND WASHERS:
1. AS INDICATED ON THE DRAWINGS AND AS SPECIFIED IN SECTION 050524.
- N. METAL BOLLARDS:
1. FABRICATE METAL BOLLARDS FROM SCHEDULE 40 STEEL PIPE.

2.03 MISCELLANEOUS MATERIALS

- A. WELDING RODS AND BARE ELECTRODES: SELECT ACCORDING AWS SPECIFICATIONS FOR METAL ALLOY WELDED.
- B. UNIVERSAL SHOP PRIMER: FAST-CURING, LEAD- AND CHROMATE-FREE, UNIVERSAL MODIFIED-ALKYD PRIMER COMPLYING WITH MPI#79. USE PRIMER CONTAINING PIGMENTS THAT MAKE IT EASILY DISTINGUISHABLE FROM ZIN-RICH PRIMER.
- C. ZINC-RICH PRIMER: URETHANE ZINC-RICH PRIMER COMPATIBLE WITH TOPCOAT SPECIFIED IN SECTION 099000
 1. AVAILABLE PRODUCTS: TNEMEC; SERIES 394 PERIMEPRIME, OR APPROVED EQUAL.
 2. VOC CONTENT: 250 G/L OR LESS.
- D. GALVANIZING REPAIR PAINT: HIGH-ZINC-DUST-CONTENT (95% BY WEIGHT) PAINT FOR REGALVANIZING WELDS IN STEEL, COMPLYING WITH SSPC-PAINT 20.
 1. AVAILABLE PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - a. DUNCAN GALVANIZING; ZIRP.
 - b. ZRC WORLDWIDE; GALVILITE GALVANIZING REPAIR, LOW VOC TYPE.
 2. VOC CONTENT: 250 G/L OR LESS.
- E. ISOLATION COATING (BITUMINOUS PAINT): ASTM D1187, COLD-APPLIED ASPHALT EMULSION, VOC COMPLIANT, COMPOUNDED FOR 15-MIL DRY FILM THICKNESS PER COAT. PROVIDE INERT-TYPE NONCORROSIVE COMPOUND FREE ASBESTOS FIBERS, SULFUR COMPONENTS, AND OTHER DELETERIOUS IMPURITIES.

PART 3 EXECUTION

3.01 EXAMINATION

A. VERIFICATION OF CONDITIONS:

1. EXAMINE WORK IN PLACE TO VERIFY THAT IT IS SATISFACTORY TO RECEIVE THE WORK OF THIS SECTION.
2. IF UNSATISFACTORY CONDITIONS EXIST, DO NOT BEGIN THIS WORK UNTIL SUCH CONDITIONS HAVE BEEN CORRECTED.

3.02 INSTALLATION

A. GENERAL:

1. INSTALL PRODUCTS AS INDICATED ON THE DRAWINGS, AND IN ACCORDANCE WITH SHOP DRAWINGS AND MANUFACTURER'S PRINTED INSTRUCTIONS, AS APPLICABLE EXCEPT WHERE SPECIFIED OTHERWISE.
2. INTERFACE BETWEEN MATERIALS:
 - a. DISSIMILAR METALS: WHERE STEEL COMES IN CONTACT WITH DISSIMILAR METALS (ALUMINUM, STAINLESS STEEL, ETC.), SEPARATE OR ISOLATE THE DISSIMILAR METALS.
 - 1) MAKE APPLICATION SO THAT THE ISOLATING OR PROTECTIVE BARRIER IS NOT VISIBLE IN THE COMPLETED CONSTRUCTION.
 - 2) ISOLATING SLEEVES AND WASHERS: AS SPECIFIED IN SECTION 050524.
 - b. ALUMINUM IN CONTACT WITH CONCRETE OR MASONRY: COAT ALUMINUM SURFACES AS SPECIFIED IN SECTION 099000.
 - c. ALUMINUM IN CONTACT WITH CONCRETE OR MASONRY.

B. ALUMINUM STAIR NOSING:

1. INSTALL STAIR NOSINGS ON TREADS OF CONCRETE STAIRS, INCLUDING TOP TREAD ON UPPER CONCRETE SLAB.
2. OMIT STAIR NOSINGS WHERE CONCRETE IS SUBMERGED.
3. CAST STAIR NOSINGS IN FRESH CONCRETE, FLUSH WITH TREAD AND RISER FACES. INSTALL NOSING IN CENTER OF STEP APPROXIMATELY 3 INCHES FROM EACH STAIR EDGE.

C. HANDRAILS AND GUARDRAILS:

1. GENERAL:

- a. FASTEN PIPE RAILS TO FITTINGS WITH SERIES 300 STAINLESS STEEL POP RIVETS OR FLUSH SET SCREWS.
- b. MAKE PIPE CUTS CLEAN AND STRAIGHT, FREE OF BURRS AND NICKS, AND SQUARE AND ACCURATE FOR MINIMUM JOINT-GAP.
- c. DRILL AND COUNTERSINK HOLES TO PROPER SIZE, AS REQUIRED FOR A TIGHT FLUSH FIT OF SCREWS AND OTHER COMPONENT PARTS.
- d. SPACE ATTACHMENT BRACKETS AS INDICATED IN THE MANUFACTURER'S INSTRUCTIONS.

2. ALUMINUM PIPE HANDRAILS AND GUARDRAILS:

- a. DURING CONSTRUCTION, KEEP EXTERIOR SURFACES OF HANDRAILS AND GUARDRAILS COVERED WITH 0.4 MILLIMETERS, MINIMUM, HEAT SHRINK POLYETHYLENE FILM.
- b. DO NOT REMOVE PROTECTIVE FILM BEFORE HANDRAILS AND GUARDRAILS HAVE BEEN ACCEPTED BY ENGINEER NOR BEFORE OTHER WORK IN PROXIMITY OF HANDRAILS AND GUARDRAILS HAS BEEN COMPLETED.

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- c. DISCONTINUE HANDRAILS AND GUARDRAILS AT LIGHTING FIXTURES.
 - d. PROVIDE 1/8-INCH DIAMETER WEEP HOLE AT BASE OF EACH POST.
 - e. SPACE POSTS AS INDICATED ON THE DRAWINGS.
 - f. ANCHOR POSTS INTO CONCRETE BY GROUTING POSTS INTO FORMED HOLES IN CONCRETE, INTO STAINLESS STEEL SLEEVES CAST IN CONCRETE; OR BRACKET MOUNT TO FACE OF CONCRETE SURFACES AS SPECIFIED AND INDICATED ON THE DRAWINGS.
 - g. SPACE RAILS AS INDICATED ON THE DRAWINGS.
 - h. MAKE ADEQUATE PROVISION FOR EXPANSION AND CONTRACTION OF KICK PLATES AND RAILS.
 - 1) MAKE PROVISIONS FOR REMOVABLE SECTIONS WHERE INDICATED ON THE DRAWINGS.
 - i. MAKE LOWER RAILS A SINGLE, UNSPLICED LENGTH BETWEEN POSTS, OR CONTINUOUS.
 - j. MAKE TOP RAILS CONTINUOUS WHENEVER POSSIBLE, AND ATTACH SINGLE, UNSPLICED LENGTHS TO 3 POSTS MINIMUM.
 - k. DRAW UP FASTENERS TIGHT WITH HAND WRENCH OR SCREW DRIVER.
 - l. SPACE ATTACHMENT BRACKETS AS INDICATED ON SHOP DRAWINGS OR IN MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 - m. COMPLETED INSTALLATION SHALL HAVE HANDRAILS AND RAILINGS RIGID AND FREE OF PLAY AT JOINTS AND ATTACHMENTS.
 - n. PROTECT HANDRAIL AND GUARDRAIL FINISH FROM SCRATCHES, GOUGES, DENTS, STAINS, AND OTHER DAMAGE.
 - o. REPLACE DAMAGED OR DISFIGURED HANDRAILS AND GUARDRAILS WITH NEW.
 - p. SHORTLY BEFORE FINAL ACCEPTANCE OF THE WORK, AND AFTER REMOVAL OF PROTECTIVE POLYETHYLENE FILM, CLEAN HANDRAILS AND GUARDRAILS WITH MILD DETERGENT OR WITH SOAP AND WATER.
 - 1) AFTER CLEANING, THOROUGHLY RINSE HANDRAILS AND GUARDRAILS AND WIPE WITH SOFT CLOTH.
 - q. ERECT GUARDRAIL STRAIGHT, LEVEL, PLUMB, AND TRUE TO THE POSITIONS AS INDICATED ON THE DRAWINGS. CORRECT DEVIATIONS FROM TRUE LINE OF GRADE, WHICH ARE VISIBLE TO THE EYE.
- D. LADDERS:
- 1. SECURE TO SUPPORTING SURFACE WITH BENT PLATE CLIPS PROVIDING MINIMUM 8 INCHES BETWEEN SUPPORTING SURFACE AND CENTER OF RUNGS.
 - 2. WHERE EXIT FROM LADDER IS FORWARD OVER TOP RUNG, EXTEND SIDE RAILS 3 FEET
 - a. 3 INCHES MINIMUM ABOVE LANDING, AND RETURN THE RAILS WITH A RADIUS BEND TO THE LANDING.
 - b. WHERE EXIT FROM LADDER IS TO SIDE, EXTEND LADDER 5 FEET 6 INCHES MINIMUM ABOVE LANDING AND RIGIDLY SECURE AT TOP.
 - 3. ERECT RAIL STRAIGHT, LEVEL, PLUMB, AND TRUE TO POSITION INDICATED ON THE DRAWINGS.
 - a. CORRECT DEVIATIONS FROM TRUE LINE OR GRADE WHICH ARE VISIBLE TO THE EYE.
- E. METAL GRATINGS:
- 1. GENERAL:
 - a. ALLOW 1/8-INCH MAXIMUM CLEARANCE BETWEEN ENDS OF GRATING AND INSIDE FACE OF VERTICAL LEG OF SHELF ANGLES.

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- b. HORIZONTAL BEARING LEG OF SHELF ANGLES SHALL BE 2 INCHES MINIMUM.
- c. INSTALL ALUMINUM PLATE OR ANGLES WHERE NECESSARY TO FILL OPENINGS AT CHANGES IN ELEVATION AND AT OPENINGS BETWEEN EQUIPMENT AND GRATING.
- d. INSTALL ANGLE STOPS AT ENDS OF GRATING.
- e. INSTALLED GRATING SHALL NOT SLIDE OUT OF REBATE OR OFF SUPPORT.
- f. WELD STOPS IN PLACE, UNLESS OTHERWISE SPECIFIED OR INDICATED ON THE DRAWINGS.
- g. TOP SURFACES OF GRATING SECTIONS ADJACENT TO EACH OTHER SHALL LIE IN SAME PLANE.
- 2. ALUMINUM GRATING:
 - a. ALUMINUM GRATING: SUPPORT ON ALUMINUM SHELF ANGLES OR REBATES.
- 3. HEAVY-DUTY STEEL GRATING:
 - a. SUPPORT ON HOT-DIP GALVANIZED STRUCTURAL STEEL REBATES EMBEDDED AND ANCHORED IN CONCRETE.
 - b. USE FOR ROADWAYS, TRAFFIC AREAS, AND WHERE INDICATED ON THE DRAWINGS.
- F. STAIRS:
 - 1. GENERAL:
 - a. INSTALL GUARD RAILINGS AROUND STAIR WELLS AS INDICATED ON THE DRAWINGS OR SPECIFIED.
- G. STAINLESS STEEL:
 - 1. WELDING:
 - a. PASSIVATE FIELD-WELDED SURFACES:
 - 1) PROVIDE CLEANING, PICKLING AND PASSIVATING AS SPECIFIED IN THIS SECTION.
 - 2) CLEAN USING DERUSTIT STAINLESS STEEL CLEANER, OR EQUAL.
- H. PIPE BOLLARDS:
 - 1. BOLLARDS CAN BE ANCHORED TO EXISTING CONSTRUCTION WITH ANCHOR BOLTS. PROVIDE FOUR 3/4 INCH BOLTS AT EACH BOLLARD UNLESS OTHERWISE INDICATED. BOLLARDS MAY ALSO BE EMBEDDED INTO NEW CONCRETE FOUNDATIONS.
 - 2. FILL BOLLARDS SOLIDLY WITH CONCRETE, MOUNDING TOP SURFACES TO SHED WATER.

3.03 ADJUSTING AND CLEANING

- A. TOUCHUP PAINTING: IMMEDIATELY AFTER ERECTION, CLEAN FIELD WELDS, BOLTED CONNECTIONS, AND ABRADED AREAS. PAINT UNCOATED AND ABRADED AREAS WITH THE SAME MATERIAL AS USED FOR SHOP PAINTING TO COMPLY WITH SSPC-PA 1 FOR TOUCHING UP SHOP-PAINTED SURFACES.
 - 1. APPLY BY BRUSH OR SPRAY TO PROVIDE A MINIMUM 2.0-MIL DRY FILM THICKNESS.
- B. TOUCH-UP AND REPAIR FOR GALVANIZED SURFACES: FOR DAMAGED AND FIELD-WELDED METAL COATED SURFACES, CLEAN WELDS, BOLTED CONNECTIONS AND ABRADED AREAS.
 - 1. FOR GALVANIZED SURFACES, APPLY ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780, MODIFIED TO 95 PERCENT ZINC IN DRY FILM. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT LESS THAN COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE. TOUCH-UP OF GALVANIZED SURFACES WITH SILVER PAINT, BRITE PAINT OR ALUMINUM PAINTS IS NOT ACCEPTABLE.
 - 2. FOR FACTORY APPLIED FINISH COATINGS, FIELD TOUCH-UP SHALL BE PERFORMED BY FACTORY APPROVED PERSONNEL. TOUCH-UP SHALL BE SUCH THAT REPAIR IS NOT VISIBLE FROM A

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DISTANCE OF 6 FEET.

3. A TOUCH-UP REPAIR KIT OR TOUCH-UP INSTRUCTIONS SHALL BE PROVIDED TO THE OWNER FOR EACH TYPE OF FACTORY-APPLIED FINISH.

END OF SECTION

SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel railings.

B. Related Requirements:

1. Section 055113 "Metal Pan Stairs" for steel tube railings associated with metal pan stairs.
2. Section 057300 "Decorative Metal Railings" for ornamental railings fabricated from pipes and tubes and guard-infill metals.
3. Section 096900 "Access Flooring" for railings included with access flooring.

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. 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. Expanded metal infill panels.
3. Perforated metal infill panels.
4. Woven-wire mesh infill panels.
5. Fasteners.
6. Post-installed anchors.
7. Handrail brackets.
8. Shop primer.
9. Intermediate coats and topcoats.
10. Bituminous paint.
11. Nonshrink, nonmetallic grout.
12. Anchoring cement.
13. Metal finishes.

14. Paint products.

B. Sustainable Design Submittals:

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

D. Samples for Initial Selection: For products involving selection of color, texture, or design[, **including mechanical finishes**].

E. Samples for Verification: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters, including finish.
2. Fittings and brackets.
3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.

a. Show method of [**connecting**][**and**][**finishing**] members at intersections.

F. Delegated Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

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 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. Tuttle, a Dant Clayton Division
 6. VIVA Railings, LLC
 7. Wagner Companies (The); R&B Wagner, Inc.
- B. Source Limitations: Obtain each type of railing from single source from single manufacturer.

PART 3 - EXECUTION

END OF SECTION 055213

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood products.
2. Wood-preservative-treated lumber.
3. Fire-retardant-treated lumber.
4. Dimension lumber framing.
5. Miscellaneous lumber.
6. Plywood backing panels.

B. Related Requirements:

1. Section 061533 "Wood Patio Decking" for elevated decks, including support framing.
2. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.
3. Section 061753 "Shop-Fabricated Wood Trusses" for wood trusses made from dimension lumber.
4. Section 064013 "Exterior Architectural Woodwork" for exterior wood stairs and railings.
5. Section 064023 "Interior Architectural Woodwork" for interior wood stairs and railings.
6. Section 313116 "Termite Control" for site application of borate treatment to wood framing.

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. SPIB: The Southern Pine Inspection Bureau.
 4. WCLIB: West Coast Lumber Inspection Bureau.
 5. WWPA: Western Wood Products Association.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5664.
 - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates:
 - 1. For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
 - 2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained.

1.5 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
PART 3 - EXECUTION

END OF SECTION 061000

**SECTION 061000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES: CARPENTRY NORMALLY NOT EXPOSED TO VIEW, RELATED METAL ITEMS, AND CONNECTORS.
- B. RELATED SECTIONS:
 - 1. SECTION 016000 - PRODUCT REQUIREMENTS.
 - 2. SECTION 051200 - STRUCTURAL STEEL.

1.02 REFERENCES

- A. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME):
 - 1. B18.2.1 - SQUARE AND HEX BOLTS AND SCREWS.
 - 2. B18.6.1 - WOOD SCREWS.
- B. AMERICAN SOFTWOOD LUMBER STANDARD (ASLS):
 - 1. PS 20 -SOFTWOOD LUMBER, PRODUCT STANDARD.
- C. ASTM INTERNATIONAL (ASTM):
 - 1. D226 - STANDARD SPECIFICATION FOR ASPHALT-SATURATED ORGANIC FELT USED IN ROOFING AND WATERPROOFING.
 - 2. F1667 - STANDARD SPECIFICATION FOR DRIVEN FASTENERS: NAILS, SPIKES, AND STAPLES.
- D. CALIFORNIA REDWOOD ASSOCIATION (CRA):
 - 1. STANDARD SPECIFICATION FOR GRADES OF CALIFORNIA REDWOOD LUMBER.
 - 2. REDWOOD INSPECTION SERVICE (RIS).
- E. U.S. DEPARTMENT OF COMMERCE (DOC):
 - 1. VOLUNTARY PRODUCT STANDARD PS 1-07 - STRUCTURAL PLYWOOD.
- F. WEST COAST LUMBER INSPECTION BUREAU (WCLIB):
 - 1. STANDARD NO. 17 - GRADING RULES FOR WEST COAST LUMBER.
- G. WESTERN WOOD PRODUCTS ASSOCIATION (WWPA):
 - 1. WESTERN LUMBER GRADING RULES.

1.03 SUBMITTALS

- A. SHOP DRAWINGS.
 - 1. PRODUCT DATA.

1.04 QUALITY ASSURANCE

- A. GRADE LUMBER IN ACCORDANCE WITH FOLLOWING:
 - 1. DOUGLAS FIR AND LARCH LUMBER:
 - a. WCLIB GRADING RULES.

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- b. WWPA GRADING RULES.
- c. ASLS PS 20.
- 2. REDWOOD LUMBER: CRA AND RIS GRADING RULES.
- B. STAMP EACH PIECE OF LUMBER WITH GRADE, SPECIES, AND SIZE.
- C. IDENTIFY EACH PANEL OF SOFTWOOD PLYWOOD WITH APPROPRIATE APA GRADE-TRADEMARK. PLYWOOD SHALL MEET REQUIREMENTS DOC PS 1-07.
- D. GRADE LUMBER 2 INCHES, 3 INCHES, AND 4 INCHES THICK IN ACCORDANCE WITH ASLS PS 20. IDENTIFY WITH GRADE NAME AND SPECIES ONLY WITHOUT REFERENCE TO PARAGRAPH NUMBERS.
- E. GRADE LUMBER 6 INCHES AND LARGER UNDER PROVISIONS OF WWPA. IDENTIFY WITH GRADE, SPECIES, AND SIZE. EQUIVALENT MEMBERS GRADED BY WCLIB WILL BE ACCEPTED UNLESS SPECIFICALLY EXCLUDED.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. COVER PRODUCTS FOR PROTECTION FROM DAMAGE AND MOISTURE.
- B. STACK LUMBER TO PERMIT GOOD AIR DRYING. POSITION SEPARATORS AT EACH LAYER AND BETWEEN SOIL AND FIRST LAYER

PART 2 PRODUCTS

2.01 WOOD

- A. MINIMUM LUMBER GRADE REQUIREMENTS FOR FRAMING AND SHEATHING:

CLASSIFICATION	NOMINAL SIZE	SPECIES AND MINIMUM GRADE
STUDS	2 BY 3, 2 BY 4	DF-L NUMBER 2 OR CONSTRUCTION
	2 BY 6, 2 BY 8	DF-L NUMBER 2
ROOF JOISTS	2 BY 6 THROUGH 2 BY 14	DF-L NUMBER 2
FLOOR JOISTS AND PLANKING	2 BY 6 THROUGH 2 BY 14	DF-L NUMBER 2
HEADERS, BEAMS, AND STRINGERS	4 BY 4 THROUGH 4 BY 14	DF-L NUMBER 1
	6 BY 6 THROUGH 6 BY 14	DF-L NUMBER 1 (WWPA 70-11)
POSTS AND TIMBERS	6 BY 6 AND LARGER	DF-L NUMBER 1
BOARDS	1 BY	DF-L CONSTRUCTION
FRAMING LUMBER	ALL SIZES	DF-L NUMBER 2
BLOCKING AND BRIDGING	2 BY 3 THROUGH 2 BY 14	DF-L NUMBER 3
DF-L = DOUGLAS FIR - LARCH (NORTH) GROUPING		

- B. SPECIES SHALL BE AS SPECIFIED, OR ANY COMBINATION OF SPECIES ALLOWED BY GRADING RULES.
- C. LUMBER 4 INCHES THICK AND LESS: SEASONED OR KILN-DRIED WITH MAXIMUM 19 PERCENT MOISTURE.
- D. LUMBER THICKER THAN 4 INCHES: SEASONED TO MINIMIZE WARPING AND TWISTING.
- E. LUMBER SURFACES: SURFACED FOUR SIDES (S4S), UNLESS OTHERWISE SPECIFIED OR INDICATED

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ON THE DRAWINGS.

- F. LUMBER SHALL BE FREE OF BOW, WARP, OR TWIST. PIECES WITH SERIOUS DEFECTS WILL BE DISCARDED REGARDLESS OF GRADING.
- G. SILLS, CANTS, AND NAILERS FOR FASCIA FOR ROOFING: PRESERVATIVE PRESSURE-TREATED NUMBER 2 OR BETTER DOUGLAS FIR.
- H. ROOF NAILERS: USE PRESERVATIVE PRESSURE-TREATED NUMBER 2 OR BETTER DOUGLAS FIR NAILERS FOR GRAVEL STOPS AT EDGES OF ROOF AND AT ROOF EXPANSION JOINTS. MATCH THICKNESS OF NAILERS AND ROOF INSULATION.
- I. REDWOOD:
- J. REDWOOD FOR BAFFLES AND STOP LOGS: [SELECT HEART.]

2.02 PLYWOOD

- A. PLYWOOD:
 - 1. DOC PS 1-09 FOR STRUCTURAL PLYWOOD.
- B. PLYWOOD WITH EDGES OR SURFACES PERMANENTLY EXPOSED TO WEATHER: EXTERIOR TYPE WITH EXTERIOR TYPE GLUE, GRADE A-C.
- C. PLYWOOD ROOF SHEATHING: EXTERIOR TYPE WITH EXTERIOR TYPE GLUE, OF THICKNESS AND GRADE AS INDICATED ON THE DRAWINGS.
- D. PLYWOOD SHEATHING EXPOSED AT OVERHANGS: EXTERIOR TYPE PLYWOOD WITH EXTERIOR TYPE GLUE, GRADE A-C OR BETTER.
- E. MISCELLANEOUS PLYWOOD: EXTERIOR TYPE PLYWOOD OF THICKNESS INDICATED ON THE DRAWINGS, GRADE A-C, OR AS OTHERWISE INDICATED ON THE DRAWINGS.
- F. PLYWOOD FOR ROOF DIAPHRAGMS AND SHEAR WALLS: AS INDICATED ON THE DRAWINGS.

2.03 ROUGH HARDWARE

- A. FASTENERS:
 - 1. NAILS: ASTM F1667 COMMON WIRE NAILS OR SPIKES WITH FULL HEAD.
 - 2. BOLTS, NUTS, AND STUDS: ASME B18.2.1, HOT-DIP GALVANIZED.
 - 3. WASHERS: HOT-DIP GALVANIZED SQUARE OR ROUND STEEL PLATE WASHERS, OR MALLEABLE IRON WASHERS WITH FOLLOWING DIMENSIONS:
 - a. HOT-DIP GALVANIZED SQUARE STEEL WASHERS:

BOLT DIAMETER	WASHER DIMENSIONS
1/2 INCH	2-1/2 BY 2-1/2 BY 1/4 INCHES
5/8 INCH	2-1/2 BY 2-1/2 BY 1/4 INCHES
3/4 INCH	2-3/4 BY 2-3/4 BY 5/16 INCHES
7/8 INCH	3-1/4 BY 3-1/4 BY 5/16 INCHES
1 INCH	3-3/4 BY 3-3/4 BY 3/8 INCHES

- b. HOT-DIP GALVANIZED ROUND STEEL WASHERS:

BOLT DIAMETER	WASHER DIMENSIONS
1/2 INCH	2-1/2 INCH DIAMETER BY 1/4 INCH
5/8 INCH	2-3/4 INCH DIAMETER BY 1/4 INCH
3/4 INCH	3 INCH DIAMETER BY 5/16 INCH

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7/8 INCH	3-1/2 INCH DIAMETER BY 3/8 INCH
1 INCH	4 INCH DIAMETER BY 7/16 INCH

c. ROUND MALLEABLE IRON WASHERS:

BOLT DIAMETER	WASHER DIMENSIONS
1/2 INCH	2-1/2 INCH DIAMETER BY 1/4 INCH
5/8 INCH	2-3/4 INCH DIAMETER BY 5/16 INCH
3/4 INCH	3 INCH DIAMETER BY 7/16 INCH
7/8 INCH	3-1/2 INCH DIAMETER BY 7/16 INCH
1 INCH	4 INCH DIAMETER BY 1/2 INCH

4. LAG SCREWS: ASME B18.2.1, HOT-DIP GALVANIZED.
5. WOOD SCREWS: ASME B18.6.1.
6. NAILS, SCREWS, BOLTS, PLATES, AND OTHER FASTENERS EXPOSED TO WEATHER OR ON BUILDING EXTERIORS SHALL BE HOT-DIP GALVANIZED OR OF SERIES 300 STAINLESS STEEL.
7. ANCHOR BOLTS, CONCRETE ANCHORS, FLUSH SHELLS, AND POWDER ACTUATED FASTENERS: AS SPECIFIED IN SECTION 051200.
8. SHEET METAL CONNECTORS:
 - a. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - 1) SIMPSON STRONG-TIE COMPANY, INC.
 - 2) USP STRUCTURAL CONNECTORS.
 - b. MATERIAL: SHEET STEEL, HOT-DIP GALVANIZED AFTER FABRICATION.
 - c. MODEL NUMBERS: AS INDICATED ON THE DRAWINGS.
 - d. NAILS, TYPICAL: COMMON, HOT-DIP GALVANIZED.
 - e. NAILS, JOIST HANGER: SPECIAL, HOT-DIP GALVANIZED, PROVIDING FULL BUILDING CODE LATERAL LOAD RESISTANCE VALUES FOR COMMON NAILS.
- B. MISCELLANEOUS HARDWARE:
 1. CLAMPS, EXPANSION SCREWS, ANCHORS, AND PLATES: STANDARD PRODUCTS OF ESTABLISHED MANUFACTURERS OF PROPER SIZE AND STRENGTH TO ADEQUATELY FASTEN, SUPPORT, AND MAINTAIN MEMBERS IN PLACE.
 2. HARDWARE EXPOSED TO WEATHER OR ON BUILDING EXTERIORS: HOT-DIP GALVANIZED.
- C. BUILDING PAPER: ASTM D226; UNPERFORATED; NO. 15 UNLESS OTHERWISE INDICATED.

PART 3 EXECUTION

3.01 EXAMINATION

- A. VERIFY THAT CONDITIONS ARE SATISFACTORY FOR INSTALLATION OF PRODUCTS AS SPECIFIED IN SECTION 016000.

3.02 GENERAL

- A. NOTCH, COPE, AND MITER MEETING MEMBERS SO MEETING MEMBERS HAVE FULL BEARING WITHOUT OVERCUTTING OR UNDERCUTTING.
- B. ACCURATELY CUT, FIT, AND FRAME LUMBER.

3.03 SILLS AND PLATES

- A. INSTALL 2 LAYERS OF BUILDING PAPER UNDER SILLS AND MEMBERS FASTEN TO CONCRETE OR MASONRY.
- B. SECURE SILLS TO FOUNDATION AS INDICATED ON THE DRAWINGS. WHEN NOT INDICATED ON THE DRAWINGS, ANCHOR SILLS WITH 1/2-INCH DIAMETER HOT-DIP GALVANIZED ANCHOR BOLTS AT 4-FOOT CENTERS AND WITHIN A MINIMUM OF 6 INCHES FROM EACH END OF EACH MEMBER.
- C. SET PLATES ON TOP OF MASONRY AND CONCRETE WALLS LEVEL AND IN SAME PLANE.
- D. ANCHOR PLATES TO MASONRY OR CONCRETE WITH ANCHOR BOLTS OF SIZE AND SPACING INDICATED ON THE DRAWINGS. INSTALL ANCHOR BOLT WITHIN 6 INCHES OF MEMBER ENDS.
- E. USE CEMENT GROUT, WHEN NECESSARY, TO ASSURE FULL BEDDING AND LEVELING OF PLATES.

3.04 WALLS

- A. ERECT WALLS PLUMB AND TRUE TO LINE.
- B. FRAME WALLS AND PARTITIONS WITH STUDS OF SIZES AND SPACING INDICATED ON THE DRAWINGS AND AT NOT GREATER THAN 16 INCHES ON CENTER.
- C. PROVIDE DOUBLE STUDS AT OPENINGS AND TRIPLE STUDS AT CORNERS.
- D. PROVIDE DOUBLE PLATES AT TOP OF WALL STUDS, ARRANGING TO FORM CONTINUOUS HORIZONTAL TIES. SPLICE INDIVIDUAL PLATES AND STAGGER ENDS OF DOUBLE PLATES.
- E. PROVIDE TWO 2-BY-6 LINTELS FOR OPENINGS UP TO 48 INCHES AND TWO 2-BY-8 LINTELS FOR OPENINGS FROM 48 INCHES TO 72 INCHES.
- F. FRAME OPENINGS FOR LARGE PIPES AND DUCTS AND FOR RECEIVING RECESSED WORK IN PARTITIONS WITHOUT CUTTING STRUCTURAL MEMBERS.
- G. PLACE NAILING BLOCKS AND BACKING NECESSARY FOR ATTACHMENT OF GROUND, TRIM, FIXTURES, AND MISCELLANEOUS ITEMS. CUT, FUR, AND INSTALL BACKING REQUIRED FOR PLUMBING AND HEATING PIPES, FIXTURES, AND ELECTRICAL WORK.
- H. PROVIDE FIRE RETARDANT PRESSURE-TREATED WOOD WITHIN METAL-FRAMED PARTITIONS AND FURRING.
- I. PROVIDE BLOCKING FOR ATTACHING PANELING, TRIM, AND SIMILAR ITEMS TO FRAMING.
- J. DO NOT CUT WOOD BEAMS OR JOISTS AND PLATES IN BEARING WALLS FOR PASSAGE OF PIPES.
- K. COORDINATE REQUIREMENTS FOR SLEEPERS FOR MECHANICAL EQUIPMENT AND CURB OPENINGS WITH WORK OF OTHER SECTIONS FOR LOCATIONS AND SIZES.

3.05 ROUGH HARDWARE

- A. PROVIDE NAILING AS INDICATED ON THE DRAWINGS OR IN ACCORDANCE WITH FASTENING SCHEDULE SPECIFIED IN BUILDING CODE, WHICHEVER IS MORE STRINGENT. DO NOT USE BOX AND SINKER NAILS.
- B. INSTALL BOLTS AND OTHER FASTENINGS AS INDICATED ON THE DRAWINGS OR IN ACCORDANCE WITH BUILDING CODE, WHICHEVER IS MORE STRINGENT.
- C. PREBORE NAIL HOLES WHERE REQUIRED TO AVOID SPLITTING OF WOOD MEMBERS. REMOVE AND REPLACE SPLIT PIECES.
- D. PREBORE HOLES FOR SCREWS AND LAG SCREWS, THEN SCREW INTO PLACE. WHEN WOOD SCREWS AND LAG SCREWS ARE DEFECTIVE BECAUSE THEY HAVE BEEN DRIVEN INTO PLACE WITH HAMMER, REPLACE WOOD MEMBERS INVOLVED WITH NEW MEMBERS.
- E. DRILL HOLES FOR BOLTS 1/32-INCH LARGER THAN BOLT SHANK UNLESS OTHERWISE INDICATED ON

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THE DRAWINGS.

- F. PERFORM FINAL BOLTING AFTER STRUCTURAL MEMBERS HAVE BEEN PROPERLY ALIGNED.
- G. PLACE WASHERS UNDER HEADS OF BOLTS AND NUTS AND HEADS OF LAG SCREWS BEARING ON WOOD. ALIGN EXPOSED BOLTS.
- H. POWER NAILING WILL BE PERMITTED WHERE NAILS ARE AS SPECIFIED AND PROVIDED INSTALLATION DOES NOT MAR OR DAMAGE WOOD MEMBERS. NAILS SHALL HAVE FULL HEAD. DO NOT OVERDRIVE NAILS.
- I. DRIVE NAIL HEADS FOR PLYWOOD DIAPHRAGMS FLUSH WITH PLYWOOD SURFACE. WHERE NAILS HAVE BEEN OVERDRIVEN IN PLYWOOD PANEL, REMOVE AND REPLACE PLYWOOD, NAILS, AND DAMAGED SUPPORTING MEMBERS.
 - 1. USE COMMON NAILS UNLESS OTHERWISE INDICATED ON THE DRAWINGS

END OF SECTION

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements:

1. Section 061000 "Rough Carpentry" for plywood backing panels.
2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Wall sheathing.
2. Roof sheathing.

1.3 DELIVERY, STORAGE, AND HANDLING

- ##### A.
- Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 ROOF SHEATHING

A. Plywood Sheathing, Roofs: DOC PS 1, Exterior, Structural I sheathing.

1. Span Rating: Not less than [16/0][20/0][24/0][32/16][40/20][48/24].
2. Nominal Thickness: Not less than 1/2 inch.

PART 3 - EXECUTION

END OF SECTION 061600

SECTION 061753
SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pre-engineered, pre-fabricated wood trusses, consisting of top and bottom chord members connected with diagonal web members.
 - 2. Engineering design of wood trusses.
 - 3. Manufacture and erection of wood trusses, including all temporary and permanent required bracing, whether shown on the Drawings or not.
- B. Related Sections:
 - 1. Section 052100 – Steel Joist Framing.
 - 2. Section 061000 – Rough Carpentry: Fabricated steel connections with bolts.
 - 3. Section 061800 – Glued-Laminated Construction: Providing and installing glulam beams.

1.2 REFERENCES

- A. The following references, codes and standards are hereby made a part of this Section. Conform to the applicable requirements therein except as otherwise specified herein or shown on the Drawings. Nothing contained herein shall be construed as permitting work that is contrary to code requirements.
- B. American Plywood Association (APA), latest edition.
 - 1. "Product Guide to Grades and Specifications".
- C. American Society for Testing and Materials (ASTM), latest edition:
 - 1. A36/A36M: "Specification for Carbon Structural Steel C33; "Standard Specification for Concrete Aggregates".
 - 2. A123/A123M; "Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products".
- D. International Conference of Building Officials (ICBO), latest edition.
 - 1. California Building Code, Volume 2, Chapter 23, "Wood".
- E. Redwood Inspection Service (RIS), latest edition.
 - 1. "Standard Specifications for Grades of California Lumber".
- F. Truss Plate Institute (TPI), latest edition.
 - 1. BWT-76; "Bracing Wood Trusses: Commentary and Recommendations (see A & E Section 8)".
 - 2. HET-80; "Handling and Erecting Wood Trusses: Commentary and Recommendations (see A & E Section 8)".
 - 3. PCT-80; "Design Specification for Metal Plate Connected Parallel Chord Wood Trusses (Floor)".
 - 4. PCT-80 Supplement; "Interim Design Methodology For PCT-C11 4x2 Wood Trusses".
 - 5. TPI-85; "Design Specification for Metal Plate Connected Wood Trusses (Roof)".

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6. TPI-85 Supplement; "Interim Design Methodology For PCT-C11 4x2 Wood Trusses".
 7. TPI QST-88; "Quality Standard for Metal Plate Connected Wood Trusses".
- G. Western Wood Products Association (WWPA), latest edition.
1. "Western Lumber Grading Rules".

1.3 DESIGN CRITERIA

- A. Design wood trusses using criteria indicated on the Drawings and in accordance with Uniform Building Code live load requirements. Designs must be made, certified, stamped and signed by a civil or structural engineer licensed in California.
- B. Design all trusses to fit span, spacing and configuration requirements indicated on the Drawings. Make all interface conditions compatible with other structural and architectural building elements.

1.4 SHOP DRAWINGS

- A. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer. Show fabrication and installation details for trusses.
1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
 2. Indicate sizes, stress grades, and species of lumber.
 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
 4. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
 5. Show splice details and bearing details.
 6. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Product Certificates: For pre-engineered wood trusses, signed by officer of truss fabricating firm.
- C. Qualification Data: For metal-plate manufacturer, professional engineer, and fabricator.
- D. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- E. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Metal-plate connectors.
 2. Metal truss accessories.

1.5 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

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- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.
- C. Source Limitations for Connector Plates: Obtain metal connector plates from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations of TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."
 - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
 - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
 - 3. Provide for air circulation around stacks and under coverings.
 - 4. Store to provide protection from termites.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

1.7 COORDINATION

- A. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying progress of other trades whose work must follow erection of trusses.

PART 2 - MATERIALS

2.1 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of grading agencies 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, omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Provide dressed lumber, S4S.
 - 4. Provide dry lumber with 19 percent maximum moisture content **low enough to preclude excessive shrinkage after installation** at time of dressing.
- B. Lumber Grading: In accordance with the NFPA; National Design Specification for Stress Grade Lumber and Its Fastenings, latest edition,
 - 1. Grade lumber to meet the stress requirements of the design calculations.
- C. Plywood Grading: In accordance with the rules of the American Plywood Association.
- D. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000.
- E. Lumber defects such as wane or knots occurring in the connector plate area may not affect more than ten percent of required plate area or number of effective teeth required for each truss member.

2.2 METAL CONNECTOR PLATES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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1. ITW Building Components Group, Inc., Alpine Engineered Products.
2. CompuTrus, Inc.
3. Truswal Systems Corporation.

B. General: Fabricate connector plates to comply with TPI 1.

C. Hot-Dip Galvanized Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: NES NER-272.

2.4 METAL TRUSS ACCESSORIES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. KC Metals Products, Inc.
2. Simpson Strong-Tie Co., Inc.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 (Z180) coating designation.

D. Truss Tie-Downs (Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/4 inches (57 mm) wide by 0.062 inch (1.6 mm) thick. Tie fits over top of truss and fastens to both sides of truss, top plates, and one side of stud below.

1. Manufacturer: Simpson Strong-Tie; "H-7".

E. Truss Tie-Downs (Seismic Ties): Bent strap tie for fastening roof trusses to wall studs below, 2-1/2 inches (63 mm) wide by 0.062 inch (1.6 mm) thick. Tie fits over top of truss and fastens to both sides of truss, inside face of top plates, and both sides of stud below.

1. Manufacturer: Simpson Strong-Tie; "H-15".

F. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches (32 mm) wide by 0.050 inch (1.3 mm) thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

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2.5 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 94 percent zinc dust by weight.

2.6 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
 - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Lay out trusses properly, closely fitted, accurately plumbed, leveled and aligned.
- F. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in truss accessories according to manufacturer's fastening schedules and written instructions.
- G. Install trusses making proper provisions for work of other trades. Cut wood as required to accommodate plumbing, heating and ventilating, electrical and other trades, and as permitted by truss design. Fit neatly around all exposed items, such as outlet boxes, conduit, pipes and ducts.
- H. Do not cut, notch or bore structural members without specific approval. Bolt, nail, and spike in a thorough manner with not less than the sizes and quantities of fasteners indicated or specified. Install trusses to provide full contact at all bearing surfaces.
- I. Connector Plates: Applied to both faces of truss at each joint, provide firm even contact between the plate and the wood
 - 1. Maximum Tolerance: 1/16-inch.
 - 2. Open Joint Tolerances: Comply with TPI QST-88.

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- J. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
- K. Securely brace trusses both during erection and after permanent installation in accordance with TPI BWT-76.
 - 1. Use erection bracing to hold trusses straight and plumb and in safe condition until decking and permanent truss bracing has been fastened forming a structurally sound roof framing system.
 - 2. Install permanent structural cross bracing to ensure overall rigidity of the roof system in accordance with Drawings. See truss design drawings for any additional special bracing requirements.
- L. Do not cut or remove truss members.
- M. Replace wood trusses that are damaged or do not meet requirements.
 - 1. Do not alter trusses in field.

3.2 REMOVAL OF MATERIALS

- A. Termite Control and Decay Prevention: Remove all wood, including form lumber, scrap lumber, shavings and sawdust, in contact with ground. Leave no wood buried in any fill or backfill.

3.3 REPAIRS AND PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.
- C. Provide adequate protection from damage for installed work. Repair or replace damaged work as directed by the Architect/Engineer.

END OF SECTION

**SECTION 061800
GLUED-LAMINATED CONSTRUCTION**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural glued-laminated lumber shown on Drawings.
 - 2. All glued-laminated lumber shown on Drawings including glulam purlins.
 - 3. All required temporary bracing for glulam members.
 - 4. Installation, only, of hardware connecting glulam members to glulam members.
 - 5. Glulam hardware at hinge connections, wood column caps.
 - 6. Glulam hardware at hinge connections.
- B. Related Sections:
 - 1. Section 051200 – Structural Steel Framing: Steel columns.
 - 2. Section 061000 – Rough Carpentry: Furnishing of hardware connecting glulams to other glulams and other portions of the work, except as noted in 1.01 above.

1.2 REFERENCES

- A. The following references, codes and standards are hereby made a part of this Section. Conform to the applicable requirements therein except as otherwise specified herein or shown on Drawings. Nothing contained herein shall be construed as permitting work that is contrary to code requirements.
- B. American Institute of Timber Construction (AITC), latest edition.
 - 1. A190.1; "American National Standard, Structural Glued Laminated Timber".
 - 2. 110; "Standard Appearance Grades for Structural Glued Laminated Timber".
 - 3. 117; "Standard Specifications for Structural Glued-Laminated Timber of Softwood Species".
 - 4. 203; "Standard Specifications for Structural Glued Laminated Timber".
 - 5. Certificate of Conformance, with Attachments Numbers 1 and 2.
- C. National Institute of Standards and Technology (NIST), U.S. Department of Commerce (DOC).
 - 1. "Structural Glued-Laminated Timber ,Voluntary Product Standard PS 56".
- D. West Coast Lumber Inspection Bureau (WCLIB), latest edition.
 - 1. "Standard Grading and Dressing Rule # 16".
- E. Western Wood Products Association, (WWPA), latest edition.
 - 1. "Western Lumber Grading Rules".

1.3 DEFINITIONS

- A. Structural Glued-Laminated (Glulam) Timber: An engineered, stress-rated timber product assembled from selected and prepared wood laminations bonded together with adhesives and with the grain of the laminations approximately parallel longitudinally.

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1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Include data on lumber, adhesives, fabrication, and protection.
 - 2. For preservative-treated wood products, include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
 - 3. For connectors, include installation instructions.
- B. Shop Drawings:
 - 1. Show layout of structural glued-laminated timber system and full dimensions of each member.
 - 2. Indicate species and laminating combination, adhesive type, and other variables in required work.
 - 3. Show member types, dimensions, appearance grade, surface finish, combination symbols, number of laminations, design stresses and erection details.
- C. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.
 - 1. Provide certificates in triplicate.
- D. Research/Evaluation Reports: For structural glued-laminated timber and timber connectors, from ICBO.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide factory-glued structural units produced by an AITC- or APA-licensed firm with no less than 5 years experience.
 - 1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that will not be exposed in the completed Work.
- B. Quality Standard: Comply with AITC A190.1.
- C. Members shall be marked with a qualified inspection and testing agency mark, and, in addition, all costs of inspection shall be paid by the Contractor.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with provisions in AITC 111.
- B. Schedule delivery of members so as not to delay progress of the Work.
- C. Deliver members to site in undamaged condition, protecting them as required in transit. Protect members from weather while stored on site and after being erected, until covered by other work.
- D. Wrapping of Members (Individual or Bundle) Optional with Contractor. If members are furnished without wrapping, take precautions to ensure that members are protected against wetting.

PART 2 - PRODUCTS

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2.1 STRUCTURAL GLUED-LAMINATED TIMBER

- A. General: Provide structural glued-laminated timber that complies with AITC 117 or research/evaluation reports acceptable to authorities having jurisdiction.
- B. Lumber: Unless otherwise noted on Drawings, provide glued laminated timber manufactured from species and grades of lumber which produce design values equal to or exceeding the following:
 - 1. Beams and Girders:
 - a. Bending (F_b) = 2,400 psi
 - b. Horizontal Shear (F_v) = 155 psi
 - c. Modulus of Elasticity (E) = 1,700,000 psi
 - d. Compression Perpendicular to Grain (Tension Face) (F_c) = 450 psi
 - e. Compression Perpendicular to Grain (Compression Face) (F_c) = 450 psi
 - f. Tension Parallel to grain (F_t) = 1100 psi
 - 2. Roof Purlins (3-1/8" Wide):
 - a. F_b = 2,400 psi
 - b. F_v = 155 psi
 - c. E = 1,700,000 psi
- C. Columns Stress Grade: Equivalent to Douglas Fir/Larch, Combination 3.
- D. **Appearance Grade: Industrial**, complying with AITC 110, unless otherwise shown on Drawings.
- E. **Appearance Grade: Architectural**, complying with AITC 110, unless otherwise shown on Drawings.

2.2 TIMBER CONNECTORS

- A. General: Unless otherwise indicated, fabricate from the following materials:
 - 1. Structural-steel shapes, plates, and flat bars complying with ASTM A36/A36M.
 - 2. Round steel bars complying with ASTM A575, Grade M1020.
 - 3. Hot-rolled steel sheet complying with ASTM A1011/A1011M, Structural Steel, Type SS, Grade 33.
- B. Fabricate beam seats from steel with bearing plates sized as indicated on Drawings, **3/4-inch- (19-mm-) diameter-by-12-inch- (300-mm-) long deformed bar anchors, and 0.239-inch (6-mm) side plates.**
- C. Fabricate beam hangers from steel with 0.179-inch (4.6-mm) stirrups and 0.239-inch (6-mm) top plates.
- D. Fabricate hinge connectors from steel with 0.179-inch (4.6-mm) side plates and 3/4-inch (19-mm) **[1-inch (25-mm)]** top and bottom plates.
- E. Fabricate strap ties from steel, thickness as indicated on Drawings.
- F. Fabricate tie rods from round steel bars with upset threads connected with forged-steel turnbuckles complying with ASTM A668/A668M.
- G. Provide bolts, 3/4 inch (19 mm) unless otherwise indicated, complying with ASTM A307, Grade A (ASTM F568M, Property Class 4.6); nuts complying with ASTM A563 (ASTM A563M); and, where indicated, flat washers.
- H. Glued Laminated Hardware: Provide at hinges, wood column caps and bases.

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1. Manufacturer: Simpson STRONG-TIE or equal.
- I. Provide shear plates of diameter indicated on Drawings, complying with ASTM D5933.
- J. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil (0.05-mm) dry film thickness.
- K. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A123/A123M or ASTM A153/A153M.

2.3 ADHESIVES

- A. Provide structural glued-laminated timber made with wet-use adhesive complying with ASTM D2559. Interior (Dry-Use) type adhesives will not be permitted.
- B. Use water-resistant casein type adhesives in accordance with UBC Standards Section 2303.1.7.1.
- C. Use wet-use adhesive type adhesive on all glulam lumber exposed to weather, located outside the main walls of the building.
- D. Exterior type adhesives shall comply with the requirements of Military Specification on MIL-A-397B, for room and intermediate temperature setting resin adhesives of phenol, resorcinol and melamine base or Military Specification MIL-5534-A, for high temperature setting resin adhesives of phenol, resorcinol and melamine base.

2.4 FABRICATION

- A. Fabricate glued-laminated lumber in a plant conforming to AITC quality control standards. Accompany each shipment supplied to the Project with the standard AITC certificate of conformance.
- B. Fabricate glued-laminated lumber in accordance with AITC 203, and conform to the fabrication requirements of the Uniform Building Code, latest edition.
 1. Lumber: Douglas Fir/Larch.
 2. Alternate Acceptable Lumber:
 - a. Western Hemlock fabricated in accordance with ICBO Research Recommendation No. 3327.
 - b. Hem Fir fabricated in accordance with ICBO Research Recommendation No. 3311.
 3. Hem-Fir Beams: Fabricate with 2 laminations of Douglas Fir at both the top and the bottom.
 4. Regardless of the type of lumber, fabricate glued-laminated beams to provide the same allowable stresses as listed in the UBC for the combination of Douglas Fir-Larch specified.
- C. Cantilevered Glued Laminated Beams: Provide with tension laminations at top extending for twice the cantilever length from end of beam.
- D. Certificate of Inspection: Provide for glued laminated beams to the Engineer and to the local building department.
 1. Inspection: Independent inspection agency approved by the Engineer and by the local building department.
 2. Report of Inspection: Indicate continuous inspection during the fabrication process by the inspector, who shall not be an employee of the fabricator.
- E. Moisture Content:
 1. At Time of Gluing: No less than 7%, nor more than 16%.

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2. Range of Moisture Content In Any One Member: Not to exceed 5%.
- F. Laminations: Machine finished (not sanded) to a smooth surface and uniform thickness with maximum allowable variation of 1/64-inch. Warp, twist or other characteristics which would prevent proper glued-contact or proper curvature will not be permitted. Clean surfaces free of coatings or material which would prevent proper adhesion.
- G. Identification: Suitably mark each member with identification as to its final location. Identify tops of beams unless configuration makes top obvious.
- H. Form beam cambers as shown on Drawings.
- I. Do not notch, drill, taper, dap or cut members in any way except as shown on Drawings. Make notches, daps and tapers shown on Drawings in factory; do not cut in the field.
 1. Predrill for fasteners using timber connectors as templates.
 2. Dress exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.
 3. Coat cross cuts with end sealer.
- J. Provide members, particularly beams, of lengths sufficient to provide proper bearing areas, allowing for normal tolerances in alignment and plumb of supporting walls and columns.
 1. Run one end of at least one beam in each continuous line "wild", and cut in field to allow for slight differences between dimensions shown and those actually obtained in the field.

2.5 FACTORY FINISHING

- A. Trim ends of members and seal ends, cuts and mortises.
- B. Wiped Stain Finish: Manufacturer's standard, dry-appearance, penetrating acrylic stain and sealer; oven dried and resistant to mildew and fungus.
 1. Color: As selected by Architect from manufacturer's full range.
- C. Clear Finish: Manufacturer's standard, two-coat, clear conversion varnish finish; oven dried and resistant to mildew and fungus.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates in areas to receive structural glued-laminated timber, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of structural glued-laminated timber.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

- A. General: Erect structural glued-laminated timber true and plumb, and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
 1. Lift with padded slings and protect corners with wood blocking.

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- B. Perform work in a neat and workmanlike manner. Set members accurately, closely fitted, aligned, and rigidly secured in place. Brace all members as required for safety.
- C. Comply with details on Drawings.
- D. Coordinate with Section 051200 for metal connectors and fittings and be responsible for installation and mounting of such items as a part of the work of this Section.
- E. Only permit original fabricator to make repairs of damaged members. Repairs are subject to approval of Structural Engineer.
- F. Tapering, dapping, notching or drilling of members is limited to those locations shown on approved shop drawings; do not make modifications to structural glued-laminated timber in the field.
- G. Where ends of members are field trimmed, apply same sealer as used in the shop to cut portions.
- H. Leave required field bracing in place until roof sheathing is nailed or until other permanent portions of the structure are installed so as to stabilize the beams and columns as required for safety.

3.3 ADJUSTING

- A. Repair damaged surfaces and finishes after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Engineer.

3.4 PROTECTION

- A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose including protection from weather, sunlight, soiling, and damage from work of other trades.
 - 1. Coordinate wrapping removal with finishing work specified in Division 9. Retain wrapping where it can serve as a painting shield.

END OF SECTION

SECTION 062013 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior trim.
2. Lumber siding.
3. Lumber soffits.

PART 2 - PRODUCTS

2.1 EXTERIOR TRIM

- A. Foam-Plastic Moldings: Molded product of shapes indicated, recommended by manufacturer for exterior use, with a tough outer skin on exposed surfaces; factory primed. Exposed surfaces are not to be shaped after molding.
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. Architectural Mall, Inc
 - b. Carter Millwork
 - c. Chemcrest Inc.; a division of Foamcore
 - d. Diamond Mfg., Inc.
 - e. Focal Point Products
 - f. Fypon LLC
 - g. Melton Classics Inc.
 - h. Vintage Mouldings Manufacturing Ltd.
 - i. Worthington Millwork, LLC.
 2. Density: Not less than **20 lb/cu. ft.**
 3. Flame-Spread Index: Not more than [75]<Insert number> when tested in accordance with ASTM E84.
 4. Thickness: Not more than **1/2 inch.**
 5. Width: Not more than **8 inches.**
 6. Patterns: **[As indicated by manufacturer's designations][Match Architect's samples].**

2.2 MISCELLANEOUS MATERIALS

PART 3 - EXECUTION

END OF SECTION 062013

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Shelving and clothes rods.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view[**and for framing exposed to view**].
2. Section 099123 "Interior Painting" for priming and backpriming of interior finish carpentry.

1.2 DEFINITIONS

- ##### A. MDF: Medium-density fiberboard.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Shelving and clothes rods.

PART 2 - PRODUCTS

2.1 INTERIOR TRIM

2.2 PANELING

2.3 SHELVING AND CLOTHES RODS

- ##### A. Shelf Brackets with Rod Support: BHMA A156.16, B04051; prime-painted formed steel.

PART 3 - EXECUTION

END OF SECTION 062023

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass-fiber blanket insulation.
- B. Related Requirements:

1.2 INFORMATIONAL SUBMITTALS

- A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.
 - 1. Sign, date, and post the certification in a conspicuous location on Project site.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.
- B. Glass-Fiber Blanket Insulation, Foil Faced: ASTM C665, Type III (reflective faced), Class B (faced surface with a flame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

2.2 MINERAL-WOOL BOARD INSULATION

2.3 INSULATION FASTENERS

2.4 ACCESSORIES

- A. Insulation for Miscellaneous Voids:

PART 3 - EXECUTION

END OF SECTION 072100

SECTION 072600 - VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyethylene vapor retarders.
2. Reinforced-polyethylene vapor retarders.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for under-slab vapor retarders.
2. Section 072100 "Thermal Insulation" for vapor retarders integral with insulation products.

PART 2 - PRODUCTS

2.1 REINFORCED-POLYETHYLENE VAPOR RETARDERS

- A. Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than **20 lb/1000 sq. ft.**, with maximum permeance rating of **0.1 perm.**

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. ISI Building Products
 - b. Reef Industries, Inc.
 - c. Viaflex
 - d. W. R. Meadows, Inc

PART 3 - EXECUTION

END OF SECTION 072600

SECTION 073213 - CLAY ROOF TILES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Clay roof tiles.
2. Underlayment materials.
3. Metal flashing and trim.

B. Related Requirements:

1. Section 077253 "Snow Guards" for snow guards.

1.2 UNIT PRICES

- A. See Section 012200 "Unit Prices" for description of unit prices affecting items specified under this Section.

1.3 ALTERNATES

- A. See Section 012300 "Alternates" for description of alternates affecting items specified under this Section.

1.4 DEFINITIONS

- A. Roofing Terminology: See ASTM D1079 and glossary in TRI/WSRCA's "Concrete and Clay Roof Tile Installation Manual" for definitions of terms related to roofing Work in this Section.

1.5 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. Clay Roof Tiles: 100 sq. ft. of each type, in unbroken bundles.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store underlayment rolls in a dry, well-ventilated location protected from weather,

sunlight, and moisture in accordance with manufacturer's written instructions.

1. Store on end, on pallets or other raised surfaces. Do not double-stack rolls.
- B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing Work is not in progress.
- C. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit product installation and related Work to be performed in accordance with manufacturer's written instructions and warranty requirements.
 1. Install self-adhering, polymer-modified bitumen sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.8 WARRANTY

- A. Materials Warranty: Manufacturer agrees to repair or replace clay roof tiles that fail in materials within specified warranty period.
 1. Warranty Period: 5 years from date of Substantial Completion.
- B. Roofing Installer's Warranty: On warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of clay-tile roofing 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 CLAY ROOF TILES

- A. Clay Roof Tiles: ASTM C1167, molded- or extruded-clay roof tile units of shape and configuration indicated, kiln fired, and free of surface imperfections. Provide with fastening holes prepunched at factory before firing.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Boral Roofing LLC; Boral USA
 2. Durability: Grade 2.

3. High-Profile Shape: Type I, two-piece straight barrel mission.
 - a. Accessory Tiles: Ridge,hip and hip starter,starter,eave closure units.
4. Finish and Texture: Matte, smooth.
5. Color: "Mission El Camino" Blend.

2.2 UNDERLAYMENT MATERIALS

- A. Self-Adhering, Polymer-Modified Bitumen Sheet: ASTM D1970/D1970M, minimum 60-mil- thick sheet; glass-fiber-mat-reinforced, polymer-modified asphalt; with slip-resistant top surface and release backing; cold applied; and recommended in writing by manufacturer for use in tile roofing system required. Provide primer for adjoining concrete, masonry, and metal surfaces to receive underlayment.

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. [ALCO Products LLC]
 - b. [Atlas Polyiso Roof and Wall Insulation]
 - c. [Carlisle WIP Products; a brand of Carlisle Construction Materials]
 - d. [CertainTeed; SAINT-GOBAIN]
 - e. [Drexel Metals Corp.]
 - f. [GAF]
 - g. [GCP Applied Technologies Inc.]
 - h. [Henry, a Carlisle Company (formerly Henry Company and Carlisle Coatings & Waterproofing Inc. brands)]
 - i. [IKO Industries Inc.]
 - j. [Malarkey Roofing Products]
 - k. [SDP Advanced Polymer Products Inc.]
 - l. [Tamko Building Products LLC]
 - m. <Insert manufacturer's name>

2.3 FASTENERS

PART 3 - EXECUTION

END OF SECTION 073213

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Custom flashing and trim fabrications, made from the following:
 - 1. Sheet metal materials.
 - 2. Underlayment.
 - 3. Miscellaneous materials.
- B. Related Requirements:
 - 1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Section <Insert Section number> "<Insert Section title>" for [materials and] installation of manufactured sheet metal through-wall flashing and trim integral with masonry.
 - 3. Section <Insert Section number> "<Insert Section title>" for [materials and] installation of sheet metal flashing and trim integral with roofing.
 - 4. Section <Insert Section number> "<Insert Section title>" for sheet metal flashing and trim integral with metal wall panels.
 - 5. Section 077100 "Roof Specialties" for manufactured copings, roof-edge specialties, roof-edge drainage systems, reglets, and counterflashings.
 - 6. Section 077200 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
 - 7. Section 079513.13 "Interior Expansion Joint Cover Assemblies" for manufactured expansion-joint cover assemblies for interior floors, walls, and ceilings.
 - 8. Section 079513.16 "Exterior Expansion Joint Cover Assemblies" for manufactured expansion-joint cover assemblies for exterior building walls, soffits, and parapets.
 - 9. Section 079513.19 "Parking Deck Expansion Joint Cover Assemblies" for manufactured expansion-joint cover assemblies subject to vehicular traffic.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- A. 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. Prepainted by the coil-coating process to comply with ASTM A755/A755M.

1. Nominal Thickness: [0.022 inch][0.028 inch][0.034 inch][0.040 inch][0.052 inch].
 2. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than <Insert value> percent.
 3. Surface: [Smooth, flat][Embossed][and mill phosphatized for field painting][and with manufacturer's standard clear acrylic coating on both sides].
 4. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: 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[for seacoast and severe environments].
 - b. Three-Coat Fluoropolymer: Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions[for seacoast and severe environments].
 - c. Mica Fluoropolymer: Two-coat fluoropolymer finish with suspended mica flakes 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[for seacoast and severe environments].
 - d. Metallic Fluoropolymer: Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions[for seacoast and severe environments].
 - e. FEVE Fluoropolymer: Two-coat fluoropolymer finish containing 100 percent FEVE resin in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions[for seacoast and severe environments].
 - f. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.
 5. Color: [As indicated by manufacturer's designations][Match Architect's sample][As selected by Architect from manufacturer's full range]<Insert color>.
 6. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
- C. Aluminum Sheet: Coil-coated sheet, ASTM B209/B209M, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
1. Thickness: [0.032 inch][0.040 inch][0.050 inch][0.063 inch].
 2. Surface: [Smooth, flat][Embossed].
 3. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than <Insert value> percent.
 4. Exposed Coil-Coated Finish:

- a. 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[**for seacoast and severe environments**].
 - b. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions[**for seacoast and severe environments**].
 - c. Mica Fluoropolymer: AAMA 2605. Two-coat fluoropolymer finish with suspended mica flakes 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[**for seacoast and severe environments**].
 - d. Metallic Fluoropolymer: AAMA 2605. Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions[**for seacoast and severe environments**].
 - e. FEVE Fluoropolymer: AAMA 2605. Two-coat fluoropolymer finish containing 100 percent FEVE resin in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions[**for seacoast and severe environments**].
 - f. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with dry film thickness of not less than **0.2 mil** for primer and **0.8 mil** for topcoat.
5. Color: [As indicated by manufacturer's designations][Match Architect's sample][As selected by Architect from manufacturer's full range]<Insert color>.
 6. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of **0.5 mil**.
 7. Clear Anodic Finish, Coil Coated: AAMA 611, [AA-M12C22A41, Class I, 0.018 mm][AA-M12C22A31, Class II, 0.010 mm] or thicker.
 8. Color Anodic Finish, Coil Coated: AAMA 611, [AA-M12C22A42/A44, Class I, 0.018 mm][AA-M12C22A32/A34, Class II, 0.010 mm] or thicker.
 - a. Color: [Champagne][Light bronze][Medium bronze][Dark bronze][Black][Match Architect's sample][As selected by Architect from full range of industry colors and color densities]<Insert color>.
 - b. Color Range: 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.
 9. As-Milled Finish: [Mill][One-side bright mill][Standard one-side bright][Standard two-side bright].
 10. Alclad Finish: Metallurgically bonded surfacing alloy on both sides, forming aluminum sheet with reflective luster.

11. Factory Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, factory-applied, baked-on epoxy primer coat; minimum dry film thickness of **0.2 mil**.
- D. Stainless Steel Sheet: ASTM A240/A240M, [**Type 304**][**Type 316**], dead soft, fully annealed.
1. Nominal Thickness:
[0.0156 inch][0.0188 inch][0.0250 inch][0.0313 inch][0.0375 inch][0.0500 inch].
 2. Surface: [**Smooth, flat**][**Embossed**].
 3. Exterior Finish: [**ASTM A480/A480M, No. 2B (bright, cold rolled)**][**ASTM A480/A480M, No. 2D (dull, cold rolled)**][**ASTM A480/A480M, No. 3 (coarse, polished directional satin)**][**ASTM A480/A480M No. 4**]**<Insert finish>**.
 - a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
 - b. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1) Run grain of directional finishes with long dimension of each piece.
 - 2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 4. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **<Insert value>** percent.
- E. Copper Sheet: ASTM B370, cold-rolled copper sheet, H00 or H01 temper.
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. Hussey Copper Ltd.
 - b. Revere Copper Products, Inc
 2. Thickness: **20 oz./sq. ft.**
 3. Nonpatinated, Exposed Finish: Mill.
- F. Lead Sheet: ASTM B749 lead sheet.
1. Thickness: **4 lb**
- 2.2 UNDERLAYMENT
- A. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- B. Slip Sheet: Rosin-sized building paper, **3 lb/100 sq. ft.** minimum, of type required for application.

2.3 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners[, **solder**], 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[**or manufactured item**] 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[**or manufactured item**].
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. 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.
 - 3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 4. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
 - 5. Fasteners for Copper, Zinc-Tin Alloy-Coated Copper, or Copper-Clad Stainless Steel Sheet: Copper, hardware bronze or passivated Series 300 stainless steel.
 - 6. Fasteners for Zinc Sheet: Series 300 stainless steel[**or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329/F2329M**].
- C. Solder:
 - 1. For Zinc-Coated (Galvanized) Steel: ASTM B32, [**Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead**][with maximum lead content of 0.2 percent].
 - 2. For Stainless Steel: ASTM B32, [**Grade Sn60**][**Grade Sn96**], with acid flux of type recommended by stainless steel sheet manufacturer.
 - 3. For Copper or Copper-Clad Stainless Steel: ASTM B32, [**Grade Sn50, 50 percent tin and 50 percent lead**][with maximum lead content of 0.2 percent].
 - 4. For Zinc-Tin Alloy-Coated Copper: ASTM B32, 100 percent tin, with maximum lead content of 0.2 percent, as recommended by sheet metal manufacturer.
 - 5. For Zinc: ASTM B32, [**40 percent tin and 60 percent lead with low antimony,**][with maximum lead content of 0.2 percent,] as recommended by zinc manufacturer.
- D. 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.

- E. Elastomeric Sealant: ASTM C920, elastomeric [polyurethane][polysulfide][silicone] polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- H. Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.
- I. Asphalt Roofing Cement: ASTM D4586/D4586M, asbestos free, of consistency required for application.

PART 3 - EXECUTION

END OF SECTION 076200

SECTION 079000
JOINT SEALANTS FOR NON-POTABLE USE

PART 1 GENERAL

1.01 SUMMARY

- A. SECTION INCLUDES JOINT SEALANTS FOR USE IN APPLICATIONS THAT ARE NOT WITHIN A POTABLE WATER STORAGE TANK:
 - 1. ACRYLIC-LATEX SEALANT.
 - 2. PRECAST CONCRETE JOINT SEALANT.
 - 3. SILICONE SEALANT.
 - 4. SYNTHETIC RUBBER SEALING COMPOUND.
 - 5. SYNTHETIC SPONGE RUBBER FILLER.
 - 6. RELATED MATERIALS.

1.02 REFERENCES

- A. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO):
 - 1. M 198 - STANDARD SPECIFICATION FOR JOINTS FOR CONCRETE PIPE, MANHOLES, AND PRECAST BOX SECTIONS USING PREFORMED FLEXIBLE JOINT SEALANTS.
- B. ASTM INTERNATIONAL (ASTM):
 - 1. C920 - STANDARD SPECIFICATION FOR ELASTOMERIC JOINT SEALANTS.
 - 2. C990 - STANDARD SPECIFICATION FOR JOINTS FOR CONCRETE PIPE, MANHOLES, AND PRECAST BOX SECTIONS USING PREFORMED FLEXIBLE JOINT SEALANTS.
 - 3. C1330 - STANDARD SPECIFICATION FOR CYLINDRICAL SEALANT BACKING FOR USE WITH COLD LIQUID-APPLIED SEALANTS.
 - 4. C1521 - STANDARD PRACTICE FOR EVALUATING ADHESION OF INSTALLED WEATHERPROOFING SEALANT JOINTS.
 - 5. D412 - STANDARD TEST METHODS FOR VULCANIZED RUBBER AND THERMOPLASTIC ELASTOMERS - TENSION.
 - 6. D624 - STANDARD TEST METHOD FOR TEAR STRENGTH OF CONVENTIONAL VULCANIZED RUBBER AND THERMOPLASTIC ELASTOMER.

1.03 SUBMITTALS

- A. PRODUCT DATA.
- B. SAMPLES, INCLUDE COLOR SELECTIONS.
- C. MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- D. WARRANTY.

1.04 QUALITY ASSURANCE

- A. MANUFACTURER QUALIFICATIONS: MANUFACTURER OF PROPOSED PRODUCT FOR MINIMUM 5 YEARS WITH SATISFACTORY PERFORMANCE RECORD.
- B. INSTALLER QUALIFICATIONS: MANUFACTURER APPROVED INSTALLER OF PRODUCTS SIMILAR TO

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CONSTRUCTION DOCUMENT SPECIFICATIONS

SPECIFIED PRODUCTS ON MINIMUM 5 PROJECTS OF SIMILAR SCOPE AS PROJECT WITH SATISFACTORY PERFORMANCE RECORD.

1.05 PROJECT/SITE CONDITIONS

- A. ENVIRONMENTAL REQUIREMENTS: DO NOT APPLY SEALANT ON WET OR FROSTY SURFACES OR WHEN SURFACE TEMPERATURE IS HIGHER THAN 100 DEGREES FAHRENHEIT OR LOWER THAN RECOMMENDED BY THE MANUFACTURER.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. DELIVER, STORE, AND HANDLE PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- B. CODE DATE PACKAGES. DO NOT USE MATERIAL OLDER THAN MANUFACTURER'S PUBLISHED SHELF LIFE. STORE MATERIALS AT TEMPERATURES LOWER THAN 80 DEGREES FAHRENHEIT. CONDITION MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS PRIOR TO INSTALLATION.

1.07 SEQUENCING AND SCHEDULING

- A. CAULK JOINTS PRIOR TO PAINTING.

1.08 WARRANTY

- A. WARRANT TO CORRECT DEFECTIVE PRODUCTS FOR MINIMUM 1 YEAR IN ACCORDANCE WITH MANUFACTURER'S STANDARD WARRANTY.

PART 2 PRODUCTS

2.01 SEALANTS

- A. GENERAL:
 - 1. PROVIDE COLORS MATCHING MATERIALS BEING SEALED.
 - 2. WHERE COMPOUND IS NOT EXPOSED TO VIEW IN FINISHED WORK, PROVIDE MANUFACTURER'S COLOR WHICH HAS BEST PERFORMANCE.
 - 3. NON-SAGGING SEALANT FOR VERTICAL AND OVERHEAD HORIZONTAL JOINTS.
 - 4. SEALANTS FOR HORIZONTAL JOINTS: SELF-LEVELING PEDESTRIAN/TRAFFIC GRADE.
 - 5. JOINT CLEANER, PRIMER, BOND BREAKER: AS RECOMMENDED BY SEALANT MANUFACTURER.
 - 6. SEALANT BACKER ROD AND/OR COMPRESSIBLE FILLER MADE FROM CLOSED CELL POLYETHYLENE, POLYETHYLENE JACKETED POLYURETHANE FOAM, OR OTHER FLEXIBLE, NONABSORBENT, NON-BITUMINOUS MATERIAL RECOMMENDED BY SEALANT MANUFACTURER TO:
 - a. CONTROL JOINT DEPTH.
 - b. BREAK BOND OF SEALANT AT BOTTOM OF JOINT.
 - c. PROVIDE PROPER SHAPE OF SEALANT BEAD.
 - d. SERVE AS EXPANSION JOINT FILLER.

2.02 ACRYLIC-LATEX SEALANT

- A. PERMANENTLY FLEXIBLE, NON-STAINING, AND NONBLEEDING LATEX MODIFIED ACRYLIC SEALANT COMPOUND, COLORS AS SELECTED BY ENGINEER FROM MANUFACTURER'S STANDARD OPTIONS. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:

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1. TREMCO, TREMFLEX 834.
2. PECORA CORP., NUMBER AC-20.
3. SONNEBORN, SONOLAC.

2.03 PRECAST CONCRETE JOINT SEALANT

- A. PREFORMED, COLD-APPLIED, READY-TO-USE, FLEXIBLE JOINT SEALANT IN ACCORDANCE WITH ASTM C990 AND AASHTO M 198. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL.
1. HENRY CORPORATION, RAM-NEK.
 2. CONCRETE SEALANTS DIVISION, CONSEAL.

2.04 SILICONE SEALANT

- A. ASTM C920, TYPE S, GRADE NS, CLASS 25, SINGLE COMPONENT SILICONE SEALANT. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
1. TREMCO, PROGLAZE.
 2. PECORA CORP., NUMBER 864.
 3. DOW CORNING, NUMBER 795.
 4. GENERAL ELECTRIC, NUMBER 1200 SERIES.

2.05 SYNTHETIC RUBBER SEALING COMPOUND

- A. MANUFACTURER: ONE OF THE FOLLOWING OR EQUAL:
1. SIKA CORPORATION, SIKAFLEX 2C NS OR SL
 2. PACIFIC POLYMERS, ELASTOTHANE 227R.
- B. MATERIAL: IN ACCORDANCE WITH ASTM C920 TYPE M, GRADE P (POURABLE), CLASS 25 AND TYPE M, GRADE NS (NON-SAG), CLASS 25; MULTI-PART POLYURETHANE; ABLE TO CURE AT ROOM TEMPERATURE TO FIRM, HIGHLY RESILIENT POLYMER; ABLE TO PERFORM SATISFACTORY WHEN CONTINUOUSLY SUBMERGED IN WATER OR SEWAGE AND EXPOSED TO DIRECT SUNLIGHT IN DRY CONDITION; WITH THE FOLLOWING PROPERTIES DETERMINED AT 75 DEGREES FAHRENHEIT AND 50 PERCENT RELATIVE HUMIDITY:
1. BASE: POLYURETHANE RUBBER.
 2. APPLICATION TIME: MINIMUM 2 HOURS.
 3. CURE TIME: MAXIMUM 3 DAYS.
 4. TACK FREE TIME: MAXIMUM 24 HOURS.
 5. ULTIMATE HARDNESS: NON-SAG 25, POURABLE/SL 40, WITHIN 5 SHORE A.
 6. TENSILE STRENGTH: NON-SAG 95 POUNDS PER SQUARE INCH MINIMUM AND SELF-LEVELING MINIMUM 170 POUNDS PER SQUARE INCH WHEN TESTED IN ACCORDANCE WITH ASTM D412.
 7. ULTIMATE ELONGATION: MINIMUM 340 PERCENT WHEN TESTED IN ACCORDANCE WITH ASTM D412.
 8. TEAR RESISTANCE: NON-SAG 45 POUNDS PER INCH MINIMUM AND SELF-LEVELING MINIMUM 85 POUNDS PER INCH WHEN TESTED IN ACCORDANCE WITH ASTM D624, DIE C.
 9. SERVICE TEMPERATURE RANGE: MINUS 25 DEGREES TO 158 DEGREES FAHRENHEIT.
- C. COLOR: GRAY TO MATCH CONCRETE, UNLESS INDICATED ON THE DRAWINGS.

2.06 SYNTHETIC SPONGE RUBBER FILLER

- A. CLOSED-CELL EXPANDED SPONGE RUBBER MANUFACTURED FROM SYNTHETIC POLYMER NEOPRENE BASE, OR RESILIENT POLYETHYLENE FOAM BACKER ROD. IN ACCORDANCE WITH
- B. ASTM C1330, TYPE O.
 - 1. MANUFACTURERS: ONE OF THE FOLLOWING OR EQUAL:
 - a. PRESSTITE, NUMBER 750.3 ROPAX ROD STOCK.
- C. CHARACTERISTICS:
 - 1. SUITABLE FOR APPLICATION INTENDED.
 - 2. STRENGTH: AS NECESSARY FOR SUPPORTING SEALING COMPOUND DURING APPLICATION.
 - 3. RESILIENCY: RESISTANCE TO ENVIRONMENTAL CONDITIONS OF INSTALLATION.
 - 4. BONDING: NO BONDING TO THE SEALING COMPOUND.
 - 5. STRUCTURE: CELLULAR, PREVENTS ABSORPTION OF WATER.
 - 6. COMPATIBILITY WITH OTHER MATERIALS IN JOINT AND ACCEPTANCE BY MANUFACTURER OF SEALING COMPOUND.
 - 7. SIZE: MINIMUM 25 PERCENT GREATER THAN NOMINAL JOINT WIDTH.

2.07 RELATED MATERIALS

- A. PRIMER: NON-STAINING TYPE, RECOMMENDED BY SEALANT MANUFACTURER TO SUIT APPLICATION.
- B. JOINT CLEANER: NONCORROSIVE, NON-STAINING, COMPATIBLE WITH JOINT FORMING MATERIALS AND AS RECOMMENDED BY SEALANT MANUFACTURER.
- C. BOND BREAKER TAPE: PRESSURE-SENSITIVE TAPE RECOMMENDED BY SEALANT MANUFACTURER TO SUIT APPLICATION.

PART 3 EXECUTION

3.01 EXAMINATION

- A. VERIFY ACCEPTABILITY OF JOINT DIMENSIONS, PHYSICAL, AND ENVIRONMENTAL CONDITIONS.
- B. VERIFY THAT SURFACES ARE DRY, CLEAN, AND FREE OF DIRT, GREASE, CURING COMPOUND, AND OTHER RESIDUE WHICH MIGHT INTERFERE WITH ADHESION OF SEALANTS.

3.02 PREPARATION

- A. ALLOW CONCRETE TO CURE THOROUGHLY BEFORE CAULKING.
- B. SYNTHETIC SPONGE RUBBER FILLER:
 - 1. PREPARE SURFACES DESIGNATED TO RECEIVE FILLER IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 - 2. DO NOT STRETCH FILLER BEYOND ITS NORMAL LENGTH DURING INSTALLATION.
- C. CAULKING:
 - 1. VERIFY THAT SURFACES ARE DRY, CLEAN, AND FREE OF DIRT, GREASE, CURING COMPOUNDS, AND OTHER RESIDUE THAT MIGHT INTERFERE WITH ADHESION OF SEALANT.
 - 2. CONCRETE, MASONRY, WOOD, AND STEEL SURFACES: CLEAN AND PRIME IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS PRIOR TO CAULKING.
- D. SYNTHETIC RUBBER SEALING COMPOUND:
 - 1. ENSURE SURFACES TO WHICH SYNTHETIC RUBBER MUST BOND ARE DRY AND FREE OF DUST,

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DIRT, AND OTHER FOREIGN RESIDUE.

2. HEAVY SANDBLASTED CAULKING GROOVE TO SOUND SURFACE, AND PRIME WITH MANUFACTURER'S RECOMMENDED PRIMER FOR PARTICULAR SURFACE.
- E. FOR SIDEWALKS, PAVEMENTS, AND SIMILAR JOINTS SEALED WITH ELASTOMERIC SEALANTS AND SUBJECT TO TRAFFIC AND OTHER ABRASION AND INDENTATION EXPOSURES, FILL JOINTS TO DEPTH EQUAL TO 75 PERCENT OF JOINT WIDTH, BUT NEITHER MORE THAN 5/8 INCHES DEEP NOR LESS THAN 3/8 INCHES DEEP.
- F. FOR NORMAL MOVING BUILDING JOINTS SEALED WITH ELASTOMERIC SEALANTS NOT SUBJECT TO TRAFFIC, FILL JOINTS TO DEPTH EQUAL TO 50 PERCENT OF JOINT WIDTH, BUT NEITHER MORE THAN 1/2 INCH DEEP NOR LESS THAN 1/4 INCH DEEP.
- G. FOR JOINTS SEALED WITH ACRYLIC-LATEX SEALANTS, FILL JOINTS TO DEPTH IN RANGE OF 75 PERCENT TO 125 PERCENT OF JOINT WIDTH.
- H. USE JOINT FILLER TO ACHIEVE REQUIRED JOINT DEPTHS, TO ALLOW SEALANTS TO PERFORM PROPERLY.
- I. PREPARE SURFACES AND INSTALL SYNTHETIC SPONGE RUBBER FILLER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- J. DO NOT STRETCH FILLER BEYOND NORMAL LENGTH DURING INSTALLATION.
- K. APPLY BOND BREAKER WHEN RECOMMENDED BY JOINT SEALER MANUFACTURER.

3.03 INSTALLATION

- A. SYNTHETIC SPONGE RUBBER FILLER: INSTALL FILLER IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- B. CAULKING, JOINTS, AND SEALING:
 1. CONSTRUCT EXPANSION, CONTRACTION, AND CONSTRUCTION JOINTS AS INDICATED ON THE DRAWINGS.
 2. INSTALL PIPE AND CONDUIT IN STRUCTURES AS INDICATED ON THE DRAWINGS.
 3. CAULK DOORS, WINDOWS, LOUVERS, AND OTHER ITEMS INSTALLED IN OR OVER CONCRETE OPENINGS INSIDE AND OUT.
 4. USE SYNTHETIC RUBBER SEALING COMPOUND FOR CAULKING WHERE INDICATED ON THE DRAWINGS OR AS SPECIFIED, EXCEPT FOR MASONRY CONSTRUCTION AND WHERE SPECIFIED OTHERWISE.
 5. COMPLETE CAULKING PRIOR TO PAINTING.
 6. VERIFY THAT CONCRETE IS THOROUGHLY CURED PRIOR TO CAULKING.
 7. WHEN FILLER COMPRESSIBLE MATERIAL IS USED, USE UNTREATED TYPE.
 8. APPLY CAULKING WITH PNEUMATIC CAULKING GUN.
 9. USE NOZZLES OF PROPER SHAPE AND SIZE FOR APPLICATION INTENDED.
 10. MAINTAIN CONTINUOUS BOND BETWEEN CAULKING AND SIDES OF JOINT TO ELIMINATE GAPS, BUBBLES, OR VOIDS AND FILL JOINT IN CONTINUOUS OPERATION WITHOUT LAYERING OF COMPOUND.
 11. EMPLOY EXPERIENCED APPLICATORS TO CAULK JOINTS AND SEAMS IN NEAT WORKMANLIKE MANNER.
 12. TO HASTEN CURING OF COMPOUND WHEN USED ON WIDE JOINTS SUBJECT TO MOVEMENT, APPLY HEAT WITH INFRARED LAMPS OR OTHER CONVENIENT MEANS.
 13. APPLY SYNTHETIC RUBBER SEALING COMPOUND WITH PNEUMATIC CAULKING TOOL OR OTHER

ACCEPTABLE METHOD.

3.04 CLEANING

- A. CLEAN SURFACES ADJACENT TO SEALANT AS WORK PROGRESSES.
- B. REMOVE EXCESS UNCURED SEALANT BY SOAKING AND SCRUBBING WITH SEALANT CLEANING SOLVENT.
- C. REMOVE EXCESS CURED SEALANT BY SANDING WITH NUMBER 80 GRIT SANDPAPER.
- D. LEAVE FINISHED WORK IN NEAT, CLEAN CONDITION.

3.05 SCHEDULE

- A. ACRYLIC LATEX:
 - 1. USE WHERE INDICATED ON THE DRAWINGS.
 - 2. INTERIOR JOINTS WITH MOVEMENT LESS THAN 7.5 PERCENT AND NOT SUBJECT TO WET CONDITIONS.
- B. SILICONE:
 - 1. USE WHERE INDICATED ON THE DRAWINGS.
 - 2. JOINTS AND RECESSES FORMED WHERE WINDOW, DOOR, LOUVER AND VENT FRAMES, AND SILL ADJOIN MASONRY, CONCRETE, STUCCO, OR METAL SURFACES.
 - 3. DOOR THRESHOLD BEDDING.
 - 4. MOIST OR WET LOCATIONS, INCLUDING JOINTS AROUND PLUMBING FIXTURES.
 - 5. STAINLESS STEEL DOORS AND FRAMES, INCLUDING JOINTS BETWEEN APPLIED STOPS AND FRAMES, AND AROUND ANCHOR BOLTS.
 - 6. PLENUM JOINTS.
- C. SYNTHETIC RUBBER SEALING COMPOUND, NON-SAG TYPE II:
 - 1. USE WHERE INDICATED ON THE DRAWINGS.
 - 2. WATER-BEARING AND EARTH-BEARING CONCRETE STRUCTURES.
 - 3. JOINTS IN MASONRY, CONCRETE VERTICAL SURFACES, AND METAL-FACED PANELS IN VERTICAL SURFACES.
 - 4. JOINTS BETWEEN SHEET METAL FLASHING AND TRIM.
 - 5. JOINTS BETWEEN SHEET METAL FLASHING AND TRIM, AND VERTICAL WALL SURFACES.
 - 6. SMALL VOIDS BETWEEN MATERIALS REQUIRING FILLING FOR WEATHERTIGHT PERFORMANCE IN VERTICAL SURFACES.
 - 7. PERIMETERS OF FRAMES OF DOORS, WINDOWS, LOUVERS, AND OTHER OPENINGS WHERE BONDING IS CRITICAL TO AIRTIGHT PERFORMANCE.
 - 8. EXPANSION AND CONTROL JOINTS IN MASONRY VERTICAL SURFACES.
- D. SYNTHETIC RUBBER SEALING COMPOUND, SELF-LEVELING TYPE I:
 - 1. USE WHERE INDICATED ON THE DRAWINGS.
 - 2. EXPANSION AND CONTROL JOINTS IN MASONRY, CONCRETE HORIZONTAL SURFACES, AND METAL PANELS IN HORIZONTAL SURFACES.
 - 3. SMALL VOIDS BETWEEN MATERIALS REQUIRING FILLING FOR WEATHERTIGHT PERFORMANCE IN HORIZONTAL SURFACES.
 - 4. PAVEMENT JOINTS.

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5. PERIMETERS OF FRAMES OF DOORS, WINDOWS, LOUVERS, AND OTHER OPENINGS IN HORIZONTAL SURFACES WHERE BONDING IS CRITICAL TO AIRTIGHT PERFORMANCE.

3.06 FIELD QUALITY CONTROL

A. ADHESION TESTING:

1. PERFORM ADHESION TESTS IN ACCORDANCE WITH ASTM C1521 PER THE FOLLOWING CRITERIA:
 - a. WATER BEARING STRUCTURES: 1 TEST PER EVERY 1,000 LF OF JOINT SEALED.
 - b. EXTERIOR PRECAST CONCRETE WALL PANELS: 1 TEST PER EVERY 2,000 LF OF JOINT SEALED.
 - c. CHEMICAL CONTAINMENT AREAS: 1 TEST PER EVERY 1,000 LF OF JOINT SEALED.
 - d. BUILDING EXPANSION JOINTS: 1 TEST PER EVERY 500 LF OF JOINT SEALED.
 - e. ALL OTHER TYPE OF JOINTS EXCEPT BUTT GLAZING JOINTS: 1 TEST PER EVERY 3,000 LF OF JOINT SEALED.
 - f. MANUFACTURER'S AUTHORIZED FACTORY REPRESENTATIVE PROVIDE WRITTEN RECOMMENDATIONS FOR REMEDIAL MEASURES ON FAILING TESTS.

END OF SECTION

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior custom hollow-metal doors and frames.
2. Exterior custom hollow-metal doors and frames.

1.2 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.

PART 2 - PRODUCTS

2.1 HOLLOW METAL DOORS AND FRAMES

PART 3 - EXECUTION

END OF SECTION 081113

SECTION 083326 - OVERHEAD COILING GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Open-curtain overhead coiling grilles.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, angle-framing of grille opening, corner guards, and bollards.
2. **[Section 099113 "Exterior Painting"]****[and]****[Section 099123 "Interior Painting"]** for finish painting of factory-primed grilles.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling grille and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for curtain components, and finishes.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. For exterior components, include details of provisions for assembly expansion and contraction.
5. Show locations of controls, locking devices, and other accessories.
6. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:

1. Open-curtain grille with full-size components consisting of rods, spacers, and

links as required to illustrate each assembly[, including glazed inserts].

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
- B. Accessibility Standard: Comply with applicable provisions in [the USDOJ's "2010 ADA Standards for Accessible Design"] [the ABA standards of the Federal agency having jurisdiction] [and] [ICC A117.1] <Insert requirement>.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of grilles that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: [Two] <Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OPEN-CURTAIN GRILLE ASSEMBLY

- A. Open-Curtain Grille: Overhead coiling grille with a curtain having a network of horizontal rods that interconnect with vertical links.
- B. Grille Curtain Material: Aluminum.
 - 1. Rod Spacing: Approximately 2 inches o.c.
- C. Manual Grille Operator: Push-up operation.

2.2 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.

2.3 MANUAL GRILLE OPERATORS

- A. General: Equip grille with manual grille operator by grille manufacturer.

2.4 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.

PART 3 - EXECUTION

END OF SECTION 083326

SECTION 08 33 00

ROLLING GRILLES – OPEN DESIGN

GENERAL NOTES TO SPECIFIER:

THIS SPECIFICATION SECTION HAS BEEN PREPARED TO ASSIST DESIGN PROFESSIONALS IN THE PREPARATION OF PROJECT OR OFFICE MASTER SPECIFICATIONS. IT FOLLOWS GUIDELINES ESTABLISHED BY THE CONSTRUCTION SPECIFICATIONS INSTITUTE, AND THEREFORE MAY BE USED WITH MOST MASTER SPECIFICATION SYSTEMS WITH MINOR EDITING.

EDIT CAREFULLY TO SUIT PROJECT REQUIREMENTS. MODIFY AS NECESSARY AND DELETE ITEMS THAT ARE NOT APPLICABLE. VERIFY THAT REFERENCED SECTION NUMBERS AND TITLES ARE CORRECT. (NUMBERS AND TITLES REFERENCED ARE BASED ON MASTERFORMAT™, 2004 EDITION).

THIS SECTION ASSUMES THE PROJECT MANUAL WILL CONTAIN COMPLETE DIVISION 01 DOCUMENTS INCLUDING SECTIONS 01 33 00 SUBMITTAL PROCEDURES, 01 62 00 PRODUCT OPTIONS, 01 25 13 PRODUCT SUBSTITUTION PROCEDURES, 01 66 00 PRODUCT STORAGE AND HANDLING REQUIREMENTS, 01 77 00 CLOSEOUT PROCEDURES, AND 01 78 00 CLOSEOUT SUBMITTALS. IF THE PROJECT MANUAL DOES NOT CONTAIN THESE SECTIONS, ADDITIONAL INFORMATION SHOULD BE INCLUDED UNDER THE APPROPRIATE ARTICLES.

THIS IS AN OPEN PROPRIETARY SPECIFICATION ALLOWING USERS THE OPTION OF APPROVING OTHER MANUFACTURERS WHICH COMPLY WITH THE CRITERIA SPECIFIED HEREIN.

NOTES TO THE SPECIFIER ARE CONTAINED IN BOXES AND SHOULD BE DELETED FROM FINAL COPY.

OPTIONAL ITEMS REQUIRING SELECTION BY THE SPECIFIER ARE ENCLOSED WITHIN BRACKETS, E.G.: [35] [40] [45]. IN CASES WHERE ONE OF THE OPTIONAL ITEMS IS A STANDARD FEATURE OF THE GRILLE MODEL, IT IS LISTED IN THE FIRST POSITION. MAKE APPROPRIATE SELECTION AND DELETE OTHERS.

ITEMS REQUIRING ADDITIONAL INFORMATION ARE UNDERLINED, E.G.: _____.

OPTIONAL PARAGRAPHS ARE SEPARATED BY A REDLINED "OR," E.G.:

OR

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: [Manual] [and] [electric operated] overhead rolling grilles.
- B. Related Sections:
 - 1. 05 50 00 Metal Fabrications. Door opening jamb and head members.
 - 2. 06 10 00 Rough Carpentry. Door opening jamb and head members.
 - 3. 08 31 00 Access Doors and Panels. Access doors.
 - 4. 08 70 00 Hardware. Masterkeyed cylinders.
 - 5. Division 26. Electrical wiring and conduit, fuses, disconnect switches, connection of operator to power supply, and installation of control station and wiring.
- C. Products That May Be Supplied, But Are Not Installed Under This Section:
 - 1. Control station.
 - 2. Manual release pull handle.

INCLUDE APPROPRIATE LANGUAGE BELOW, INCLUDING A REFERENCE TO SECTION 01 23 00 ALTERNATES, IF ROLLING GRILLES ARE INCLUDED IN ANY ALTERNATES, ADD SECTION 01 23 00 TO 1.1 B. DELETE IF NO ALTERNATES.
--

D. Alternates:

1.2 SYSTEM DESCRIPTION

A. Design Requirements:

1. Cycle Life:

- a. Design grilles of standard construction for normal use of up to 5 cycles per day maximum.

OR

- a. Design grilles of special construction for high cycle use. Expected cycles of up to ____ per day.

1.3 SUBMITTALS

A. Reference Section 01 33 00 Submittal Procedures; submit the following items:

- 1. Product Data.
- 2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
- 3. Quality Assurance/Control Submittals:
 - a. Provide proof of manufacturer ISO 9001:2000 registration.
 - b. Provide proof of manufacturer and installer qualifications - see 1.3 below.
 - c. Provide manufacturer's installation instructions.
- 4. Closeout Submittals:
 - a. Operation and Maintenance Manual.
 - b. Certificate stating that installed materials comply with this specification.

1.4 QUALITY ASSURANCE

A. Qualifications:

- 1. Manufacturer Qualifications: ISO 9001:2000 registered and a minimum of five years experience in producing grilles of the type specified.
- 2. Installer Qualifications: Manufacturer's approval.

1.5 DELIVERY STORAGE AND HANDLING

A. Reference Section 01 66 00 Product Storage and Handling Requirements.

B. Follow manufacturer's instructions.

1.6 WARRANTY

A. Standard Warranty: Two years from date of shipment against defects in material and workmanship.

B. Maintenance: Submit for owner's consideration and acceptance of a maintenance service agreement for installed products.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: Clopay Building Products Co., Inc., 3885 Duke Blvd., Mason, OH 45040-3101. Phone: 800-282-2260. Underwriters Laboratories, Inc. (UL), ISO 9001:2000 Registered.

INSERT NAME, ADDRESS, AND PHONE NUMBERS OF LOCAL DISTRIBUTOR BELOW.

1. Distributor:

SELECT MODEL CESG10 FOR STRAIGHT PATTERN GRILLES OR MODEL CESG12 FOR GRILLES THAT WILL BE ROUTINELY CYCLED MORE THAN 5 TIMES PER DAY OR WHEN A BRICK PATTERN CURTAIN CONFIGURATION IS DESIRED.

- B. Model: [CESG10] [CESG12]

- C. Substitutions: Reference Section 01 25 13 Product Substitution Procedures.

2.2 MATERIALS

- A. Curtain:

1. CESG10 Straight Pattern

- a. Horizontal Rods: Solid [5/16 inch (8 mm) diameter, 5056 H32 aluminum alloy] [5/16 inch (8 mm) diameter, AISI 300 series stainless steel] [5/16 inch (8 mm) diameter galvanized steel].

1. Vertical Spacing: 2 inches (50.8 mm) on center.

SELECT ALUMINUM CHAIN LINKS BELOW FOR ALUMINUM AND GALVANIZED RODS AND STAINLESS STEEL LINKS FOR STAINLESS STEEL RODS.

- b. Vertical Chains: Grommetted [aluminum] [stainless steel] links, 3/4 inch (19 mm) wide, positioned by E-rings on [9 inch (228.6 mm)] [6 inch (152.4 mm)] [3 inch (76.2 mm) centers. Provide double E-rings on horizontal bars on both sides of end chains to retain curtain in guides.

OR

2. CESG12 Brick Pattern

- a. Horizontal Rods: Solid 5/16 inch (8 mm) diameter, 5056 H32 aluminum alloy sleeved with horizontal aluminum tube spacers to separate vertical links.
1. Vertical Spacing 2 inches (50.8 mm)
b. Vertical Links: Heavy duty aluminum links, 3/4 inch (19mm) wide, positioned by tube spacers on 9 inch (228.6 mm) staggered centers. End links to be held in place by self-locking retaining rings.

INCLUDE REINFORCING ANGLES NOTED BELOW ON GRILLES OVER 27'-4" (8.33 M) WIDE.

3. Bottom Bar: 2 x 3-1/2 inch (50.8 x 88.9 mm) extruded aluminum tubular section [reinforced with 3 x2 x 3/16 inch (76.2 x 50.8 x 4.76 mm) aluminum angle(s)].

SELECT ALUMINUM CURTAIN AND BOTTOM BAR BELOW FOR MODEL ESG12 BRICK PATTERN GRILLES. STAINLESS AND GALVANIZED FINISHES ARE NOT AVAILABLE WITH BRICK PATTERN CURTAINS.

4. Finish:
 - a. Aluminum Curtain and Bottom Bar:
 1. Curtain: [Mill finish] [Clear anodized] [Medium bronze anodized] [Dark bronze anodized] [Black anodized].
 2. Bottom Bar: [Mill finish] [Clear anodized] [Medium bronze anodized] [Dark bronze anodized] [Black anodized].

OR

- a. Stainless Steel Curtain with Aluminum Bottom Bar:
 1. Curtain: Factory polished.
 2. Bottom Bar:[Clear anodized] [Mill finish].

OR

- a. Stainless Steel Curtain with Stainless Steel Bottom Bar: Factory polished.

OR

- a. Galvanized Steel Rods with Aluminum Chains and Bottom Bar:
 1. Rods: Galvanized steel, unpainted.
 2. Chains and Bottom Bar: [Mill finish] [Clear anodized].

- B. Guides, Wall Mounted: Heavy duty extruded aluminum sections with [snap-on cover to conceal fasteners and] polypropylene pile runners on both sides of curtain. Provide [steel] [aluminum] mounting angle as required for face of wall installation.

OR

- B. Guides, Tube Mounted: Heavy duty extruded aluminum sections with [snap-on cover to conceal fasteners and] polypropylene pile runners on both sides of curtain. Provide [steel] [aluminum] tubes, floor saddles and hardware as recommended by manufacturer to support grille.
 1. Finish, Aluminum Guide Components:
 - a. [Mill finish] [Clear anodized] [Medium bronze anodized] [Dark bronze anodized] [Black anodized].

DELETE (2.) BELOW WHEN NOT USING ANY STEEL COMPONENTS IN SECTION 2.2 B ABOVE.

2. Finish, Steel [Mounting Angles] [Tubes]:

USE POWDER COAT FINISH FOR EXPOSED STEEL GUIDE COMPONENTS AND UNPAINTED WHEN STEEL GUIDE COMPONENTS ARE RECESSED IN THE WALL.

- a. Unpainted.

OR

- a. Phosphate treatment followed by a light gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness.

OR

- a. Phosphate treatment followed by a corrosion inhibitive baked-on zinc-rich gray polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness.
- C. Counterbalance Shaft Assembly:
1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width.
 2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of grille to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.
- D. Brackets: Fabricate from minimum 3/16 inch (4.76 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
1. Finish: Phosphate treatment followed by a light gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness.
- OR
1. Finish: Phosphate treatment followed by a corrosion inhibitive baked-on zinc-rich gray polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness.
- OR
1. ASTM A 123, Grade 85 zinc coating, hot-dip galvanized after fabrication.

HOODS ARE NOT NORMALLY PROVIDED FOR COIL ABOVE CEILING APPLICATION, DELETE HOOD BELOW IF NOT DESIRED.

- E. Hood [and Fascia]: [24 gauge galvanized steel] [24 gauge stainless steel] [0.040 inch (1.016 mm) aluminum] with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.
1. Finish:
 - a. GalvaNex™ Coating System to include an ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation of a chemical bonding, light gray baked-on polyester base coat and a light gray baked-on polyester finish coat. The scientific organic material composition and chemical bonding process of GalvaNex™ produces a superior finish against corrosion and abrasion. GalvaNex™ components include a limited two year finish warranty.
- OR
- a. Stainless Steel: No. 4 finish.
- OR
- a. Aluminum: [Mill finish] [Clear anodized] [Medium bronze anodized] [Dark bronze anodized] [Black anodized].

2.3 ACCESSORIES

TO PROVIDE SECURITY, A LOCKING MECHANISM IS REQUIRED ON ALL GRILLES. MOST COMMON LOCKING METHODS ARE LISTED BELOW; CONSULT CLOPAY ARCHITECTURAL DESIGN SERVICES (800) 526-4301 option #3 FOR OTHER OPTIONS. EMERGENCY EGRESS LOCK MUST BE USED WITH EMERGENCY EGRESS SYSTEM.

- A. Locking:
1. Manual Push-Up: Keyed cylinder locking into both jambs operable from both sides of curtain.

OR

1. Manual Crank Hoist: Keyed cylinder locking into both jambs operable from coil side of curtain.

OR

1. Motor Operated: Keyed cylinder locking into both jambs operable from both sides of curtain with motor interlock cutout switches.

OR

1. Emergency Egress Lock: Key cylinder locking from public side, thumbturn cylinder locking from tenant side, locking into both jambs. Provide an additional security panel in curtain. [Provide motor interlock cutout switches on motorized units.]

FOLLOWING EMERGENCY EGRESS SYSTEM CAN BE USED WITH MG MOTOR OPERATORS.

- B. Emergency Egress System: Provide wall mounted manual release system pull handle to disengage motor operator and automatically open grille for emergency egress without the use of electrical power. Release of pull handle will reset grille to normal motor operation.

EXPOSED MOVING OPERATOR COMPONENTS LOWER THAN 8 FEET ABOVE FLOOR LEVEL THAT CREATE POSSIBLE PINCH POINTS ARE REQUIRED TO BE COVERED PER UL 325. SPECIFY AN OPERATOR COVER WHENEVER THIS FIELD CONDITION EXISTS.

- C. Operator [and Bracket Mechanism] Cover: Provide [24 gauge galvanized steel] [24 gauge stainless steel] [0.040 inch (1.016 mm) aluminum] sheet metal cover [to provide weather resistance] [to enclose exposed moving operating components] at coil area of unit. Finish to match door hood.

2.4 OPERATION

- A. Manual Push-Up: Provide pole with hook. Suitable for model ESG10 aluminum grilles up to 16' (4.88 M) wide and up to 10' (3.05 M) high and model ESG12 aluminum grilles up to 14' (4.27 M) wide and up to 10' (3.05 M) high.

OR

EZ LIFT CONSTRUCTION PACKAGE EXTENDS THE WIDTH RANGE OF ALL STANDARD CONSTRUCTION PUSH-UP GRILLES BY APPROXIMATELY 33%. USE FOR PUSH-UP GRILLES THAT EXCEED THE SIZE LIMITS FOR STANDARD PUSH-UP CONSTRUCTION LISTED ABOVE. ALTHOUGH POSSIBLE TO BUILD, CLOPAY DOES NOT RECOMMEND PUSH-UP OPERATION FOR UNITS TALLER THAN 10' (3.05 M) HIGH. CONSULT CLOPAY ARCHITECTURAL DESIGN SERVICES (800) 526-4301 option #3 FOR EZ LIFT LIMITATIONS ON GALVANIZED AND STAINLESS STEEL GRILLES.

- A. Manual Push-Up with EZ Lift Construction Package: Provide pole with hook. Suitable for aluminum grilles up to 22' (6.70 M) wide and up to 10' (3.05 M) high.

OR

- A. Manual Crank Hoist: Provide crank hoist operator including crank gear box, steel crank drive shaft and geared reduction unit. Fabricate gear box to completely enclose operating mechanism and be oil-tight.

OR

SELECT MODEL MG OPERATORS FOR UNITS THAT WILL ROUTINELY CYCLE LESS THAN 20 TIMES PER DAY AND REQUIRE NO MORE THAN 3/4 HP. SELECT SG OPERATORS FOR UNITS THAT WILL CYCLE MORE THAN 20 TIMES PER DAY AND FOR LARGE SIZE UNITS THAT WILL REQUIRE GREATER THAN 3/4 HP.

- A. Supply Clopay Model MG, industrial duty - rated for a maximum of 20 cycles per hour, cULus listed, Totally Enclosed Non Ventilated gear head operator(s) rated (1/3) (1/2) or (3/4) hp as recommended by door manufacture for size and type of door, ____ Volts, ____ Phase. Provide complete with electric motor and factory pre-wired motor control terminals, maintenance free solenoid actuated brake, [emergency manual chain hoist] [provisions for auxiliary push-up operation] and control station(s). Motor shall be high starting torque, industrial type, protected against overload with an auto-reset thermal sensing device. Primary speed reduction shall be heavy-duty, lubricated gears with mechanical braking to hold the door in any position. Operator shall be equipped with [an emergency manual chain hoist assembly that safely cuts operator power when engaged. A disconnect chain shall not be required to engage or release the manual chain hoist.] [a disconnect cable for auxiliary push-up operation.] Operator drive and door driven sprockets shall be provided with #50 roller chain. [Provide an integral Motor Mounted Interlock system to prevent damage to door and operator when mechanical door locking devices are provided.] Operator shall be capable of driving the door at a speed of 6 to 9 inches per second (15 to 23 cm/sec). Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The electrical contractor shall mount the control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.

OR

- A. Supply Clopay Model SG, continuous duty, cULus listed, Totally Enclosed Fan Cooled gear head operator(s) rated (1/2) to (7 1/2) hp as recommended by door manufacture for size and type of door, ____ Volts, ____ Phase. Provide complete with electric motor and factory pre-wired motor control terminals, maintenance free solenoid actuated brake, emergency manual chain hoist provided up to 2 hp and control station(s). Motor shall be high starting torque, industrial type, with overload protection. Primary speed reduction shall be heavy-duty gears running in grease or oil bath with mechanical braking to hold the door in any position. When equipped, the emergency manual chain hoist assembly is automatically disengaged when motor is energized. A disconnect chain shall not be required to engage or release the manual chain hoist. Operator drive and door driven sprockets shall be provided with minimum #50 roller chain. Operator shall be capable of driving the door at a speed of 6 to 9 inches per second (15 to 23 cm/sec). Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The motor shall be removable without affecting the limit switch settings. The electrical contractor shall mount the control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.

MOST COMMON CONTROL STATIONS ARE LISTED BELOW; CONSULT CLOPAY ARCHITECTURAL DESIGN SERVICES (800) 526-4301 option #3 FOR OTHER OPTIONS. GRILLES WITHOUT A BOTTOM SENSING EDGE MUST BE WIRED FOR CONSTANT PRESSURE ON THE "CLOSE" BUTTON.

1. Control Station: Flush mounted, "Open/Close" push buttons ; NEMA 1B.

OR

1. Control Station: Flush mounted, "Open/Close" key switch; NEMA 1B.

OR

1. Control Station: Surface mounted, "Open/Close" push buttons; NEMA 1.

OR

1. Control Station: Surface mounted, "Open/Close" key switch; NEMA 3R.

OR

1. Control Station: Flush mounted, "Open/Close/Stop" push buttons; NEMA 1B.

OR

1. Control Station: Flush mounted, "Open/Close" key switch with "Stop" push button; NEMA 1B.

SENSING EDGE IS RECOMMENDED WITH MOTOR OPERATED UNITS, BUT IS NOT REQUIRED; DELETE IF NOT DESIRED.
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- B. Sensing Edge: Provide automatic [reversing] [stop] control by an automatic sensing switch within neoprene astragal extending full width of grille bottom bar.

1. Provide an electric sensing edge device. Contact before door fully closes shall cause door to immediately [stop downward travel and reverse direction to the fully opened position] [stop downward travel]. Provide a self-monitoring wireless sensing edge connection to motor operator eliminating the need for a physical traveling electric cord connection between bottom bar sensing edge device and motor operator. Supervised system alters normal door operation preventing damage, injury or death due to an inoperable sensing edge system.

OR

1. Provide an electric sensing edge device. Contact before door fully closes shall cause door to immediately [stop downward travel and reverse direction to the fully opened position] [stop downward travel]. Provide a wireless sensing edge connection to motor operator eliminating the need for a physical traveling electric cord connection between bottom bar sensing edge device and motor operator.

OR

1. Provide an electric sensing edge device. Contact before door fully closes shall cause door to immediately [stop downward travel and reverse direction to the fully opened position] [stop downward travel]. Provide [self-coiling cable] [retracting safety cord and reel] connection to control circuit.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.
- B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
- C. Commencement of work by installer is acceptance of substrate.

3.2 INSTALLATION

- A. General: Install grille and operating equipment with necessary hardware, anchors, inserts, hangers and supports.
- B. Follow manufacturer's installation instructions.

3.3 ADJUSTING

- A. Following completion of installation, including related work by others, lubricate, test, and adjust grilles for ease of operation, free from warp, twist, or distortion.

3.4 CLEANING

- A. Clean surfaces soiled by work as recommended by manufacturer.
- B. Remove surplus materials and debris from the site.

3.5 DEMONSTRATION

- A. Demonstrate proper operation to Owner's Representative.
- B. Instruct Owner's Representative in maintenance procedures.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hinges.
2. Self-closing hinges and pivots.
3. Delayed-egress electromagnetic locks.
4. Operating trim.
5. Surface closers.
6. Metal protective trim units.

B. Related Requirements:

1. **[Section 064113 "Wood-Veneer-Faced Architectural Cabinets"]****[and]****[Section 064116 "Plastic-Laminate-Clad Architectural Cabinets"]** for cabinet door hardware provided with cabinets.
2. Section 081113 "Hollow Metal Doors and Frames" **[for astragals provided as part of labeled fire-rated assemblies]****[and]****[for door silencers provided as part of hollow-metal frames]**.
3. Section 081119 "Stainless-Steel Doors and Frames" **[for astragals provided as part of labeled fire-rated assemblies]****[and]****[for door silencers provided as part of stainless steel frames]**.
4. Section 081173 "Sliding Metal Fire Doors" for door and track preparation, reinforcement, and motorized operators provided as part of automatic-closing assemblies.
5. Section 081213 "Hollow Metal Frames" **[for astragals provided as part of labeled fire-rated assemblies]****[and]****[for door silencers provided as part of hollow-metal frames]**.
6. Section 081216 "Aluminum Frames" for door silencers provided as part of aluminum frames.
7. Section 081316.13 "Aluminum Terrace Doors" for entrance door hardware, **[except]****[including]** cylinders.
8. Section 081416 "Flush Wood Doors" for **[astragals]****[and]****[integral intumescent seals]** provided as part of labeled fire-rated assemblies.
9. Section 081433 "Stile and Rail Wood Doors" for **[astragals]****[and]****[integral intumescent seals]** provided as part of labeled fire-rated assemblies.
10. Section 081713 "Integrated Metal Door Opening Assemblies" for door hardware provided as part of integrated metal door opening assemblies.
11. Section 083113 "Access Doors and Frames" for access door hardware, **[except]****[including]** cylinders.
12. Section 083323 "Overhead Coiling Doors" for door hardware provided as part of overhead coiling door assemblies.
13. Section 083326 "Overhead Coiling Grilles" for door hardware provided as part of

- overhead coiling grille assemblies.
14. **[Section 083473.13 "Metal Sound Control Door Assemblies"]****[and]****[Section 083473.16 "Wood Sound Control Door Assemblies"]** for hinges and gasketing provided as part of sound-rated door assemblies.
 15. Section 083513 "Folding Doors" for pulls, latches, hinges, guides, and pivots provided as part of the folding door package.
 16. Section 084113 "Aluminum-Framed Entrances and Storefronts" for entrance door hardware, **[except][including]** cylinders.
 17. Section 084126 "All-Glass Entrances and Storefronts" for entrance door hardware, **[except][including]** cylinders.
 18. Section 084229.13 "Folding Automatic Entrances" for entrance door hardware, **[except][including]** cylinders.
 19. Section 084229.23 "Sliding Automatic Entrances" for entrance door hardware, **[except][including]** cylinders.
 20. Section 084229.33 "Swinging Automatic Entrances" for entrance door hardware, **[except][including]** cylinders.
 21. Section 084233 "Revolving Door Entrances" for revolving door entrance hardware, **[except][including]** cylinders.
 22. Section 084243 "Intensive Care Unit/Critical Care Unit (ICU/CCU) Entrances" for entrance door hardware, **[except][including]** cylinders.
 23. Section 087113 "Power Door Operators" for low-energy power operators and low-energy power-assist operators.
 24. Section 102213 "Wire Mesh Partitions" for door hardware for doors in wire mesh partitions, **[except][including]** cylinders.
 25. Section 102600 "Wall and Door Protection" for plastic door protection units that match wall protection units.
 26. Section 119812 "Detention Doors and Frames" for door silencers provided as part of detention frames.
 27. Section 119814 "Detention Door Hardware" for hardware for detention doors.
 28. Section 133419 "Metal Building Systems" for door hardware, **[except][including]** cylinders.
 29. Section 134900 "Radiation Protection" for lead-lined astragals provided as part of labeled fire-rated assemblies.
 30. Section 281000 "Access Control" for coordination of access control system components.
 31. Section 281400 "Access Control System Hardware" for access control system units, power, battery chargers, and computer equipment.
 32. Section 283100 "Intrusion Detection" for detection devices installed at door openings and provided as part of an intrusion-detection system.
 33. **[Section 284600 "Fire Detection and Alarm"]****[and]****[Section 284614 "Single- and Multiple-Station Alarms"]** for connections to building fire alarm system.

PART 2 - PRODUCTS

2.1 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. STANLEY; dormakaba USA, Inc.
 - b. or approved equal.

2.2 SELF-CLOSING HINGES AND PIVOTS

A. Self-Closing Hinges and Pivots: ANSI/BHMA A156.17.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. STANLEY; dormakaba USA, Inc.
 - b. or approved equal.

2.3 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.
2. Mortise Locks: Minimum **3/4-inch** latchbolt throw.
3. Deadbolts: Minimum [**1-inch**][**1.25-inch**]**<Insert dimension>** bolt throw.

C. Lock Backset: **2-3/4 inches** unless otherwise indicated.

D. Lock Trim:

1. Description: [**As indicated on Drawings**]**<Insert description or manufacturer's design designation>**.
2. Levers: [**Wrought**][**Forged**][**Cast**].

a. **<Insert model number and description>**.

3. Escutcheons (Roses): [**Wrought**][**Forged**][**Cast**].
4. Dummy Trim: Match lever lock trim and escutcheons.

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. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.

4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

2.4 LOCK CYLINDERS

- A. Standard Lock Cylinders: ANSI/BHMA A156.5, [Grade 1][Grade 1A][Grade 2] permanent cores; face finished to match lockset.
 1. Core Type: [Interchangeable][Removable].
- B. High-Security Lock Cylinders: ANSI/BHMA A156.30, [Grade 1][Grade 2][Grade 3] permanent cores that are removable; face finished to match lockset.
 1. [Type M, mechanical][Type E, electrical].
- C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.5 OPERATING TRIM

- A. Operating Trim: ANSI/BHMA A156.6; [aluminum][brass][bronze][stainless steel] unless otherwise indicated.
 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Allegion plc

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, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allegion plc
 - b. STANLEY; dormakaba USA, Inc.
 - c. or approved equal.

2.7 DOOR GASKETING

- A. Maximum Air Leakage: When tested in accordance with ASTM E283/E283M with tested pressure differential of **0.3 inch wg**, as follows:
1. Smoke-Rated Gasketing: **0.3 cfm/sq. ft.** of door opening.
 2. Gasketing on Single Doors: **0.3 cfm/sq. ft.** of door opening.
 3. Gasketing on Double Doors: **0.50 cfm per ft.** of door opening.

2.8 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: ANSI/BHMA A156.6; fabricated from **0.050-inch-** thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Allegion plc

PART 3 - EXECUTION

END OF SECTION 087100

SECTION 092400 - CEMENT PLASTERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal lath.
2. Base-coat cement plaster.
3. Cement plaster finish coats.

1.2 MOCKUPS

A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups for each substrate and color and finish texture indicated for cement plastering, including accessories.
 - a. Size: 4 sq. ft. in surface area.
2. For interior plasterwork, simulate finished lighting conditions for review of mockups.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL LATH

- ##### A. Expanded Metal Lath: ASTM C847; cold-rolled carbon steel sheet, hot-dip galvanized with ASTM A653/A653M G60 zinc coating.

2.2 ACCESSORIES

2.3 CEMENT PLASTER FINISH COATS

- ##### A. Acrylic-Based Finish Coatings: Factory-mixed, acrylic-emulsion coating systems formulated with colorfast mineral pigments and fine aggregates; for use over cement plaster base coats. Include manufacturer's recommended primers and sealing topcoats for acrylic-based finishes.

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. California Stucco Products Corp.
 - b. Dryvit Systems, Inc.
 - c. El Rey Stucco Solutions; a Parex USA, Inc. brand
 - d. Omega Products International, Inc.

PART 3 - EXECUTION

END OF SECTION 092400

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

B. Related Requirements:

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: 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. Gold Bond Building Products, LLC provided by National Gypsum Company
 - c. USG Corporation

B. 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. Gold Bond Building Products, LLC provided by National Gypsum Company
2. Thickness: **5/8 inch**.
3. Long Edges: Tapered.

2.2 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:

- a. Cornerbead.

2.3 TEXTURE FINISHES

PART 3 - EXECUTION

END OF SECTION 092900

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements:

1. **[Section 051200 "Structural Steel Framing"]****[Section 051213 "Architecturally Exposed Structural Steel Framing"]** for shop priming structural steel.
2. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
3. Section 055113 "Metal Pan Stairs" for shop priming metal pan stairs.
4. Section 055116 "Metal Floor Plate Stairs" for shop priming metal floor plate stairs.
5. Section 055119 "Metal Grating Stairs" for shop priming metal grating stairs.
6. Section 055213 "Pipe and Tube Railings" for shop **[priming]****[painting]** pipe and tube railings.
7. **[Section 055313 "Bar Gratings"]****[Section 055316 "Plank Gratings"]****[Section 055319 "Expanded Metal Gratings"]** for shop priming metal gratings.
8. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.
9. Section 099600 "High-Performance Coatings" for tile-like coatings.

PART 2 - PRODUCTS

2.1 PAINT PRODUCTS

- ##### 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. Dunn-Edwards Corporation (a Nippon Paint Holdings Co. Ltd. company)
 2. 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][Match Architect's samples][As indicated in a color schedule]<Insert requirements>.**

1. **[Ten][Twenty][Thirty]<Insert number>** percent of surface area will be painted with deep tones.

PART 3 - EXECUTION

END OF SECTION 099123

SECTION 102113.13 - METAL TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal toilet compartments.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for supports that attach **[ceiling-hung compartments][floor-and-ceiling-anchored compartments][and][post-to-ceiling screens]** to overhead structural system.
2. Section 061000 "Rough Carpentry" for **[blocking][overhead support of floor-and-ceiling-anchored compartments][and][overhead support of post-to-ceiling screens]**.
3. Section 092216 "Non-Structural Metal Framing" for blocking.
4. Section 102800 "Toilet, Bath, and Laundry Accessories" for accessories mounted on toilet compartments.

PART 2 - PRODUCTS

2.1 METAL TOILET COMPARTMENTS

PART 3 - EXECUTION

END OF SECTION 102113.13

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Corner guards.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for [steel angle corner guards][pipe guards][and][wheel guards].
2. Section 057300 "Decorative Metal Railings" for metal handrails without plastic bumpers.
3. Section 064023 "Interior Architectural Woodwork for solid-wood handrails, bumper rails, chair rails, or corner moldings without plastic bumpers.
4. [Section 087100 "Door Hardware"] [Section 087111 "Door Hardware (Descriptive Specification)"] for metal[and plastic] protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

PART 2 - PRODUCTS

2.1 IMPACT-RESISTANT HANDRAILS

A. Structural Performance: Handrails, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform load of **50 lbf/ft.** <Insert requirement> applied in any direction.
2. Concentrated load of **200 lbf** applied in any direction.
3. Uniform and concentrated loads need not be assumed to act concurrently.

2.2 CORNER GUARDS

A. Surface-Mounted, Metal Corner Guards: Fabricated as one piece from formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.

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 Floor Products Company, Inc
- b. Babcock-Davis

- c. Construction Specialties, Inc.
 - d. Pawling Corporation
 - e. Western Fabricating LLC
- 2. Material:
 - a. Stainless-steel sheet, Type 304.
 - 1) Thickness: Minimum 0.0500 inch.
 - 2) Finish: Directional satin, No. 4.
- 3. Wing Size: Nominal [1-1/2 by 1-1/2 inches][2-1/2 by 2-1/2 inches][3-1/2 by 3-1/2 inches]<Insert dimensions>.
- 4. Corner Radius: 1/8 inch.
- 5. Mounting: Flat-head, countersunk screws through factory-drilled mounting holes.

2.3 PLASTIC DOOR-PROTECTION PLATES

- A. Full-Height Door-Surface Protection : Minimum [0.040-inch][0.060-inch][0.080-inch]<Insert dimension> wall thickness; with 90-degree bend for edge return to protect door edge.
 - 1. Color and Texture: [As indicated by manufacturer's designations][Match Architect's sample][As selected by Architect from manufacturer's full range]<Insert color and texture>.
 - 2. Mounting: [Adhesive][Countersunk screws through factory-drilled mounting holes].
- B. Armor Plates : Minimum [0.040-inch][0.060-inch][0.080-inch]<Insert dimension> wall thickness; beveled four sides.
 - 1. Size: [32 inches][36 inches][40 inches][42 inches]<Insert dimension> high by door width, with allowance for frame stops.
 - 2. Color and Texture: [As indicated by manufacturer's designations][Match Architect's sample][As selected by Architect from manufacturer's full range]<Insert color and texture>.
 - 3. Mounting: [Adhesive][Countersunk screws through factory-drilled mounting holes].
- C. Kick Plates : Minimum [0.040-inch][0.060-inch][0.080-inch]<Insert dimension> wall thickness; beveled four sides.
 - 1. Size: [8 inches][10 inches][12 inches]<Insert dimension> high by door width, with allowance for frame stops.
 - 2. Color and Texture: [As indicated by manufacturer's designations][Match Architect's sample][As selected by Architect from manufacturer's full range]<Insert color and texture>.
 - 3. Mounting: [Adhesive][Countersunk screws through factory-drilled mounting holes].

- D. Mop Plates : Minimum [0.040-inch][0.060-inch][0.080-inch]<Insert dimension> wall thickness; beveled four sides.
1. Size: [4 inches][6 inches]<Insert dimension> high by 1 inch less than door width.
 2. Color and Texture: [As indicated by manufacturer's designations][Match Architect's sample][As selected by Architect from manufacturer's full range]<Insert color and texture>.
 3. Mounting: [Adhesive][Countersunk screws through factory-drilled mounting holes].
- E. Stretcher Plates : Minimum [0.040-inch][0.060-inch][0.080-inch]<Insert dimension> wall thickness; beveled four sides.
1. Size: [6 inches][8 inches]<Insert dimension> high by door width, with allowance for frame stops.
 2. Color and Texture: [As indicated by manufacturer's designations][Match Architect's sample][As selected by Architect from manufacturer's full range]<Insert color and texture>.
 3. Mounting: [Adhesive][Countersunk screws through factory-drilled mounting holes].
- F. Push Plates : Minimum [0.040-inch][0.060-inch][0.080-inch]<Insert dimension> wall thickness; beveled four sides.
1. Size: [12 inches high by 4 inches wide][16 inches high by 4 inches wide]<Insert dimensions>.
 2. Color and Texture: [As indicated by manufacturer's designations][Match Architect's sample][As selected by Architect from manufacturer's full range]<Insert color and texture>.
 3. Mounting: [Adhesive][Countersunk screws through factory-drilled mounting holes].

PART 3 - EXECUTION

END OF SECTION 102600

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Custodial accessories.

B. Related Requirements:

1. Section 088300 "Mirrors" for frameless mirrors.
2. Section 093013 "Ceramic Tiling" for ceramic toilet and bath accessories.
3. Section 102813.63 "Detention Toilet Accessories" for accessories designed for installation in detention facilities.

PART 2 - PRODUCTS

2.1 PUBLIC-USE WASHROOM ACCESSORIES

A. Toilet Tissue (Jumbo-Roll) Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Renown Jumbo Jr #REN05150-1B or comparable product by one of the following:
 - a. [ASI-American Specialties, Inc.]
 - b. [Bobrick Washroom Equipment, Inc]
 - c. [Bradley Corporation]
 - d. [Brey-Krause Manufacturing Co.]
 - e. [Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.]
 - f. [Tubular Specialties Manufacturing, Inc.]
 - g. <Insert manufacturer's name>

B. Paper Towel (Roll) Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Georgia Pacific #GPT54338 or comparable product by one of the following:
 - a. [ASI-American Specialties, Inc.]
 - b. [Bobrick Washroom Equipment, Inc]
 - c. [Bradley Corporation]
 - d. [Gamco Commercial Restroom Accessories; Bobrick Washroom

Equipment, Inc.]

- e. **[Tubular Specialties Manufacturing, Inc.]**
- f. **<Insert manufacturer's name>**

- 2. Description: Lever-actuated mechanism that permits controlled delivery of paper rolls in preset lengths.
- 3. Mounting: Surface mounted.
- 4. Minimum Capacity: **8-inch-** wide, **800-foot-** long roll.
- 5. Material and Finish: ABS plastic, gray, with translucent front cover.

C. Waste Receptacle:

- 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. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc
 - c. Bradley Corporation
 - d. Brey-Krause Manufacturing Co.
 - e. Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.
 - f. Tubular Specialties Manufacturing, Inc.
- 2. Mounting: Freestanding.
- 3. Liner: Reusable vinyl liner.

D. Soap Dispenser:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Deb Proline Soap Dispenser #SBS19428 or comparable product by one of the following:
 - a. **[Aluids; Krome USA Inc.]**
 - b. **[ASI-American Specialties, Inc.]**
 - c. **[Bobrick Washroom Equipment, Inc]**
 - d. **[Bradley Corporation]**
 - e. **[Brey-Krause Manufacturing Co.]**
 - f. **[Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.]**
 - g. **[Seachrome Corporation]**
 - h. **[Tubular Specialties Manufacturing, Inc.]**
 - i. **<Insert manufacturer's name>**
- 2. Description: Designed for manual operation and dispensing soap in lather form.
- 3. Mounting: Vertically oriented, surface mounted.
- 4. Lockset: Tumbler type.
- 5. Refill Indicator: Window type.

E. Grab Bar:

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. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc
 - c. ProFlo; a Ferguson Enterprises, Inc. brand
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, **0.05 inch** thick.
 - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin)[**on ends and slip-resistant texture in grip area**].
4. OD: **1-1/2 inches**.
5. Configuration and Length: As indicated on Drawings.

F. Sanitary-Napkin Disposal Unit:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick Surface Mounted Sanitary ND #BOB-270 or comparable product by one of the following:
 - a. Bobrick Washroom Equipment, Inc
2. Mounting: Surface mounted.
3. Receptacle: Removable.
4. Material and Finish: ABS plastic, gray.

G. Seat-Cover Dispenser:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Safe-T-Guard #GPT57748 or comparable product by one of the following:
 - a. [ASI-American Specialties, Inc.]
 - b. [Bobrick Washroom Equipment, Inc]
 - c. [Bradley Corporation]
 - d. [Brey-Krause Manufacturing Co.]
 - e. [Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.]
 - f. [Seachrome Corporation]
 - g. [Tubular Specialties Manufacturing, Inc.]
 - h. <Insert manufacturer's name>
2. Mounting: Surface mounted.
3. Minimum Capacity: 500 seat covers.
4. Exposed Material and Finish: BLACK.
5. Lockset: Tumbler type.

H. Mirror Unit:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Bobrick # B-1556 Series or Similar or comparable product by one of the following:
 - a. Bobrick Washroom Equipment, Inc
2. Frame: Stainless steel channel.
 - a. Corners: Manufacturer's standard.

- 2.2 PUBLIC-USE SHOWER ROOM ACCESSORIES
- 2.3 PRIVATE-USE BATHROOM ACCESSORIES
- 2.4 HEALTHCARE ACCESSORIES
- 2.5 CHILDCARE ACCESSORIES
- 2.6 CUSTODIAL ACCESSORIES

A. Custodial Utility Shelf:

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. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc
 - c. Gamco Commercial Restroom Accessories; Bobrick Washroom Equipment, Inc.
 - d. Tubular Specialties Manufacturing, Inc.
2. Description: With exposed edges turned down not less than **1/2 inch** and supported by two triangular brackets welded to shelf underside.
3. Size: See Floor Plan.
4. Material and Finish: Not less than nominal **0.05-inch-** thick stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.7 HAND-SANITIZER DISPENSERS

PART 3 - EXECUTION

END OF SECTION 102800

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:
2. Fire-protection cabinets for the following:
 - a. Portable fire extinguisher.
 - b. Portable fire extinguisher and fire-hose valve.
 - c. Portable fire extinguisher, fire hose, rack, and fire-hose valve.
 - d. Fire-hose valve.
 - e. Fire hose, rack, and fire-hose valve.

B. Related Requirements:

1. Section 104416 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets.
2. Section 211000 "Water-Based Fire-Suppression Systems" for fire-hose connections.

PART 2 - PRODUCTS

2.1 FIRE-PROTECTION CABINET

- ##### A. Manufacturers: Subject to compliance with requirements, provide products by the following:
1. ULINE
 2. ULINE

PART 3 - EXECUTION

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes portable, **[hand-carried][wheeled]** fire extinguishers[**and mounting brackets for fire extinguishers**].
- B. Owner-Furnished Material: **[Hand-carried][Wheeled]** fire extinguishers.
- C. Related Requirements:
 - 1. Section 104413 "Fire Protection Cabinets."
 - 2. Section 233813 "Commercial-Kitchen Hoods" for fire-extinguishing systems provided as part of commercial-kitchen exhaust hoods.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Amerex Corporation
 - b. Ansul; brand of Johnson Controls International plc, Building Solutions North America
 - c. Babcock-Davis
 - d. Guardian Fire Equipment, Inc
 - e. JL Industries; Activar Construction Products Group, Inc.
 - f. Larsen's Manufacturing Company
 - g. Pyro-Chem; brand of Johnson Controls International plc, Building Solutions North America
 - 2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
 - 3. Valves: Manufacturer's standard.
 - 4. Handles and Levers: Manufacturer's standard.
 - 5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

2.2 MOUNTING BRACKETS

PART 3 - EXECUTION

END OF SECTION 104416

SECTION 116623 - GYMNASIUM EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Basketball equipment.
2. Volleyball equipment.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for **[installation of floor-insert sleeves][oversized recessed voids]** to be cast in concrete slabs and footings.
2. Section 096466 "Wood Athletic Flooring" for game lines and markers.
3. Section 096566 "Resilient Athletic Flooring" for game lines and markers.
4. Section 096766 "Fluid-Applied Athletic Flooring" for game lines and markers.
5. Section 116653 "Gymnasium Dividers" for gymnasium divider curtain systems.

PART 2 - PRODUCTS

2.1 BASKETBALL EQUIPMENT

A. Basis-of-Design Product: Subject to compliance with requirements, provide Quality Hoops or comparable product by one of the following:

1. Performance Sports Systems

B. Source Limitations: Obtain from single source from single manufacturer.

C. Standard Rules: Provide equipment according to the requirements of NCAA's "Men's Basketball Rules."

D. Protruding fasteners or exposed bolt heads on front face of backboards are not permitted.

E. Connections: Manufacturer's standard connections or connections recommended in writing by manufacturer and complying with Section 055000 "Metal Fabrications" of size and type required to transfer loads to building structure.

F. Overhead-Supported[, **Wall-Braced**] Backstops:

1. Stationary Type: Manufacturer's standard assembly.
2. Framing: Steel pipe, tubing, and shapes designed to minimize vibration during play.

2.2 VOLLEYBALL EQUIPMENT

- A. Manufacturers: Subject to compliance with requirements, **[provide products by the following][provide products by one of the following][available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]**:
1. **[AALCO Manufacturing]**
 2. **[ADP Lemco]**
 3. **[Arizona Courtlines, Inc.]**
 4. **[Bison, Inc.]**
 5. **[Douglas Industries, Inc.]**
 6. **[Draper, Inc.]**
 7. **[IPI by Bison]**
 8. **[Jaypro Sports, LLC]**
 9. **[L.A. Steelcraft, a brand of Americana Outdoor]**
 10. **[P. W. Athletic Mfg. Co.]**
 11. **[Performance Sports Systems]**
 12. **[Porter Athletic Equipment Company]**
 13. **[Schelde Sports]**
 14. **[Spalding]**
 15. **[Sports Imports, Inc.]**
 16. **<Insert manufacturer's name>**
- B. Source Limitations: Obtain from single source from single manufacturer.
- C. Standard Rules: Provide equipment according to the requirements of **[FIVB's "Official Volleyball Rules."][NCAA's "Women's Volleyball Rules and Interpretations."][NFHS's "Volleyball Rules Book."]**
- D. Floor Insert: **[Solid-brass][Chrome-finished steel]** floor plate and steel pipe sleeve, concealed by floor plate, with capped bottom end, sized with ID to fit post standards, minimum **[9 inches long][12 inches long][length required]**, to securely anchor pipe sleeve **[in structural floor][below finished floor in concrete footing][as indicated on Drawings]**; with anchors designed for securing floor insert to floor substrate indicated; **[one per post standard][quantity as indicated on Drawings]<Insert requirement>**.
1. Flush Floor Plate: **[Self-locking,][Lockable,][Manufacturer's standard]** hinged access cover, designed to be flush with adjacent flooring. Provide **[one][two]<Insert number>** tool(s) for unlocking access covers.
 2. Recessed Floor Plate: **[Self-locking,][Lockable,][Manufacturer's standard]** hinged access cover, recessed to accept finish flooring matching, and designed to be level with adjacent flooring. Provide **[one][two]<Insert number>** tool(s) for unlocking access covers.
 3. Floating Wood Floor, Floor Plate: Lockable swivel access cover, designed for use with floating wood floors and to be flush with adjacent flooring. Provide **[one][two]<Insert number>** tool(s) for unlocking access covers.
 4. Floor Plate: **<Insert requirements>**.
- E. Post Standards: Removable, **[fixed-height][adjustable-height, telescoping,]** paired

volleyball post standards[**and a center post standard for multicourt play**], as indicated on Drawings, designed for easy removal from permanently placed floor inserts.

1. Materials: [~~Steel~~][~~Extruded-aluminum~~][**Combined steel and extruded-aluminum**][**Manufacturer's standard metal**] pipe or tubing, with nonmarking plastic or rubber end cap or floor bumper to protect permanent flooring.
 2. Nominal Pipe or Tubing Diameter: [~~3-inch~~][~~3-1/2-inch~~][**4-inch**] OD at base.
 3. Finish: Manufacturer's standard [~~factory-applied, polyester powder-coat finish~~][~~or~~][**plated metal finish**].
 4. Net Height Adjuster: [~~Track or rail system and lock mechanism, designed for infinite~~][~~Sliding collar and lock mechanism, designed for infinite~~][**Preset net hooks, designed for incremental**][**Manufacturer's standard mechanism for**] height adjustment, complete with fittings; designed for positioning net at heights indicated.
 - a. Net Heights: [**Between sitting volleyball net height and boys'/men's volleyball net height, 36 and 95-5/8 inches**][**Between tennis net height and boys'/men's volleyball net height, 42 and 95-5/8 inches**][**For ages 12 and under net height and boys'/men's volleyball net height, 84 and 95-5/8 inches**]<Insert net height range> or more.
 5. Telescopic and Net Height Adjuster System: Provide [**infinitely adjustable system consisting of screw rod, gear, and crank or constant-tension spring and pulley assist and**][**incrementally adjustable system with predrilled holes and pin**][**manufacturer's standard telescoping system with**] locking device, telescopic post, and fittings for holding net at selected height; designed for height adjustment of post standard to position net at heights indicated.
 - a. Net Heights: [**Between sitting volleyball net height and boys'/men's volleyball net height, 36 and 95-5/8 inches**][**Between tennis net height and boys'/men's volleyball net height, 42 and 95-5/8 inches**][**For ages 12 and under net height and boys'/men's volleyball net height, 84 and 95-5/8 inches**]<Insert net height range> or more.
 6. Height Markers: Clearly marked at regulation play heights for [**elementary school**][**girls/women**][**boys/men**][**sitting volleyball**][**tennis**]<Insert requirements>.
- F. Net: **32 feet** long; [**one per pair of paired post standards**][**two per every center post standard**]<Insert requirements>; and as follows:
1. Width and Polyester Mesh: **36 inches** with ~~4-1/2-inch-~~ square mesh made of black polyester string.
 - a. Hem Band Edges: White, ~~2-inch-~~ wide top binding; black, [~~3/4-inch-~~][~~1-inch-~~] wide bottom and side bindings; tie offs at top and bottom of each side end of net; and ~~1/4-inch-~~ diameter rope, at least **42 feet** long, threaded through top hem of binding.
 2. Width and Nylon Mesh: Competition volleyball net, [**36 inches**][**39 inches**] with ~~4-inch-~~ square[**knotless**] mesh made of black nylon string.

- a. Hem Band Edges: White, minimum **2-inch-** wide top, bottom, and side bindings; **[tie offs at top, bottom, and midpoint of each side end of net][minimum 1-inch- wide tension straps at top, bottom, and midpoint of each side end of net]**; end sleeves for dowels; and lines with linkage fittings threaded through top and bottom hems of binding. Provide lengths of lines and linkage fittings as required to properly connect to and set up net for post-standard spacing indicated on Drawings.
 - 1) Top Line: Minimum **[1/4-inch- diameter rope][1/8-inch- diameter, galvanized- or coated-steel cable]<Insert description>**.
 - 2) Bottom Line: Minimum **[1/4-inch- diameter rope][1/8-inch- diameter, galvanized- or coated-steel cable]<Insert description>**.
3. Dowels: Minimum **1/2-inch-** diameter fiberglass or **1-inch-** diameter wood. Provide two dowels per net threaded through each side hem sleeve for straightening net side edges.
4. Net Antennas: **3/8-inch-** diameter, high-tensile-strength, extruded-fiberglass or plastic rods, **72 inches** long, extending above top hem band of net, with alternating white and red bands according to referenced standard rules. Provide two antennas per net.
 - a. Clamps: Designed to secure antenna to top and bottom of net.
5. Boundary Tape Markers: **2-inch-** wide white strip **[with sleeve for securing net antenna]**, secured to net top and bottom with hook-and-loop attachment. Provide two tape markers per net for marking court boundaries.
- G. Net-Tensioning System: Designed to adjust and hold tension of net. Fully enclosed, nonslip, **[worm-gear][rack-and-pinion][ratchet][manufacturer's standard]**-type winch with cable length and fittings for connecting to net lines, positive-release mechanism, and **[permanently fixed][removable][manufacturer's standard]** handle. **[Mount net tensioner on post standard at side away from court.]** Provide end post with post top pulley. Provide opposing post with welded-steel loops, hooks, pins, or other devices for net attachment and post top grooved line guide.
- H. Bottom Net Lock Tightener: Manufacturer's standard quick-release-type tension strap; a spring-loaded, self-locking tensioner; a turnbuckle; a pulley; or other device and linkage fittings designed to quickly and easily tighten bottom line or net.
- I. Judges' Stands: Manufacturer's standard **[adjustable-height]** units designed to be **[freestanding, folding for storage][freestanding, folding for storage with wheels for transporting][attached to and supported by post standard]**. Fabricate welded-steel tubing units with finish and color to match post standards.
- J. Safety Pads: Consisting of minimum **[1-inch-][1-1/4-inch-]** thick, multiple-impact-resistant **[polyurethane][crosslinked or closed-cell polyethylene][manufacturer's standard]** foam filler covered by puncture- and tear-resistant fabric cover[, minimum **14-oz./sq. yd. PVC-coated polyester, treated with fungicide for mildew resistance][, minimum 14-oz./sq. yd. nylon-reinforced PVC][, molded PVC][, manufacturer's standard]<Insert description>**; with fire-test-response characteristics indicated[, and

lined with fire-retardant liner]. Provide pads with hook-and-loop closure or attachments for the following components:

1. Post Standards: [**Wraparound**][**three- or four-sided**] style pads, designed to totally enclose each standard to a minimum height of [**66 inches**][**72 inches**]; one per post.
 2. Net Lines: Four per net.
 3. Judges' Stands: Pads designed to totally enclose front and sides.
 4. Fabric Cover Flame-Resistance Ratings: [**Complies with NFPA 701**]**<Insert requirement for fire-test-response characteristic>**.
 5. Fabric Color: [**Match school colors**][**As indicated by manufacturer's designations**][**Match Architect's sample**][**As selected by Architect from full range of industry standard colors and color densities**]**<Insert color(s)>**.
 6. Graphics: Custom graphics as indicated on Drawings.
- K. Post Standard Transporter: Manufacturer's standard wheeled unit designed for transporting a single post.
- L. Wall Storage Rack: Manufacturer's standard unit designed for mounting on walls and for storing post standards in vertical position, with retaining arms, fittings for padlock, and mounting hardware; number of units as required to provide storage for specified equipment.
- M. Storage Cart: Manufacturer's standard wheeled unit designed for transporting and storing volleyball equipment and passing through [**36-inch-**]**<Insert dimension>** wide door openings. Fabricate welded-steel tubing units with heavy-duty casters, including no fewer than two swivel casters. Fabricate wheels from materials that do not damage or mark floors; number of units as required to provide transport and storage for specified equipment.

PART 3 - EXECUTION

END OF SECTION 116623

SECTION 224200 - COMMERCIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Commercial showers.
2. Commercial sinks.
3. Commercial urinals.
4. Commercial water closets.
5. Commercial wash fountains.

1.2 DEFINITIONS

- A. High-Efficiency Flush Volume: **1.28 gal.** or less per flush.

PART 2 - PRODUCTS

2.1 COMMERCIAL LAVATORIES

2.2 COMMERCIAL SHOWERS

2.3 COMMERCIAL SINKS

2.4 COMMERCIAL URINALS

A. Urinals, Waterless:

1. Urinals, Waterless - Vitreous China, Wall Hung, Back Outlet:

- a. Basis-of-Design Product: Subject to compliance with requirements, provide Kohler #K-4909-ET-0 Urinal Vitreous China 3/4" top spud or comparable product by one of the following:
 - 1) Kohler Co
- b. Support: Urinal carrier, floor affixed with steel uprights with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture.
- c. Urinal Mounting Height: Accessible in accordance with ICC A117.1.

2.5 COMMERCIAL WATER CLOSETS

A. Water Closets, Wall Mounted:

1. Water Closets, Wall Mounted - Top Spud:
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Kohler K-84325 Elongated Wall Hung Flush Valve or comparable product by one of the following:
 - 1) Kohler Co
 - b. Bowl:
 - 1) Material: Vitreous china.
 - 2) Style: Flushometer valve.
 - 3) Mounting Height: Accessible in accordance with ICC A117.1.
 - 4) Rim Contour: Elongated.
 - 5) Water Consumption: 1.28 gal. per flush.
 - 6) Spud Size and Location: NPS 1-1/2; top.
 - 7) Color: [White]<Insert color>.

- 2.6 COMMERCIAL WASH FOUNTAINS
- 2.7 FLUSHOMETER VALVES

PART 3 - EXECUTION

END OF SECTION 224200

SECTION 224700 - DRINKING FOUNTAINS AND WATER COOLERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bottle filling stations.

PART 2 - PRODUCTS

2.1 BOTTLE FILLING STATIONS

A. Bottle Filling Station - Pedestal, Powder-Coated Metal:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Haws Model # 3612F or comparable product by one of the following:
 - a. Haws Corporation
2. Type: Vandal resistant.
3. Pedestal: Rectangular.
4. Finish Color: S.S. w/ Silver Powder Coated color finish
5. Bottle Filler: Push-button activationautomatic shutoff timer. Fill rate is **[0.5 to 1.5 gpm]**<Insert value>.
6. Access to Internal Components: Panel in pedestal.
7. Filter: One or more water filters with capacity sized for unit peak flow rate.
 - a. Standards:
 - 1) NSF 53.
8. Bottle Filling Station Height: Accessible in accordance with ICC A117.1.

PART 3 - EXECUTION

END OF SECTION 224700

SECTION 265000 - LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Luminaires.
2. Luminaire fittings.

B. Related Requirements:

1. Section 018116 "Facility Environmental Requirements" specifies basis-of-design environmental conditions and performance criteria that are applicable to product selection and installation of the Work on the Project.
2. Section 018123 "Facility Seismic and Wind Criteria" specifies basis-of-design seismic and wind criteria for nonstructural components on the Project.
3. Section 260010 "Supplemental Requirements for Electrical" specifies additional requirements applicable to coordinating, scheduling, and sequencing of the Work specified in this Section.
4. **[Section 260519 "Low-Voltage Electrical Power Conductors and Cables"]****[and]****[Section 260523 "Control-Voltage Electrical Power Cables"]** specifies wiring connections installed by this Section.
5. Section 260529 "Hangers and Supports for Electrical Systems" specifies channel and angle supports installed by this Section.
6. Section 260546 "Poles for Electrical Systems" specifies lighting standards, utility poles, and accessories referenced by this Section.
7. Section 260553 "Identification for Electrical Systems" specifies electrical equipment labels and warning signs installed by this Section.
8. Section 260923 "Lighting Control Devices" specifies automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors installed by this Section.
9. Section 260936 "Modular Dimming Controls" specifies architectural dimming systems with dimming installed by this Section.
10. Section 260943.16 "Addressable Luminaire Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls" specify manual or programmable control systems with low-voltage control wiring or data communication circuits installed by this Section.

PART 2 - PRODUCTS

2.1 LUMINAIRES

A. Surface-Mounted Luminaire:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Kenall # MLHA5-48-yy-zz-pp-45L40K or comparable product by one of the following:
 - a. [Albeo; brand of GE Current, a Daintree company; American Industrial Partners (AIP)]
 - b. [Alera Lighting; brand of GE Current, a Daintree company; American Industrial Partners (AIP)]
 - c. [Amerlux]
 - d. [Architectural Area Lighting; brand of GE Current, a Daintree company; American Industrial Partners (AIP)]
 - e. [Atlas Lighting Products]
 - f. [Columbia Lighting; brand of GE Current, a Daintree company; American Industrial Partners (AIP)]
 - g. [Cooper Lighting Solutions; Signify North America Corp.]
 - h. [Deco Lighting]
 - i. [Digital Lumens]
 - j. [E-conolight]
 - k. [Edison Price Lighting]
 - l. [Elite Lighting Corporation]
 - m. [Focal Point; Legrand North America, LLC]
 - n. [GE Current, a Daintree company; American Industrial Partners (AIP)]
 - o. [GE Lighting; a Savant Company]
 - p. [H.E. Williams]
 - q. [Howard Lighting Products]
 - r. [Hubbell Lighting; brand of Hubbell Electrical Solutions; Hubbell Incorporated]
 - s. [Kim Lighting; brand of GE Current, a Daintree company; American Industrial Partners (AIP)]
 - t. [Lighting Services, Inc.]
 - u. [Lightolier; brand of Signify North America Corp.]
 - v. [Lithonia Lighting; Acuity Brands Lighting, Inc.]
 - w. [LMPG Inc.]
 - x. [Luraline Lighting]
 - y. [OSRAM SYLVANIA]
 - z. [Philips; Signify North America; Signify Holding]
 - aa. [Pure Lighting Manufacturing Ltd.]
 - bb. [PureEdge Lighting]
 - cc. [RAB Lighting]
 - dd. [Selux Corporation]
 - ee. [Specialty Lighting Industries, Inc.]
 - ff. [Visa Lighting]
 - gg. [West Durable Lighting]
 - hh. [Zumtobel Lighting, Inc.; Zumtobel Group]
 - ii. <Insert manufacturer's name>
2. Listing Criteria:
 - a. LED Luminaires: UL CCN IFAM; including UL 1598.

3. Standard Features:

- a. Openings: Doors, frames, and access panels must operate smoothly, not leak light under operating conditions, and permit relamping without use of tools or parts falling from enclosure.

B. Recessed Luminaire:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Luminar LED #VRDL4-1000LM-WD40K or comparable product by one of the following:
 - a. [Albeo; brand of GE Current, a Daintree company; American Industrial Partners (AIP)]
 - b. [Alera Lighting; brand of GE Current, a Daintree company; American Industrial Partners (AIP)]
 - c. [Amerlux]
 - d. [Axis Lighting, Inc.]
 - e. [Columbia Lighting; brand of GE Current, a Daintree company; American Industrial Partners (AIP)]
 - f. [Cooper Lighting Solutions; Signify North America Corp.]
 - g. [Digital Lumens]
 - h. [Edison Price Lighting]
 - i. [Elite Lighting Corporation]
 - j. [Focal Point; Legrand North America, LLC]
 - k. [GE Current, a Daintree company; American Industrial Partners (AIP)]
 - l. [GE Lighting; a Savant Company]
 - m. [Lighting Services, Inc.]
 - n. [Lightolier; brand of Signify North America Corp.]
 - o. [Lithonia Lighting; Acuity Brands Lighting, Inc.]
 - p. [LMPG Inc.]
 - q. [OSRAM SYLVANIA]
 - r. [PureEdge Lighting]
 - s. [RAB Lighting]
 - t. [Selux Corporation]
 - u. [Specialty Lighting Industries, Inc.]
 - v. <Insert manufacturer's name>

PART 3 - EXECUTION

END OF SECTION 265000

SECTION 32 84 23 - IRRIGATION

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

- A. The requirements of the "General Conditions of the Contract" shall apply to all work of this Section with the same force and effect as though repeated in full herein.

1.2 DESCRIPTION

- B. Scope of Work: Provide all labor, materials, transportation, and services necessary to furnish and install the Irrigation System as shown on the Drawings and described herein.

1.3 QUALITY ASSURANCE & REQUIREMENTS

- A. Qualifications: 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. Permits and Fees: The Contractor shall secure the required licenses and permits, make payments of charges and fees required, give required notices to public authorities and verify permits secured or arrangements made by others affecting the work of this section.
- C. Manufacturer's Directions: 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.
- D. Ordinances and Regulations:
 - 1. Comply with all local, municipal and state laws, rules and regulations.
 - 2. Conform to applicable provisions of the latest editions of the Uniform Plumbing Code, the National Electric Code and all codes properly governing the materials and work at the project site.
 - 3. City Standard Plans and Specifications where project is located, local water district Regulations, municipal and state laws, and rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these Specifications and shall apply to all work of this Section with the same force and effect as though repeated in full herein. The Contractor shall carry out their provisions. Anything contained in these Specifications shall not be construed to conflict with any of the above rules, regulations, or requirements. However, when these Specifications and Drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of these Specifications and Drawings shall take precedence.

E. 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.

F. Reference specification and standards:

1. ASTM: D1784 Rigid Poly (Vinyl Chloride) Compounds and Chlorinated Poly (Vinyl Chloride) Compounds.
2. ASTM: D1785 Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and CL200.
3. ASTM: F441 Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40, 80 and CL200.
4. ASTM: D2464 Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
5. ASTM: F437 Threaded Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
6. ASTM: D2466 Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
7. ASTM: F438 Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.
8. ASTM: F2564 Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
9. ASTM: F493 Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
10. The latest edition of the City Standard Plans and Specifications where project is located.
11. The latest edition of the regulations for the construction of irrigation water systems within the local Water District.

G. 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.

H. 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.

I. Materials

1. Use only new materials of brands and types noted on the Drawings, specified herein.

1.4 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
1.	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.
2.	Paige Electric	Irrigation Control wire	# 14 UF UL approved for control wire and # 12 UF UL approved for common wire.
3.	Lasco	Slo-Close	Schedule 80 PVC Ball valves 3" and smaller.
4.	Rain Bird	1806-SAM-PRS	6" pop-up spray head with Rain Bird "MPR" nozzles.
5.	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. Handling 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.

1.6 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.

1.7 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.

1.8 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.

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LAMONT, CA

1.9 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:

LAMONT PARK
KERN COUNTY
LAMONT, CA

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: _____

LAMONT PARK
KERN COUNTY
LAMONT, CA

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

IRRIGATION

328423 - 11

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 REQUIREMENTS

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

3.4 TEMPORARY REPAIRS

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.

3.7 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.

3.8 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.

3.9 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.

3.10 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.

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.

3.11 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 3284

SECTION 32 93 00 - PLANTING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- 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.
- B. All irrigation work shall be approved by the Owner and/or Landscape Architect prior to any work in this section being performed.

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

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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

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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

1. Provide standard, approved and first-grade quality materials, in prime condition when installed and accepted.
2. 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.
3. 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
www.aguinagagreen.com ; or approved equal.
4. 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.
5. Soil Amendments:
 1. Soil sulfur - Agricultural grade sulfur containing minimum of 99 percent sulfur (expressed as elemental).
 2. Iron sulfate - 20 percent iron (expressed as 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.
6. 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.

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- 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:

a) 1-gallon plant	- 1 tablet.
b) 5-gallon plant	- 3 tablets.
c) 15-gallon plant	- 5 tablets.
d) 24-inch box tree	- 7 tablets.
e) 30-inch box tree	- 7 tablets.
f) 36-inch box tree	- 8 tablets.
g) 42-inch box tree	- 8 tablets.
h) 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

LAMONT PARK
KERN COUNTY
LAMONT, CA

- 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.
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, 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 329300

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