Title: Contract: Garcia Bend Park Restroom

Location: District 7

Recommendation: Pass a Motion: 1) approving the construction plans and specifications for the Garcia Bend Park Restroom; 2) awarding the contract to The Design Build Inc. for $161,582; and 3) authorizing the City Manager or City Manager’s designee to execute the contract.

Contact: Jeff Nittka, Associate Landscape Architect, (916) 808-5996; Raymond Costantino, Park Planning & Development Services Manager, (916) 808-1941, Department of Youth, Parks, & Community Enrichment

Presenter: None

Attachments:
1-Description/Analysis
2-Contract
Description/Analysis

Issue Detail: The Department of Youth, Parks, & Community Enrichment is seeking approval to award a contract to The Design Build Inc. for the Garcia Bend Park Restroom renovation project.

The Garcia Bend Park Restroom project (L19706038 & L19120200) consists of renovation to the existing restroom. Currently the restroom building has multi-stall segregated men and women restrooms. The renovation consists of converting this restroom into four individual restrooms for all genders and they will also be ADA accessible. All the fixtures will be replaced and new lighting, new exterior plaster coating, renovation to the existing plumbing, and a new roof installed.

Construction of the Garcia Bend Park Restroom project is expected to be completed by end of March 2019.

Garcia Bend Park is a 14.7-acre community park located at 7654 Pocket Road in Council District 7.

Policy Considerations: City Code Chapter 3.60 provides that City Council approval is required to enter into construction agreements over $100,000.

Providing parks and recreation facilities is consistent with the City’s general plan to enhance livability in Sacramento’s neighborhoods by expanding park, recreation, and trail facilities throughout the City.

Economic Impacts: The indicated economic impacts are estimates calculated using a calculation tool developed by the Center for Strategic Economic Research (CSER). CSER utilized the IMPLAN input-output model (2009 coefficients) to quantify the economic impacts of a hypothetical $1 million of spending in various construction categories within the City of Sacramento in an average one-year period. Actual impacts could differ significantly from the estimates and neither the City of Sacramento nor CSER shall be held responsible for consequences resulting from such differences.

The park construction projects in the amount of $161,582 is expected to create 0.64 FTE jobs (0.37 FTE direct jobs and 0.27 FTE indirect jobs through indirect and induced activities). Furthermore, it will create $99,767 in total economic output ($62,884 of direct output and $36,883 of output through indirect and induced activities).

Environmental Considerations: The proposed project has been determined to be exempt from environmental review under California Environmental Quality Act (CEQA) Guidelines.
Section 15301, Existing Facilities. The project consists of minor alteration of and existing public building involving negligible or no expansion of use.

**Sustainability:** The park improvements are consistent with sustainable design through the use of recycled materials and local suppliers.

**Commission/Committee Action:** None

**Rationale for Recommendation:** The formal bidding process for the Garcia Bend Park Restroom projects was posted in accordance with City Code 3.60 and Administrative Policy AP-4002. The bids were opened on December 12, 2018. Staff received four bids and the results are listed below:

<table>
<thead>
<tr>
<th>CONTRACTOR</th>
<th>Base Bid</th>
<th>Additive Alternate</th>
<th>Total Bid</th>
<th>LBE%</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Design Build Inc.</td>
<td>$161,582</td>
<td>$0</td>
<td>$161,582</td>
<td>30.33%</td>
</tr>
<tr>
<td>HA Construction</td>
<td>$189,500</td>
<td>$0</td>
<td>$189,500</td>
<td>100%</td>
</tr>
<tr>
<td>Eagle Builders</td>
<td>$265,000</td>
<td>$0</td>
<td>$265,000</td>
<td>21.60%</td>
</tr>
<tr>
<td>GNS Builders</td>
<td>$269,411</td>
<td>$0</td>
<td>$269,411</td>
<td>100%</td>
</tr>
</tbody>
</table>

The low bidder was determined based on the total bid amount. The Engineer’s Estimate for the project was $165,000.

Pursuant to City Code Sections 3.60.020 and 3.60.360 E, it was determined that The Design Build Inc. offered the lowest responsive bid and is a responsible bidder. The contract will be awarded for the bid amount of $161,582.

**Financial Considerations:** There is sufficient funding in L19706038 & L19120200 to award the contract.

Garcia Bend is an existing park; the annual maintenance and utilities costs are covered in the Department of Youth, Parks, & Community Enrichment’s operating budget for maintenance, water, and utility costs for the budget adopted in the applicable fiscal year.

**Local Business Enterprise (LBE):** At an LBE percentage of 30.33%, The Design Build Inc. exceeded the 5% LBE participation requirement.
AGREEMENT
(Construction Contract Over $25,000)

THIS AGREEMENT, dated for identification __________, 20__, is made and entered into between the CITY OF SACRAMENTO, a municipal corporation (“City”), and The Design Build, Inc. 2921 Fulton Avenue, Sacramento, CA 95821 (“Contractor”) in the amount of $161,582.00.

The City and Contractor hereby mutually agree as follows:

1. CONTRACT DOCUMENTS

The Contract Documents, sometimes also referred to as the “Contract,” consist of the following items, which are hereby incorporated by reference as if set forth in full in this Agreement:

Notice to Contractors
Proposal Form submitted by the Contractor
Instructions to Bidders
Subcontractor and Local Business Enterprise Participation Form
Drug-Free Workplace Policy and Affidavit
Construction and Demolition (C&D) Debris Recycling Requirements
Workers’ Compensation Insurance Certification
Federal or State funding requirements (if applicable)
Local Business Enterprise (LBE) Requirements
Requirements of the Non-Discrimination in Employee Benefits Code
Ban-The-Box Requirements
Notice Regarding Assembly Bill 626
Addenda, if any
This Agreement
Standard Specifications
Special Provisions
Plans and Technical Specifications
The drawings and other data and all developments thereof prepared by City pursuant to the Contract
Any modifications of any of the foregoing made or approved by City, including but not limited to duly authorized change orders

Unless specifically noted otherwise, references to the “Standard Specifications” shall mean and refer to the Standard Specifications for Public Construction of the City of Sacramento approved by the Sacramento City Council on June 4, 2007 (Resolution No. 2007-350), and any subsequent amendments thereto approved by the Sacramento City Council or the Sacramento City Manager. Work called for in any one Contract Document and not mentioned in another is to be performed and executed as if mentioned in all Contract Documents. The table of contents, titles and headings contained in the Contract Documents are provided solely to facilitate reference to various provisions of the Contract.
Documents and in no way affect or limit the interpretation of the provisions to which they refer.

2. DEFINITIONS

Unless otherwise specifically provided herein, all words and phrases defined in the Standard Specifications shall have the same meaning and intent in this Agreement.

3. AGREEMENT CONTROLS

In the event of a conflict between any of the terms and conditions set forth in this Agreement and the terms and conditions set forth in other Contract Documents, the terms and conditions set forth in this Agreement shall prevail, except that the provisions of any duly authorized change order shall prevail over any conflicting provisions of this Agreement.

4. SCOPE OF CONTRACT

Contractor agrees to furnish all tools, equipment, apparatus, facilities, labor, material and transportation necessary to perform and complete in a good and workmanlike manner to the satisfaction of City, all the Work called for in the Contract Documents entitled:

Garcia Bend Park Restroom (rebid)
(PN: L19120500 & L19706038)
Bid #B1819112126

Contractor agrees to perform such Work in the manner designated in and in strict conformity with the Contract Documents.

5. CONTRACT AMOUNT AND PAYMENTS

City agrees to pay and Contractor agrees to accept, as complete payment for the above Work, in accordance with the schedule and procedures set forth in the Contract Documents and subject to deductions, withholdings and additions as specified in the Contract Documents, a total sum that shall not exceed the total bid amount set forth in Contractor's Proposal Form. In addition, subject to deductions, withholdings and additions as specified in the Contract Documents, payment for individual items of the Work shall be computed as follows:

A. For items of the Work for which a lump sum price is specified in Contractor's Proposal Form, Contractor shall be paid the lump sum price(s) specified in Contractor's Proposal Form; and

B. For items of the Work for which a unit price is specified in Contractor's Proposal Form, Contractor shall be paid the sum computed at such unit price, or computed at a different price if such different price is determined by City in accordance with the Standard Specifications, based on the actual amount of each such item performed and/or furnished and incorporated in the Work; provided that in no event shall the
total sum for a unit price item exceed the total bid amount set forth for such item in the Contractor's Proposal Form, unless authorized by Change Order.

6. PROGRESS PAYMENTS

Subject to the terms and conditions of the Contract, City shall cause payments to be made upon demand of Contractor as follows:

A. On or about the first of the month, the Engineer shall present to the Contractor a statement showing the amount of labor and materials incorporated in the Work through the twentieth (20) calendar day of the preceding month. After both Contractor and Engineer approve the statement in writing, and the City's labor compliance officer provides written approval, the City shall issue a certificate for ninety-five (95) percent of the amount it shall find to be due, subject to any deductions or withholdings authorized or required under the Contract or any applicable Laws or Regulations.

B. No inaccuracy or error in said monthly estimates shall operate to release Contractor from damages arising from such Work or from enforcement of each and every provision of the Contract Documents, and City shall have the right subsequently to correct any error made in any estimate for payment.

C. Contractor shall not be paid for any defective or improper Work.

D. The remaining five (5) percent of the value of the Work performed under the Contract, if unencumbered and subject to any deductions or withholdings authorized or required under the Contract or any applicable Laws or Regulations, shall be released not later than sixty (60) days after completion and final acceptance of the Work by City. Acceptance by Contractor of the final payment shall constitute a waiver of all claims against the City arising under the Contract Documents, except for disputed claims in stated amounts that the Contractor specifically reserves in writing, but only to the extent that the Contractor has complied with all procedures and requirements applicable to the presentation and processing of such claim(s) under the Contract Documents. Contractor shall be entitled to substitute securities for retention or to direct that payments of retention be made into escrow, as provided in Public Contract Code Section 22300, upon execution of the City's Escrow Agreement for Security Deposits in Lieu of Retention.

E. The parties agree that, for purposes of the timely progress payment requirements specified in Public Contract Code Section 20104.50, the date that the City receives a statement jointly approved by the Contractor and the Engineer as provided above shall be deemed to constitute the date that City receives an undisputed and properly submitted payment request from the Contractor. Progress payments not made within 30 days after this date may be subject to payment of interest as provided in Public Contract Code Section 20104.50.
F. This Contract is subject to compliance monitoring and enforcement by the California Department of Industrial Relations, as specified in California Labor Code section 1771.4.

7. RETENTION OF SUMS CHARGED AGAINST CONTRACTOR

When, under the provisions of this Contract or any applicable Laws or Regulations, City is authorized or required to withhold, deduct or charge any sum of money against Contractor, City may deduct and retain the amount of such charge from the amount of the next succeeding progress estimate(s), or from any other moneys due or that may become due Contractor from City. If, on completion or termination of the Contract, sums due Contractor are insufficient to pay City's charges, City shall have the right to recover the balance from Contractor or its Sureties.

8. COMMENCEMENT AND PROSECUTION OF WORK

Contractor shall commence the Work not later than fifteen (15) working days after the date of the written Notice to Proceed from City to Contractor and shall diligently prosecute the Work to final completion. The phase “commence the Work” means to engage in a continuous program on-site including, but not limited to, site clearance, grading, dredging, land filling and the fabrications, erection, or installation of the Work. The Notice to Proceed shall be issued within fifteen (15) calendar days following execution of the Agreement by the City and the filing by Contractor of the required Bonds and proof of insurance, provided that the Engineer may delay issuance of the Notice to Proceed if the Engineer determines in the Engineer’s sole discretion that conditions on the site of the Work are unsuitable for commencement of the Work. After the Notice to Proceed is issued, the continuous prosecution of Work by Contractor shall be subject only to Excusable Delays as defined in this Agreement.

9. TIME OF COMPLETION

The entire Work shall be brought to completion in the manner provided for in the Contract Documents on or before 45 working days from the date of the Notice to Proceed (hereinafter called the “Completion Date”) unless extensions of time are granted in accordance with the Contract Documents.

Failure to complete the entire Work by the Completion Date and in the manner provided for in the Contract Documents shall subject Contractor to liquidated damages as provided in this Agreement. Time is and shall be of the essence in the performance of the Contract and the Work.

10. PAYMENTS DO NOT IMPLY ACCEPTANCE OF WORK

The payment of any progress payment, or the acceptance thereof by Contractor, shall not constitute acceptance of the Work or any portion thereof and shall in no way reduce the liability of Contractor to replace unsatisfactory work or material, whether or not the
unsatisfactory character of such work or material was apparent or detected at the time such payment was made.

11. **ACCEPTANCE NOT RELEASE**

Contractor shall correct immediately any defective or imperfect work or materials that may be discovered before final acceptance of the entire Work, whether or not such defect or imperfection was previously noticed or identified by the City. The inspection of the Work, or any part thereof, shall not relieve Contractor of any of its obligations to perform satisfactory work as herein specified.

Failure or neglect on the part of City or any of its officers, employees or authorized agents to discover, identify, condemn or reject defective or imperfect work or materials shall not be construed to imply an acceptance of such work or materials, if such defect or imperfection becomes evident at any time prior to final acceptance of the entire Work, nor shall such failure or neglect be construed as barring City from enforcing Contractor's warranty(ies) or otherwise recovering damages or such a sum of money as may be required to repair or rebuild the defective or imperfect work or materials whenever City may discover the same, subject only to any statutes of limitation that may apply to any such claim.

12. **CITY'S RIGHT TO TAKE POSSESSION OF THE WORK IN WHOLE OR IN PART**

The City shall have the right at any time to enter upon the Work and perform work not covered by this Contract, or to occupy and use a portion of the Work, prior to the date of the final acceptance of the Work as a whole, without in any way relieving Contractor of any obligations under this Contract.

13. **NO WAIVER OF REMEDIES**

Neither the inspection by City, its officers, employees or agents, nor any certificate or other approval for the payment of money, nor any payment for, nor acceptance of the whole or any part of the Work by City, nor any extensions of time, nor any position taken by City, its officers, employees or its agents shall operate as a waiver of any provision of the Contract Documents nor of any power herein reserved to City or any right to damages herein provided, nor shall any waiver of any breach of this Agreement be held to be a waiver of any other or subsequent breach. All remedies provided in the Contract Documents shall be taken and construed as cumulative; in addition to each and every other remedy herein provided, the City shall have any and all equitable and legal remedies that it would in any case have.

14. **WARRANTY**

Except as otherwise expressly provided in the Contract Documents, and excepting only items of routine maintenance, ordinary wear and tear and unusual abuse or neglect by City, Contractor warrants and guarantees all Work executed and all supplies, materials and devices of whatsoever nature incorporated in or attached to the Work, or otherwise
provided as a part of the Work pursuant to the Contract, to be absolutely free of all defects of workmanship and materials for a period of one year after final acceptance of the entire Work by the City. Contractor shall repair or replace all work or material, together with any other work or material that may be displaced or damaged in so doing, that may prove defective in workmanship or material within this one year warranty period without expense or charge of any nature whatsoever to City.

In the event that Contractor shall fail to comply with the conditions of the foregoing warranty within ten (10) days after being notified of the defect in writing, City shall have the right, but shall not be obligated, to repair, or obtain the repair of, the defect and Contractor shall pay to City on demand all costs and expense of such repair. Notwithstanding anything herein to the contrary, in the event that any defect in workmanship or material covered by the foregoing warranty results in a condition that constitutes an immediate hazard to public health or safety, or any property interest, or any person, City shall have the right to immediately repair, or cause to be repaired, such defect, and Contractor shall pay to City on demand all costs and expense of such repair. The foregoing statement relating to hazards to health, safety or property shall be deemed to include both temporary and permanent repairs that may be required as determined in the sole discretion and judgment of City.

In addition to the above, the Contractor shall make a written assignment of all manufacturer’s and other product warranties to the City, prior to completion and final acceptance of the Work by City.

The Contractor’s Performance Bond shall secure the performance of the Contractor’s obligations under this Section 14, and the Contractor and its Surety shall be jointly and severally liable for these obligations.

15. LIQUIDATED DAMAGES IF WORK NOT COMPLETED ON TIME

A. The actual fact of the occurrence of damages and the actual amount of the damages that City would suffer if the entire Work, and/or any specified portion thereof, were not completed within the time(s) specified herein are dependent upon many circumstances and conditions that could prevail in various combinations, and for this reason, it is impracticable and extremely difficult to fix the actual damages. Damages that City would suffer in the event of such delay include: loss of the use of the project; expenses of prolonged assignment to the project of an architectural and/or engineering staff; prolonged costs of administration, inspection, and supervision; increased operational expenses and/or impaired operation of other facilities dependent upon completion of the project; and the loss and inconvenience suffered by the public within the City of Sacramento by reason of the delay in the completion of the project or portion thereof. Accordingly, the parties agree, and by execution of this Agreement, Contractor acknowledges that it understands and agrees, that the amount(s) set forth herein as liquidated damages reflect the parties’ best efforts at the time of entering into the Contract to estimate the damages that may be incurred by City and the public due to the Contractor’s delay in completion of the Work and/or any specified portion thereof, and shall be presumed to be the
amount of damages sustained by the failure of Contractor to complete the entire Work and/or any specified portion thereof within the time(s) specified herein.

B. Contractor shall pay liquidated damages to City for failure to complete the entire Work by the Completion Date (as extended in accordance with the Contract Documents, if applicable) in the amount of One Thousand Dollars ($1,000) for each calendar day after the Completion Date (as extended in accordance with the Contract Documents, if applicable), continuing to the time at which the entire Work is completed. Such amount is the actual cash value agreed upon by the City and Contractor as the loss to City and the public resulting from Contractor's default.

The parties agree, and by execution of this Agreement, Contractor acknowledges that it understands and agrees, that the foregoing provisions provide for the imposition of liquidated damages from the Completion Date (as extended in accordance with the Contract Documents, if applicable) until the date of completion of the entire Work as determined by the Engineer in accordance with Section 8-4 of the Standard Specifications, whether or not the Work or any portion thereof is claimed or determined to be substantially complete prior to such date of completion.

C. In the event Contractor shall become liable for liquidated damages, City, in addition to all other remedies provided by law, shall have the right to withhold any and all payments that otherwise would be or become due Contractor until the liability of Contractor under this section is finally determined. City shall have the right to use and apply such payments, in whole or in part, to reimburse City for all liquidated damages due or to become due to City. Any remaining balance of such payments shall be paid to Contractor only after discharge in full of all liability incurred by Contractor under this section or otherwise under any provision of the Contract Documents or any applicable Law or Regulation. If the sum so retained by City is not sufficient to discharge all such liabilities of Contractor, Contractor shall continue to remain liable to City until all such liabilities are satisfied in full. No failure by City to withhold any payment as specified above shall in any manner be construed to constitute a release of any such liabilities nor a waiver of the City’s right to withhold payment for such liabilities.

16. INDEMNITY AND HOLD HARMLESS

A. Contractor shall defend, hold harmless and indemnify the City, its officers, employees, and agents, and each and every one of them, from and against any and all actions, damages, costs, liabilities, claims, demands, losses, judgments, penalties, costs and expenses of every type and description, whether arising on or off the site of the Work, including, but not limited to, any fees and/or costs reasonably incurred by City’s staff attorneys or outside attorneys and any fees and expenses incurred in enforcing this provision (hereafter collectively referred to as “Liabilities”), including but not limited to Liabilities arising from personal injury or death, damage to personal, real or intellectual property or the
environment, contractual or other economic damages, or regulatory penalties, arising out of or in any way connected with performance of or failure to perform the Work by the Contractor, any subcontractor or agent, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, whether or not (i) such Liabilities are caused in part by a party indemnified hereunder, or (ii) such Liabilities are litigated, settled or reduced to judgment; provided that the foregoing indemnity does not apply to liability for damages for death or bodily injury to persons, injury to property, or other loss, damage or expense to the extent arising from (i) the sole negligence or willful misconduct of, or defects in design furnished by, City, its agents, servants, or independent contractors who are directly responsible to City, or (ii) the active negligence of City.

B. The existence or acceptance by City of any of the insurance policies or coverages described in this Agreement shall not affect or limit any of City's rights under this Section 16, nor shall the limits of such insurance limit the liability of Contractor hereunder. The provisions of this Section 16 shall survive any expiration or termination of the Contract.

17. CONTRACTOR SHALL ASSUME RISKS

Until the completion and final acceptance by City of all Work under this Contract, the Work shall be under Contractor's responsible care and charge, and Contractor, at no cost to City, shall rebuild, repair, restore and make good all injuries, damages, re-erections, and repairs occasioned or rendered necessary by accidental causes of any nature, to all or any portions of the Work.

18. GENERAL LIABILITY OF CONTRACTOR

Except as otherwise herein expressly stipulated, Contractor shall perform all the Work and furnish all the labor, materials, tools, equipment, apparatus, facilities, transportation, power and light, and appliances, necessary or proper for performing and completing the Work herein required in the manner and within the time herein specified. The mention of any specific duty or liability of Contractor shall not be construed as a limitation or restriction of any general liability or duty of Contractor, and any reference to any specific duty or liability shall be construed to be solely for the purpose of explanation.

19. INSURANCE

During the entire term of the Contract, Contractor shall maintain the insurance coverage described in this Section 19.

Full compensation for all premiums that Contractor is required to pay for the insurance coverage described herein shall be included in the compensation specified for the Work performed by Contractor under this Contract. No additional compensation will be provided for Contractor's insurance premiums. Any available insurance proceeds in
excess of the specified minimum limits and coverages shall be available to the City.

It is understood and agreed by the Contractor that its liability to the City shall not in any way be limited to or affected by the amount of insurance coverage required or carried by the Contractor in connection with this Contract.

A. Minimum Scope & Limits of Insurance Coverage

(1) **Commercial General Liability Insurance** providing coverage at least as broad as ISO CGL Form 00 01 on an occurrence basis for bodily injury, including death, of one or more persons, property damage, and personal injury, arising out of activities performed by or on behalf of Contractor and its subcontractors, products and completed operations of Contractor and its subcontractors, and premises owned, leased, or used by Contractor and its subcontractors, with limits of not less than one million dollars ($1,000,000) per occurrence. The policy shall provide contractual liability and products and completed operations coverage for the term of the policy.

(2) **Automobile Liability Insurance** providing coverage at least as broad as ISO Form CA 00 01 for bodily injury, including death, of one or more persons, property damage, and personal injury, with limits of not less than one million dollars ($1,000,000) per accident. The policy shall provide coverage for owned, non-owned, and/or hired autos as appropriate to the operations of the Contractor.

No automobile liability insurance shall be required if Contractor completes the following certification:

"I certify that a motor vehicle will not be used in the performance of any work or services under this agreement."  

(Contractor initials)

(3) **Excess Insurance**: The minimum limits of insurance required above may be satisfied by a combination of primary and umbrella or excess insurance coverage; provided that any umbrella or excess insurance shall contain, or be endorsed to contain, a provision that it shall apply on a primary basis for the benefit of the CITY, and any insurance or self-insurance maintained by CITY, its officials, employees, or volunteers shall be in excess of such umbrella or excess coverage and shall not contribute with it.
(4) **Workers’ Compensation Insurance** with statutory limits, and **Employers’ Liability Insurance** with limits of not less than one million dollars ($1,000,000). The Workers’ Compensation policy shall include a waiver of subrogation in favor of the City.

No Workers’ Compensation insurance shall be required if Contractor completes the following certification:

“I certify that my business has no employees, and that I do not employ anyone. I am exempt from the legal requirements to provide Workers’ Compensation insurance.”

(Contractor initials)

B. **Additional Insured Coverage**

(1) **Commercial General Liability Insurance:** The City, its officials, employees, and volunteers shall be covered by policy terms or endorsement as additional insureds as respects general liability arising out of: activities performed by or on behalf of Contractor and its subcontractors; products and completed operations of Contractor and its subcontractors; and premises owned, leased, or used by Contractor and its subcontractors.

(2) **Automobile Liability Insurance:** The City, its officials, employees, and volunteers shall be covered by policy terms or endorsement as additional insureds as respects auto liability.

C. **Other Insurance Provisions**

The policies are to contain, or be endorsed to contain, the following provisions:

(1) Contractor’s insurance coverage, including excess insurance, shall be primary insurance as respects City, its officials, employees, and volunteers. Any insurance or self-insurance maintained by City, its officials, employees, or volunteers shall be in excess of Contractor’s insurance and shall not contribute with it.

(2) Any failure to comply with reporting provisions of the policies shall not affect coverage provided to City, its officials, employees, or volunteers.

(3) Coverage shall state that Contractor’s insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer’s liability.

(4) City will be provided with thirty (30) days written notice of cancellation or material change in the policy language or terms.
D. **Acceptability of Insurance**

Insurance shall be placed with insurers with a Bests’ rating of not less than A:VI. Self-insured retentions, policy terms or other variations that do not comply with the requirements of this Section 3 must be declared to and approved by the City in writing prior to execution of this Contract.

E. **Verification of Coverage**

1. Contractor shall furnish City with certificates and required endorsements evidencing the insurance required. Copies of policies shall be delivered to the City on demand. Certificates of insurance shall be signed by an authorized representative of the insurance carrier.

2. For all insurance policy renewals during the term of this Contract, Contractor shall send insurance certificates reflecting the policy renewals directly to:

   City of Sacramento  
   c/o EXIGIS LLC  
   P.O. Box 4668 ECM- #35050  
   New York, NY 10168-4668

   Insurance certificates also may be faxed to (888) 355-3599, or e-mailed to: certificates-sacramento@riskworks.com

3. The City may withdraw its offer of contract or cancel this Contract if the certificates of insurance and endorsements required have not been provided prior to execution of this Contract. The City may withhold payments to Contractor or cancel the Contract if the insurance is canceled or Contractor otherwise ceases to be insured as required herein.

F. **Subcontractors**

Contractor shall require and verify that all subcontractors maintain insurance coverage that meets the minimum scope and limits of insurance coverage specified in subsection A, above.

20. **FAILURE TO MAINTAIN BONDS OR INSURANCE**

If, at any time during the performance of this Contract, Contractor fails to maintain any item of the bonds and/or insurance required under the Contract in full force and effect,
Contractor shall immediately suspend all work under the Contract and notify City in writing of such failure. After such notice is provided, or if City discovers such failure and notifies Contractor, the City thereafter may withhold all Contract payments due or that become due until notice is received by City that such bonds and/or insurance have been restored in full force and effect and that the premiums therefor have been paid for a period satisfactory to the Division of Risk Management. Contractor shall not resume work until notified by City to do so, and the City shall have no responsibility or liability for any costs incurred by Contractor as a result of such suspension of Work.

In addition to the foregoing, any failure to maintain any item of the required bonds and/or insurance at any time during the performance of this Contract will be sufficient cause for termination of the Contract by City.

The Contractor shall be solely responsible for, and shall defend, indemnify and hold harmless the City, its officers, employees and agents against and from, any and all damages, claims, losses, actions, costs or other expenses of any kind incurred by any party as a direct or indirect result of any suspension of Work or termination of the Contract under the provisions of this Section.

21. EXCUSABLE DELAYS

For the purpose of these Contract Documents, the term "Excusable Delay" shall mean, and is limited to, delay caused directly by: acts of God; acts of a public enemy; fires; inclement weather as determined by the Engineer; riots; insurrections; epidemics; quarantine restrictions; strikes; lockouts; sitdowns; acts of a governmental agency; priorities or privileges established for the manufacture, assemble, or allotment of materials necessary in the Work by order, decree or otherwise of the United States or by any department, bureau, commission, committee, agent, or administrator of any legally constituted public authority; changes in the Work ordered by City insofar as they necessarily require additional time in which to complete the Work; the prevention of Contractor from commencing or prosecuting the Work because of the acts of others, excepting Contractor's subcontractors or suppliers; or the prevention of Contractor from commencing or prosecuting the Work because of a Citywide failure of public utility service.

The term "Excusable Delay" shall specifically not include: (i) any delay that could have been avoided by the exercise of care, prudence, foresight and diligence on the part of Contractor; (ii) any delay in the prosecution of any part of the Work that does not constitute a Controlling Operation, whether or not such delay is unavoidable; (iii) any reasonable delay resulting from time required by City for review of any Contractor submittals and for the making of surveys, measurements and inspection; and, (iv) any delay arising from an interruption in the prosecution of the Work on account of reasonable interference by other Contractors employed by City that does not necessarily prevent the completion of the entire Work within the time specified. Excusable Delays, if any, shall operate only to extend the Completion Date (not in excess of the period of such delay as determined by City) and shall not under any circumstances increase the amount City is required to pay Contractor except as otherwise provided in these Contract Documents.
22. CONTRACTOR TO SERVE NOTICE OF DELAYS

Whenever Contractor foresees any delay in the prosecution of the Work, and in any event as soon as possible (not to exceed a period of ten (10) calendar days) after the initial occurrence of any delay that Contractor regards as or may later claim to be an Excusable Delay, the Contractor shall notify the Engineer in writing of such delay and its cause, in order that the Engineer: (i) may take immediate steps to prevent if possible the occurrence or continuance of the delay; or (ii) if this cannot be done, may determine whether the delay is to be considered excusable, how long it continues, and to what extent the prosecution and completion of the Work are delayed thereby. Said written notice shall constitute an application for an extension of time only if the notice requests such an extension and sets forth the Contractor's estimate of the additional time required together with a full description of the cause of the delay relied upon.

After the completion of any part or whole of the Work, the Engineer, in estimating the amount due Contractor, will assume that any and all delays that may have occurred in its prosecution and completion were not Excusable Delays, except for such delays for which the Contractor has provided timely written notice as required herein, and that the Engineer has found to be excusable. Contractor shall not be entitled to claim Excusable Delay for any delay for which the Contractor failed to provide such timely written notice.

23. EXTENSION OF TIME

If the Contractor complies with Section 22, above, and the Engineer finds a delay claimed by the Contractor to be an Excusable Delay, the Contractor shall be allowed an extension of time to complete the Work that is proportional to the period of Excusable Delay determined by the Engineer, subject to the approval by City of a change order granting such time extension. During a duly authorized extension for an Excusable Delay, City shall not charge liquidated damages against the Contractor for such delay.

If the City extends the time to complete the Work as provided herein, such extension shall in no way release any warranty or guarantee given by Contractor pursuant to the provisions of the Contract Documents, nor shall such extension of time relieve or release the sureties of the Bonds provided pursuant to the Contract Documents. By executing such Bonds, the Sureties shall be deemed to have expressly agreed to any such extension of time. The granting of any extension of time as provided herein shall in no way operate as a waiver on the part of City of its rights under this Contract, excepting only extension of the Completion Date for such period of Excusable Delay as may be determined by the Engineer and approved by a duly authorized change order.

24. NO PAYMENT FOR DELAYS

No damages or compensation of any kind shall be paid to Contractor or any subcontractor because of delays in the progress of the Work whether or not such delays qualify for extension of time under this Agreement; except that this provision shall not preclude the recovery of damages for a delay caused by the City that is unreasonable under the circumstances and that is not within the contemplation of the parties, provided that the
Contractor timely submits all such written notice(s) and fully complies with such other procedures as may be specified in the Contract Documents or any Laws or Regulations for Contractor to claim damages for such delay.

25. CHANGES IN THE WORK

Changes in the Work authorized or directed in accordance with the Contract Documents and extensions of time of completion made necessary by reason thereof shall not in any way release any warranty or guarantee given by Contractor pursuant to the provisions of the Contract Documents, nor shall such changes in the Work relieve or release the Sureties on Bonds provided pursuant to the Contract Documents. By executing such Bonds, the Sureties shall be deemed to have expressly agreed to any such change in Work and to any extension of time made by reason thereof.

26. TERMINATION AFTER COMPLETION DATE

In addition to any other rights City may have, if any services or work required under the Contract (including but not limited to punch list items) are not completed as of the Completion Date (as adjusted by any extensions of time for Excusable Delays granted pursuant to the Contract Documents), City may terminate the Contract at any time after the Completion Date (as adjusted by any extensions of time for Excusable Delays granted pursuant to the Contract Documents), by providing a written notice to Contractor specifying the date of termination. Such notice also may specify conditions or requirements that Contractor must meet to avoid termination of the Contract on such date. If Contractor fails to fulfill all such conditions and requirements by such termination date, or, if no such conditions or requirements are specified, Contractor shall cease rendering services and performing work on such termination date, and shall not be entitled to receive any compensation for services rendered or work performed after such termination date. In the event of such termination, Contractor shall remain liable to City for liquidated damages incurred for any period of time prior to the termination date.

In addition to any other charges, withholdings or deductions authorized under the Contract or any Laws or Regulations, if City terminates the Contract pursuant to this section, City may withhold and deduct from any payment and/or retention funds otherwise due Contractor any sum necessary to pay the City’s cost of completing or correcting, or contracting for the completion or correction of, any services or work under the Contract that are not completed to the satisfaction of the City or that otherwise are deficient or require correction as of such termination date, including but not limited to incomplete punch list items. Such costs shall include all of the City’s direct and indirect costs incurred to complete or correct such services or work, including the City’s administrative and overhead costs. If the amount of payment(s) and/or retention funds otherwise due the Contractor are insufficient to pay such costs, City shall have the right to recover the balance of such costs from the Contractor and/or its Surety(ies).

27. TERMINATION FOR CONVENIENCE

Form approved by City Attorney 1-11-17

Page 17 of 312
Upon written notice to the Contractor, the City may at any time, without cause and without prejudice to any other right or remedy of the City, elect to terminate the Contract for the convenience of City. In such case, the Contractor shall be paid (without duplication of any items, and after deduction and/or withholding of any amounts authorized to be deducted or withheld by the Contract Documents or any Laws or Regulations):

A. For Work executed in accordance with the Contract Documents prior to the effective date of termination and determined to be acceptable by the Engineer, including fair and reasonable sums for overhead and profit on such Work;

B. For reasonable claims, costs, losses, and damages incurred in settlement of terminated contracts with subcontractors, suppliers, and others; and

C. For reasonable expenses directly attributable to termination.

Contractor shall not be paid for any loss of anticipated profits or revenue for any Work not performed prior to termination, nor for any economic loss arising out of or resulting from such termination, except for the payments listed in this section. Contractor’s warranty under Section 14 of this Agreement shall apply, and Contractor shall remain responsible for all obligations related to such warranty, with respect to all portions of the Work performed prior to the effective date of the termination for convenience pursuant to this section. The City shall be entitled to have any or all remaining Work performed by other contractors or by any other means at any time after the effective date of a termination for convenience pursuant to this section.

28. TERMINATION FOR BREACH OF CONTRACT

If Contractor abandons the Work under this Contract, or if the Contract or any portion of the Contract is sublet or assigned without the consent of the City, or if the Engineer determines in the Engineer’s sole discretion that the conditions of the Contract in respect to the rate of progress of the Work are not being fulfilled or any part thereof is unnecessarily delayed, or if Contractor violates or breaches, or fails to execute in good faith, any of the terms or conditions of the Contract, or if Contractor refuses or fails to supply enough properly skilled labor or materials or refuses or fails to make prompt payment to subcontractors for material or labor, or if Contractor disregards any Laws or Regulations or proper instruction or orders of the Engineer, then, notwithstanding any provision to the contrary herein, the City may give Contractor and its Sureties written notification to immediately correct the situation or the Contract shall be terminated.

In the event that such notice is given, and, in the event such situation is not corrected, or arrangements for correction satisfactory to the City are not made, within ten (10) calendar days from the date of such notice or within such other period of time as may be specified by the City in the notice, the Contract shall upon the expiration of said period cease and terminate. In the event of any such termination, City may take over the Work and prosecute the Work to completion, or otherwise, and the Contractor and its Sureties shall be liable to City for any cost occasioned City thereby, as hereinafter set forth.
In the event City completes the Work, or causes the Work to be completed, no payment of any kind shall be made to Contractor until the Work is complete. The cost of completing the Work, including but not limited to, extra costs of project administration and management incurred by City, both direct or indirect, shall be deducted from any sum then due, or that becomes due, to Contractor from City. If sums due to Contractor from City are less than the cost of completing the Work, Contractor and its Sureties shall pay City a sum equal to this difference on demand. In the event City completes the Work, and there is a sum remaining due to Contractor after City deducts the costs of completing the Work, then City shall pay such sum to Contractor. The Contractor and Contractor’s Sureties shall be jointly and severally liable for all obligations imposed on Contractor hereunder.

No act by City before the Work is finally accepted, including, but not limited to, exercise of other rights under the Contract, actions at law or in equity, extensions of time, payments, assessments of liquidated damages, occupation or acceptance of any part of the Work, waiver of any prior breach of the Contract or failure to take action pursuant to this section upon the happening of any prior default or breach of Contractor, shall be construed to be a waiver or estoppel of the City’s right to act pursuant to this Section upon any subsequent event, occurrence or failure by Contractor to fulfill the terms and conditions of the Contract. The rights of City to terminate the Contract pursuant to this Section and pursuant to Sections 26 and 27 are cumulative and are in addition to all other rights of City pursuant to the Contract and at law or in equity.

29. CONTRACTOR BANKRUPT

If Contractor should commence any bankruptcy proceeding, or if Contractor is adjudged a bankrupt, or if Contractor makes any assignment for the benefit of creditors, or if a receiver is appointed on account of Contractor’s insolvency, then the City may, without prejudice to any other right or remedy, terminate the Contract and complete the work by giving notice as provided in Section 28 above.

30. SURETIES’ OBLIGATIONS UPON TERMINATION

If the City terminates the Contract pursuant to Section 28 or Section 29 above:

A. The Surety under Contractor’s performance bond shall be fully responsible for all of the Contractor’s remaining obligations of performance under the Contract as if the Surety were a party to the Contract, including without limitation Contractor’s obligations, as provided in the Contract Documents, to complete and provide a one-year warranty of the entire Work, pay liquidated damages and indemnify, defend and hold harmless City, up to the full amount of the performance bond.

B. The Surety under Contractor’s payment bond shall be fully responsible for the performance of all of the Contractor’s remaining payment obligations for work, services, equipment or materials performed or provided in connection with the Work or any portion thereof, up to the full amount of the payment bond.

31. ACCOUNTING RECORDS OF CONTRACTOR
During performance of the Contract and for a period of three (3) years after completing the entire Work, Contractor shall maintain all accounting and financial records related to the Contract and performance of the Work in accordance with generally accepted accounting practices, and shall keep and make such records available for inspection and audit by representatives of the City upon reasonable written notice.

32. USE TAX REQUIREMENTS

During the performance of this Agreement, CONTRACTOR, for itself, its assignees and successors in interest, agrees as follows:

A. Use Tax Direct Payment Permit: For all leases and purchases of materials, equipment, supplies, or other tangible personal property used to perform the Agreement and shipped from outside California, the Contractor and any subcontractors leasing or purchasing such materials, equipment, supplies or other tangible personal property shall obtain a Use Tax Direct Payment Permit from the California State Board of Equalization ("SBE") in accordance with the applicable SBE criteria and requirements.

B. Sellers Permit: For any construction contract and any construction subcontract in the amount of $5,000,000 or more, Contractor and the subcontractor(s) shall obtain sellers permits from the SBE and shall register the jobsite as the place of business for the purpose of allocating local sales and use tax to the City. Contractor and its subcontractors shall remit the self-accrued use tax to the SBE, and shall provide a copy of each remittance to the City.

C. The above provisions shall apply in all instances unless prohibited by the funding source for the Agreement.

33. NON-DISCRIMINATION IN EMPLOYEE BENEFITS

This Agreement may be subject to the requirements of Sacramento City Code Chapter 3.54, Non-Discrimination in Employee Benefits by City Contractors. The Contract Documents include a summary of the requirements of Sacramento City Code Chapter 3.54, entitled “Requirements of the Non-Discrimination in Employee Benefits Code.” By signing this Agreement, Contractor acknowledges and represents that Contractor has read and understands these requirements and agrees to fully comply with all applicable requirements of Sacramento City Code Chapter 3.54. If requested by City, Contractor agrees to promptly provide such documents and information as may be required by City to verify Contractor’s compliance. Any violation by Contractor of Sacramento City Code Chapter 3.54 constitutes a material breach of this Agreement, for which the City may terminate the Agreement and pursue all available legal and equitable remedies.
34. CONSIDERING CRIMINAL CONVICTION INFORMATION IN THE EMPLOYMENT APPLICATION PROCESS

This Agreement may be subject to the requirements of Sacramento City Code Chapter 3.62, Procedures for Considering Criminal Conviction Information in the Employment Application Process. The Contract Documents include a summary of the requirements of Sacramento City Code Chapter 3.62, entitled “Ban-The-Box Requirements.” By signing this Agreement, Contractor acknowledges and represents that Contractor has read and understands these requirements and agrees to fully comply with all applicable requirements of Sacramento City Code Chapter 3.62. If requested by City, Contractor agrees to promptly provide such documents and information as may be required by City to verify Contractor’s compliance. Any violation by Contractor of Sacramento City Code Chapter 3.62 constitutes a material breach of this Agreement, for which the City may terminate the Agreement and pursue all available legal and equitable remedies. Contractor agrees to require its subcontractors to fully comply with all applicable requirements of Sacramento City Code Chapter 3.62, and include these requirements in all subcontracts covered by Sacramento City Code Chapter 3.62.
IN WITNESS WHEREOF, the parties hereto have signed this Agreement on the date set for opposite their names.

DATE 1-14-2019

CONTRACTOR

Under penalty of perjury, I certify that the taxpayer identification number and all other information provided here are correct.

By The Design Build Inc.

Print Name: Nazeri Muhammad
Title: CEO/PRESIDENT

By The Design Build Inc.

Print Name: Saber
Title: CFO

DIR Registration # 455561110
Federal ID# 978705
State ID# 1037396

City of Sacramento Business Operation Tax Certificate No. (City will not award contract until Certificate Number is obtained)

Type of Business Entity (check one):

___ Individual/Sole Proprietor
___ Partnership
___ Corporation
___ Limited Liability Company
___ Other (please specify: ____________)

CITY OF SACRAMENTO
a municipal corporation

DATE ______________________

BY ______________________
For: Howard Chan, City Manager

Original Approved As To Form:

Attest:

City Attorney

City Clerk

Form approved by City Attorney 1-11-17
WHEREAS, the City of Sacramento, State of California, hereinafter called City, has conditionally awarded to:
The Design Build, Inc. 2921 Fulton Avenue, Sacramento, CA 95821 as principal, hereinafter called Contractor, a contract for
construction of:

Garcia Bend Park Restroom (rebid)
(PN: L19120500 & L19706038)
Bid #B1819112126

which contract is by reference incorporated herein and made a part hereof as if the Surety named below were a party to the
contract, and is hereinafter referred to as the Contract; and

WHEREAS, under the terms of the Contract, Contractor is required to furnish a bond for the faithful performance of the
Contract.

NOW, THEREFORE, we the Contractor and (here insert full name and address of Surety):
Merchants Bonding Company (Mutual)     P.O. BOX 14498, DES MOINES, IA 50306 - 3498

a corporation duly authorized and admitted to transact business and issue surety bonds in the State of California, hereinafter
called Surety, are held and firmly bound unto the City, as obligee, in the sum of: $161,582.00, for the payment of which sum
well and truly to be made, we the Contractor and Surety bind ourselves, our heirs, executors, administrators, successors and
assigns, jointly and severally. The condition of this obligation is such that, if the Contractor, Contractor’s heirs, executors,
administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and fully perform all
covenants, conditions and agreements required to be kept and performed by Contractor in the Contract and any changes,
additions or alterations made thereto, to be kept and performed at the time and in the manner therein specified, and in all
respects according to their true intent and meanings, and shall indemnify and save harmless the City, its officers, employees
and agents, as therein provided, then the Surety’s obligations under the Contract and this bond shall be null and void;
otherwise they shall be and remain in full force and effect. This obligation shall remain in full force and effect through the end
of the Contract warranty period, which will expire one year after the completion of work date specified in the Notice of
Completion filed for the above-named project.

As part of the obligations secured hereby and in addition to the sum specified above, there shall be included all costs, expenses
and fees, including attorney’s fees, reasonably incurred by City in successfully enforcing such obligations, all to be taxed as
costs and included in any judgment rendered.

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

IN WITNESS WHEREOF, this instrument has been duly executed by authorized representatives of the Contractor and Surety.
SIGNED AND SEALED on January 15th, 2019

Merchants Bonding Company (Mutual)

(Contractor) (Seal)

By ________________________________
Title ________________

(Surety) (Seal)

By John T. Page
Title, Attorney in Fact

Agent Name and Address

SURETY SOLUTIONS INSURANCE SERVICES, INC
3225 Menor Circle Suite 100, Rancho Cordova, CA 95742
Agent Phone # 877 654 2327
Surety Phone # (515) 243-8171
California License # 2482-8
ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of _______ Sacramento _______

On 1/15/19 before me, Katherine DuPont, Notary Public (insert name and title of the officer)

personally appeared John T. Page, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Katherine DuPont (Seal)

Katherine DuPont
COMM. #2206140
Notary Public - California
Sacramento County
My Comm. Expires July 20, 2021
POWER OF ATTORNEY

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa (herein collectively called the "Companies") do hereby make, constitute and appoint, individually,

John T Page; Ryan Tash; Stephanie R Nakken; Susan Fournier

their true and lawful Attorney(s)-in-Fact, to sign its name as surety(ies) and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

This Power-of-Attorney is granted and is signed and sealed by facsimile under and by authority of the following By-Laws adopted by the Board of Directors of MERCHANTS BONDING COMPANY (MUTUAL) on April 23, 2011 and amended August 14, 2015 and adopted by the Board of Directors of MERCHANTS National Bonding, Inc., on October 16, 2015.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereunto, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognition, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually fixed."

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and authority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner-Department of Highways of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 15th day of August, 2018.

STATE OF IOWA
COUNTY OF DALLAS ss.

On this this 15th day of August 2018, before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., and that the seals affixed to the foregoing instrument are the Corporate Seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.

Expiry of notary's commission does not invalidate this instrument

I, William Warner, Jr., Secretary of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this 15th day of January, 2019.
WHEREAS, the City of Sacramento, State of California, hereinafter called City, has conditionally awarded to: The Design Build, Inc. 2921 Fulton Avenue, Sacramento, CA 95821 as principal, hereinafter called Contractor, a contract for construction of:

Garcia Bend Park Restroom (rebid)  
(PN: L19120500 & L19706038)  
Bid #B1819112126

which contract is by reference incorporated herein and made a part hereof as if the Surety named below were a party to the contract, and is hereinafter referred to as the Contract; and

WHEREAS, under the terms of the Contract and pursuant to Chapter 5 of Title 3 of Part 6 of Division 4 of the California Civil Code (commencing with Civil Code Section 9550), Contractor is required to furnish a good and sufficient payment bond to secure payment of the claims to which reference is made in Civil Code Section 9554.

NOW, THEREFORE, we the Contractor and (here insert full name and address of Surety):  
Merchants Bonding Company (Mutual) P.O. BOX 14498, DES MOINES, IA 50306 - 3498, a corporation duly authorized and admitted to transact business and issue surety bonds in the State of California, hereinafter called Surety, are held and firmly bound unto the City, and unto all persons or entities entitled to assert a claim against a payment bond under any of the aforesaid Civil Code provisions in the sum of $161,582.00, on the condition that if Contractor shall fail to pay for any materials or equipment furnished or used in performance of the Contract, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, or for any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board or the Employment Development Department from the wages of employees of the Contractor and all subcontractors with respect to such work or labor, then the Surety shall pay the same in an amount not exceeding the sum specified above. If suit is brought upon this bond, Surety shall pay, in addition to the above sum, all costs, expenses and fees, including attorney’s fees, reasonably incurred by any party in successfully enforcing the obligation secured hereby, all to be taxed as costs and included in any judgment rendered. Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect, and shall bind Contractor, Surety, their heirs, executors, administrators, successors and assigns, jointly and severally.

It is hereby stipulated and agreed that this bond shall inure to the benefit of all persons, companies, corporations, political subdivisions, State agencies and other entities entitled to assert a claim against a payment bond under any of the aforesaid Civil Code provisions, so as to give a right of action to them or their assigns in any suit brought upon this bond. The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or to the specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by authorized representatives of the Contractor and Surety.

SIGNED AND SEALED on January 15th, 2019

By _____________________________ (Contractor) (Seal)

By _____________________________ (Surety) (Seal)

Title ___________________________ Title ___________________________

Agent Name and Address

SURETY SOLUTIONS INSURANCE SERVICES, INC

3225 Monier Circle Suite 100, Rancho Cordova, CA 95742

Agent Phone # 577 654 2327  
Surety Phone # (515) 243-8171  
California License # 2482-8

Effective 7-1-12
ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Sacramento

On 1/15/19 before me, Katherine DuPont, Notary Public
(insert name and title of the officer)

personally appeared John T. Page
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Katherine DuPont
(Seal)
MERCHANDS BONDING COMPANY
POWER OF ATTORNEY

Know All Persons By These Presents, that MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., both being corporations of the State of Iowa (herein collectively called the "Companies") do hereby make, constitute and appoint, Individually,

John T Page; Ryan Tash; Stephanie R Nakken; Susan Fournier

their true and lawful Attorney(s)-in-Fact, to sign its name as surety(ies) and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

This Power-of-Attorney is granted and is signed and sealed by facsimile under and by authority of the following By-Laws adopted by the Board of Directors of Merchants Bonding Company (Mutual) on April 23, 2011 and amended August 14, 2015 and adopted by the Board of Directors of Merchants National Bonding, Inc., on October 16, 2015.

"The President, Secretary, Treasurer, or any Assistant Treasurer or any Assistant Secretary or any Vice President shall have power and authority to appoint Attorneys-in-Fact, and to authorize them to execute on behalf of the Company, and attach the seal of the Company thereon, bonds and undertakings, recognizances, contracts of indemnity and other writings obligatory in the nature thereof."

"The signature of any authorized officer and the seal of the Company may be affixed by facsimile or electronic transmission to any Power of Attorney or Certification thereof authorizing the execution and delivery of any bond, undertaking, recognizance, or other suretyship obligations of the Company, and such signature and seal when so used shall have the same force and effect as though manually signed.

In connection with obligations in favor of the Florida Department of Transportation only, it is agreed that the power and authority hereby given to the Attorney-in-Fact includes any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts required by the State of Florida Department of Transportation. It is fully understood that consenting to the State of Florida Department of Transportation making payment of the final estimate to the Contractor and/or its assignee, shall not relieve this surety company of any of its obligations under its bond.

In connection with obligations in favor of the Kentucky Department of Highways only, it is agreed that the power and authority hereby given to the Attorney-in-Fact cannot be modified or revoked unless prior written personal notice of such intent has been given to the Commissioner-Department of Highways of the Commonwealth of Kentucky at least thirty (30) days prior to the modification or revocation.

In Witness Whereof, the Companies have caused this instrument to be signed and sealed this 15th day of August , 2018

STATE OF IOWA
COUNTY OF DALLAS ss.
On this this 15th day of August 2018 , before me appeared Larry Taylor, to me personally known, who being by me duly sworn did say that he is President of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC.; and that the seals affixed to the foregoing instrument are the Corporate Seals of the Companies; and that the said instrument was signed and sealed in behalf of the Companies by authority of their respective Boards of Directors.

ALICIA K. Gram Commission Number 767430
My Commission Expires April 1, 2020

Notary Public

(Expiration of notary’s commission does not invalidate this instrument)

I, William Warner, Jr., Secretary of MERCHANTS BONDING COMPANY (MUTUAL) and MERCHANTS NATIONAL BONDING, INC., do hereby certify that the above and foregoing is a true and correct copy of the POWER-OF-ATTORNEY executed by said Companies, which is still in full force and effect and has not been amended or revoked.

In Witness Whereof, I have hereunto set my hand and affixed the seal of the Companies on this 15th day of January , 2019

POA 0018 (3/17)
TO THE HONORABLE CITY COUNCIL
SACRAMENTO, CALIFORNIA:

In compliance with the Contract Documents, the undersigned hereby proposes to furnish all required labor, materials, supervision, transportation, equipment, services, taxes and incidentals required for:

**Garcia Bend Park Restroom (rebid)**
(PN: L19120500 & L19706038)
Bid #B1819112126

in the City and County of Sacramento, California.

The Work is to be done in strict conformity with the Contract Documents now on file in the Office of the City Clerk, for the following sum:

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<th>Item No.</th>
<th>Item Description</th>
<th>Estimated Quantity</th>
<th>Unit</th>
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</table>

**BASE BID TOTAL** $160,932

**CONTRACTOR NAME:** The Design Build Inc.

**GRAND TOTAL:** $169,932 – $161,582.00

-The undersigned agrees to execute the Agreement and provide City the executed Agreement, the required insurance certificates, endorsements, and waivers of subrogation, and the required surety bonds within ten (10) calendar days after the undersigned’s receipt of the City’s notice that the undersigned will be recommended for Contract award and prior to award of the Contract by the City Council.

-It is understood that this Bid Proposal is based upon completion of the Work within a period of 45 working days, commencing on the date set forth in the written Notice to Proceed issued by the City to the Contractor. The Contractor is hereby notified and reminded that per City Contract requirements, the City will issue a Notice to Proceed within 15 calendar days of execution of
contract by City. Contract work days will start immediately on the date of the Notice to Proceed. Attached is a sample of a Notice to Proceed. The amount of liquidated damages to be paid by the Contractor for failure to complete the work by the completion date (as extended, if applicable) shall be One Thousand Dollars ($1,000) for each calendar day, continuing to the time at which the work is completed. Such amount is the actual cash value agreed upon as the loss to the City resulting from the default of the Contractor.

DETERMINATION OF LOW BIDDER
The determination of the low bidder will be based on the base bid and all additives, if any. However, the contract award may not include any of the additives. The City reserves the right to select which additives, if any, to include in the contract award in addition to the base bid work. If an additive is an alternative to a bid item and the additive is to be awarded, the contract amount will be based on the additive price instead of the base bid item price.

In determining the amount bid by each bidder, the City may disregard mathematical errors in addition, subtraction, multiplication, and division that appear obvious on the face of the Proposal. When such a mathematical error appears on the face of the Proposal, the City shall have the right to correct such an error and to compute the total amount bid by said bidder on the basis of the corrected figure or figures.

The City Council may reject any and all bids and waive any informalities or minor irregularities in the bids.

When an item price is required to be set forth in the Proposal, and the total for the item set forth separately does not agree with a figure which is derived by multiplying the item price times the Engineer's estimate of the quantity of work to be performed for said item, the item price shall prevail over the sum set forth as the total for the item unless, in the sole discretion of the City, such a procedure would be inconsistent with the policy of the bidding procedure. The total paid for each such item of work shall be based upon the item price and not the total price. Should the Proposal contain only total price for the item and the item price is omitted, the City shall determine the item price by dividing the total price for the item by the Engineer's estimate of the estimated quantities of work to be performed as items of work.

If the Proposal contains neither the item price nor the total price for the item, then it shall be deemed incomplete and the Proposal shall be deemed non-responsive.

The undersigned has examined the location of the proposed Work, the local conditions at the place where the Work is to be done, is familiar with the Contract Documents and is familiar and expressly agrees to the liquidated damages provision of the Contract Documents.

The undersigned has checked carefully all of the foregoing figures and understands that the City of Sacramento will not be responsible for any errors or omissions on the part of the undersigned in making up this Bid Proposal.

Enclosed is a Bid Proposal Guarantee, as required, consisting of a bidder's bond or other acceptable security for not less than ten percent (10%) of the amount Bid Proposal. The undersigned agrees that all addenda received and acknowledged herein shall become a part of and be included in this Bid Proposal. This Bid Proposal includes the following addenda:

Add. # ______________________ DATE ______________________
Add. # ______________________ DATE ______________________
Add. # ______________________ DATE ______________________

NOTE: State whether your concern is a corporation, a co-partnership, private individual, or individuals doing business under a firm name.

Corporation: The Design Studio Inc.

If the Bidder is a corporation, the Bid Proposal must be executed in the name of the corporation and must be signed by a duly authorized officer of the corporation.

If the Bidder is a partnership, the Bid Proposal must be executed in the name of the partnership and one of the partners must subscribe their signature thereto as the authorized representative of the partnership.
AMOUNT OF BID PROPOSAL GUARANTEE ENCLOSED:
($16,500) not less than ten percent (10%) of amount Bid Proposal

CERTIFIED CHECK  
CASHIER'S CHECK  
✓ BID BOND  
MONEY ORDER  
OTHER SECURITY

CONTRACTOR: The Design Build Inc.

By
(Signature)

Manager: Qayyum
(Print or Type)

Title: CFO / Director

Address: 2921 Fulton Avenue
Sacramento, CA 95821

Telephone No.: 916-712-1314

Fax No.: 866-828-7898

Email Address: info@designbuildinc.com

Date: 12-10-2018

Bid Bond Security

Type of Deposit

Propriety Signed  
Not Included  
Improperly Signed  
Not Required

Cashier/Certified Check  
Other

Contractor's License No.: 998705
Expiration Date: 11-30-2020
Tax I.D. Nos.- Fed.: 455561110
DIR Registration #: 1000060117
City of Sacramento Business Operation Tax Certificate No.: 1037396
(City will not award contract if Certificate Number is missing.)

Please indicate if you are any of the following:

EBE ___ Cert # ____________
UDBE ___ Cert # ____________
SBE ___ Cert # 1749347
M/WBE ___ Cert # ____________
LOCAL BUSINESS ENTERPRISE (LBE) PARTICPATION PROGRAM

NOTE: Proposers must provide responses to the following items. Failure to provide a response to each of the items in this section may be grounds for rejection of the proposal.

1. LBE FIVE PERCENT (5%) PARTICIPATION

On April 3, 2012, the Sacramento City Council adopted a Local Business Enterprise (LBE) Preference Program to provide enhanced opportunities for the participation of local business enterprises (LBEs) in the City’s contracting and procurement activities. On November 19, 2013, City Council increased the LBE preference and authorized City departments to require minimum LBE participation levels in individual contracts. Under City Code section 3.60.270, when the bid specifications for a City contract establish a minimum participation level for LBEs, no bidder on the contract shall be considered responsive unless its bid meets the minimum LBE participation level required by the bid specifications.

The City has established a minimum 5% participation level for LBEs on this contract. Pursuant to City Code Section 3.60.270, no bidder on this contract shall be considered responsive unless its bid meets or exceeds this minimum participation level.

Local Business Enterprise means a business enterprise, including but not limited to, a sole proprietorship, partnership, limited liability company, corporation, or other business entity that has a legitimate business presence in the city or unincorporated county of Sacramento. Evidence of legitimate business presence in the city or unincorporated county of Sacramento shall include:

1. Having a current City of Sacramento Business Operation Tax or County of Sacramento Business License; and
2. Having either of the following types of offices or workspace operating legally within the city or unincorporated county of Sacramento:
   a. The LBE’s principle business office or workspace; or
   b. The LBE’s regional, branch or satellite office with at least one full time employee located in the city or unincorporated county of Sacramento.

A. LOCAL BUSINESS ENTERPRISE (LBE)

Is the firm submitting the bid qualified as a local business enterprise? Check the appropriate box below:

☐ YES - the firm submitting the bid is qualified as a local business enterprise.
☐ NO - the firm submitting the bid is not qualified as a local business enterprise.

If the response to the above is YES, provide the City of Sacramento Business Operations Tax Certificate Number and/or County of Sacramento Business License Number:

1037396 / CSLB 978705

If the response to the above is YES, provide a current copy of the City of Sacramento Business Operations Tax Certificate and/or County of Sacramento Business License.

If the response to the above is YES, provide business office or workspace address*:

Q921 Fulton Avenue
Sacramento, CA 95821

* Address must be a physical address for the basis of location, this excludes P.O. Box addresses.
To be eligible for award of this contract, the bidder shall list the business entities used to attain the 5% LBE requirement. Additionally, the bidder shall list all other subcontractors who perform work, render service, or provide materials in an amount in excess of one-half of 1 percent of the total bid amount. In the case of bids for the construction of streets and highways, including bridges, subcontractors whose subcontract value exceeds one-half of 1 percent of the total bid or ten thousand dollars ($10,000), whichever is greater, shall be listed. Estimated dollar values shall be provided for all work / services listed. The failure to attain the 5% LBE participation or the inclusion of false information or the omission of required information will render the bid non-responsive.

<table>
<thead>
<tr>
<th>Prime Contractor Name</th>
<th>The Design Build Inc</th>
<th>Prime Contractor Address</th>
<th>2921 Fulton Avenue Sacramento CA 95821</th>
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<tbody>
<tr>
<td>Date</td>
<td>12-10-2018</td>
<td>Bid Amount</td>
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<th>The Design Building</th>
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<tbody>
<tr>
<td>License Number</td>
<td>9787 05</td>
</tr>
<tr>
<td>Address</td>
<td>2921 Fulton Avenue</td>
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<tr>
<td>City, State, Zip</td>
<td>Sacramento CA 95821</td>
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<tr>
<td>Contact Person</td>
<td>Maziyar Qayyum</td>
</tr>
<tr>
<td>Phone</td>
<td>916-712-1204</td>
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<tr>
<td>LBE?</td>
<td>Yes</td>
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<td>Masonry/Concrete Metal Forming Earthwork</td>
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<tr>
<td>City, State, Zip</td>
<td>Elk Grove CA 95630</td>
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<tr>
<td>Contact Person</td>
<td>Brady</td>
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<td>Phone</td>
<td>916-849-4657</td>
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<tr>
<td>City, State, Zip</td>
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<tr>
<td>Contact Person</td>
<td>Les</td>
</tr>
<tr>
<td>Phone</td>
<td>916-832-5422</td>
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<tr>
<td>LBE?</td>
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<tr>
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COPY AND ATTACH ADDITIONAL SHEETS AS NECESSARY

I hereby certify that each subcontractor listed on this Subcontractor and LBE Participation Form has been notified that it has been listed and has consented in writing to its name being submitted for this contract. The Prime Contractor also certifies that it will notify each subcontractor listed on this Form in writing if the contract award is made to the Prime Contractor, and will make all documentation relevant to the subcontractor and LBE participation available to City of Sacramento upon request. The Prime Contractor further certifies that all of the information contained in this Form is true and correct and acknowledges that the City will rely on the accuracy of this information in awarding the contract.

PRINCIPAL OF FIRM:

[Signature]

Date: 12-10-2018

Form Revised 3/9/15
We hereby guarantee:

**Garcia Bend Park Restroom (rebid)**
(PN: L19120500 & L19706038)
Bid #B1819112126

the City of Sacramento for one (1) year in accordance with the guarantee required in the specifications. We agree to repair or replace any or all such work, together with all or any other work which may be displaced in so doing, that may be proven defective in workmanship or material within the one-year period from the date of acceptance without any expense whatsoever to the City, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with the above-mentioned conditions within five (5) days time after being notified in writing, we collectively or separately, do hereby authorize the City to proceed to have the defects repaired and made good at our expense and will pay the costs and damages, including but not limited to any related attorney fees and City staff and administrative expenses, therefor immediately upon demand.

Dated: 1-14-2019

Signed: [Signature]

**Printed Name**
CHAUDHRY MAZAR MUHAMMAD

**Company**
The Design Build Inc.

**Address**
2921 Fulton Avenue
Sacramento, CA 95821
We hereby guarantee:

Garcia Bend Park Restroom (rebid)
(PN: L19120500 & L19706038)
Bid #B18191112126

the City of Sacramento for one (1) year in accordance with the guarantee required in the specifications. We agree to repair or replace any or all such work, together with all or any other work which may be displaced in so doing, that may be proven defective in workmanship or material within the one-year period from the date of acceptance without any expense whatsoever to the City, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with the above-mentioned conditions within five (5) days time after being notified in writing, we collectively or separately, do hereby authorize the City to proceed to have the defects repaired and made good at our expense and will pay the costs and damages, including but not limited to any related attorney fees and City staff and administrative expenses, therefor immediately upon demand.

Dated: 1-14-2019

Signed: [Signature]

MANZAR DAMI JUM
Printed Name
THE DESIGN BUILD INC.
Company
2921 FULTON AVENUE SAC.
Address
CA 95821

(Rev. 5-6-91)
The undersigned contractor certifies that it and all subcontractors performing under this Agreement will provide a drug-free workplace by:

1. Publishing a "Drug-Free Workplace" statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition.

2. Establishing a Drug-Free Awareness Program to inform employees about:
   a. The dangers of drug abuse in the workplace.
   b. The contractor's policy of maintaining a drug-free workplace.
   c. Any available drug counseling, rehabilitation, and employee assistance program.
   d. The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

3. Notify employees that as a condition of employment under this Agreement, employees will be expected to:
   a. Abide by the terms of the statement.
   b. Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace.

4. Making it a requirement that each employee to be engaged in the performance of the Agreement be given a copy on the "Drug-Free Workplace" statement.

5. Taking one of the following appropriate actions, within thirty (30) days of receiving notice from an employee or otherwise receiving such notice, that said employee has received a drug conviction for a violation occurring in the workplace:
   a. Taking appropriate disciplinary action against such an employee, up to and including termination; or
   b. Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement or other appropriate agency.

* I certify that no person employed by this company, corporation, or business has been convicted of any criminal drug statute violation on any job site or project where this company, corporation or business was performing was within three years of the date of my signature below.

EXCEPTION:

<table>
<thead>
<tr>
<th>Date</th>
<th>Violation Type</th>
<th>Place of Occurrence</th>
</tr>
</thead>
</table>

If additional space is required use back of this form.

* The above statement will also be incorporated as a part of each subcontract agreement for any and all subcontractors selected for performance on this project.

IN THE EVENT THIS COMPANY, CORPORATION, OR BUSINESS IS AWARDED THIS CONSTRUCTION AGREEMENT, AS A RESULT OF THIS BID; THE CONTRACTOR WITH HIS/HER SIGNATURE REPRESENTS TO THE CITY THAT THE INFORMATION DISCLOSED IN THIS DOCUMENT IS COMPLETE AND ACCURATE. IT IS UNDERSTOOD AND AGREED THAT FALSE CERTIFICATION IS SUBJECT TO IMMEDIATE TERMINATION BY THE CITY.

The Representations Made Herein On This Document Are Made Under Penalty Of Perjury.

CONTRACTOR'S NAME: ____________________________

BY: ____________________________

Signature: ____________________________

Title: ____________________________

Date: 12-10-2008

Effects of violations: a. Suspension of payments under the Agreement. b. Suspension or termination of the Agreement. c. Suspension or debarment of the contractor from receiving any Agreement from the City of Sacramento for a period not to exceed five years.
City of SACRAMENTO

WORKER'S COMPENSATION CERTIFICATION

Garcia Bend Park Restroom (rebid)
(PN: L19120500 & L19706038)
Bid #B1819112126

In accordance with Article 5 (commencing at Section 1860), Chapter 1, Part 7, Division 2 of the Labor Code, the below certificate must be signed and filed with the awarding body prior to performing any work under this contract. Labor Code Section 3700, inter alia, states the following:

"Every employer shall secure the payment of compensation in one or more of the following ways:

"(a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this State.

"(b) By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees.

To be signed by authorized corporate officer or partner or individual submitting the Proposal. If Bidder is: (example)

1. An individual using a firm name, sign: "John Doe, an individual doing business as Blank Company."
2. An individual doing business under his own name, Sign: your name only.
4. A corporation, sign: "Blank Company, by John Doe, Secretary." (or other title)

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.

DATE: 1-14-2019

Contractor THE DESIGN BUILD FNC

By MASUM DEVI
Signature CHAUDHARI NOORU MUHAMMAD

(Rev. 5-6-91)
SPECIAL PROVISIONS
GENERAL PROVISIONS


SPECIAL PROVISIONS FOR:

Garcia Bend Park Restroom Restoration (rebid)
PN: L19120200 & L19706038

I. GENERAL REQUIREMENTS

A. SCOPE AND LOCATION OF WORK

The work to be performed under these Special Provisions consists of developing the Garcia Bend Park Restroom Renovation at 7654 Pocket Road, Sacramento CA. 95831. The improvements will consist of 690 square feet, demolition, stone veneer, masonry, roofing, plumbing, electrical and concrete flatwork.

B. COMPLETION TIME

The time for the completion of all work is 45 (forty-five working days) from the Notice to Proceed for substantial completion. Should said work not be completed to the satisfaction of the City within said time, the contractor shall pay to the City of Sacramento a sum of ONE THOUSAND DOLLARS ($1,000.00) as liquidated damages and not as a penalty for each calendar day delay after the expiration of such period until the final acceptance of the work by the City and its delivery to the City.

C. SPECIFICATIONS

The work to be performed under this contract shall be done in accordance with the Standard Specifications of the City of Sacramento, adopted June 2007, referred to herein as "Standard Specifications" as modified by these Special Provisions, which shall apply to all work.
i. Standard Specification 1-23 Engineer shall also mean Landscape Architect as defined in Standard Specification Section 1-33.

ii. Standard Specifications Section 2-9 SUBCONTRACTORS, add the following after the sub paragraph 2 of the first paragraph in the Standard Specifications.

If a prime Contractor fails to specify a subcontractor, or, if a prime Contractor specifies more than one (1) subcontractor for the same portion of work to be performed under the Contract which portion exceeds one-half of one percent of the prime Contractor's total bid, the prime Contractor agrees that he or she is fully qualified to perform that portion himself or herself, and that the prime Contractor shall perform that portion himself or herself.

iii. Standard Specifications Section 5-4 COOPERATION OF CONTRACTOR

Add the following after the last paragraph of the Standard Specifications Section 5-4 COOPERATION OF CONTRACTOR with the following:

Contractor shall cooperate with the Landscape Architect, inspectors, and with other Contractors in every way possible. The Inspectors shall designate sequence of construction in case of controversy between Contractors.

iv. Standard Specifications Section 8 MEASUREMENT OF QUANTITIES

Delete the paragraph following Section heading 8-1 and replace it with the following: "The City shall determine quantities of work acceptable under the terms of the contract. Not more than once per month the Contractor shall present to the City a statement showing the amount of labor and materials incorporated into the work."

v. Special Notice Regarding Standard Specifications: The Standard Specifications of the City of Sacramento, dated June 2007, are subject to the provisions of Title 3 of the Sacramento City Code. If there is any conflict between the Standard Specifications as currently written and Title 3 of the Sacramento City Code, the latter shall govern.

vi. Standard Specifications Section 7 PROSECUTION AND PROGRESS. Add the following after the last paragraph of the Standard Specifications. Section 7-2 WORK SCHEDULE AND ADEQUATE RESOURCES. Contractor shall submit with each Pay Request Application an updated Work Schedule. The updated Work Schedule is an integral part of the Pay Request Application. The Pay Request Application will not be accepted for processing without an accompanying updated Work Schedule.
D. SUBCONTRACTORS

The Contractor shall comply with Section 2-9 of the Standard Specifications.

E. SCHEDULE OF UNIT PRICES

The successful lowest responsible bidder shall provide a Schedule of Unit Prices to the Landscape Architect prior to the award of the contract. The form for the Schedule of Unit Prices will be provided to the successful lowest responsible bidder by the Landscape Architect. This schedule of unit prices shall be not be used for payment. Unit prices provided on the schedule of unit prices are for information only and may be used as a basis for determining costs in changes in the work.

F. TIME OF AWARD

Section 3-2, "Time of Award: of the Standard Specifications is hereby amended for this project. Time of Award for this contract shall be made within ninety (90) calendar days after opening of the proposals to the lowest responsible bidder, unless otherwise stated in the contract agreement.

G. PRE-BID INTERPRETATION OF CONTRACT DOCUMENTS

No oral representations or interpretation will be made to any bidder as to the meaning of the contract documents. Request for interpretation shall be made in writing, and delivered to the City at least seven (7) days before the time announced for opening the proposals. Interpretation, where necessary, will be made by the City in the form of an addendum to the contract documents, and when issued, will be sent as promptly as is practical to all parties to whom the bid documents have been issued. All such addenda shall become part of the contract. Request for information regarding this procedure or other similar information, shall be directed to City Project Manager Jeff Nittka, a Department of Parks and Recreation, Park Planning & Development Services, 915 I Street, 5th Floor, Sacramento, CA 95814, email jnittka@cityofsacramento.org.

It shall also be the bidder's responsibility to call to the attention of the Landscape Architect any missing pages or drawings in the contract documents including the addenda. These items shall be brought to the attention of the Landscape Architect at least seven (7) calendar days before the bid opening date.

H. PRE-JOB CONFERENCE AND CONSTRUCTION SCHEDULE

The Contractor, after delivery of the contract and at least three (3) calendar days before beginning work, shall notify the Construction Inspector and arrange a pre-job conference. The Contractor shall submit
to the Park Construction Inspector construction progress schedules in accordance with Section 7-2 of the Standard Specifications.

I. WORKMANSHIP AND MATERIALS

Except as otherwise specified, all materials and equipment incorporated in the work under the contract shall be new. The quality of materials and workmanship shall be in accordance with the provisions of Section 5-17 of the Standard Specifications. Appearance of the finished work is of primary importance in all phases of this project. Any portion of the work may be rejected due to appearance.

J. TRADE NAMES AND ALTERNATIVES

In accordance with Paragraph 5-18 of the Standard Specifications of the City of Sacramento, certain articles or materials to be incorporated in the work may be designated, for convenience, under a trade name or the name of a manufacturer and his catalogue information. The use of an alternative article or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the approval of the Landscape Architect. The Contractor shall, within seven (7) calendar days after the Bid Summary and Notification of Award Recommendation, submit for the review of the Landscape Architect, materials, products, equipment and services which differ in any respect from the materials, products, equipment and services specified. Such submittals shall be accompanied by data to substantiate that such items are equal to those specified. The Landscape Architect shall be the sole judge as to the quality and suitability of substitutions and his/her decision is final. Requests for substitutions will not be entertained or considered by the Landscape Architect during the bidding period. No delay or extension of the contract time will be allowed because of the time required for submitting substitutions or for determining their equality. Failure to propose the substitution of any article or service within seven (7) calendar days after the Bid Summary and Notification of Award Recommendation will be deemed sufficient cause for the denial of request for substitution.

After an approval for a substitution is given, the Contractor shall be responsible for any variation of dimensions, locations, connections, sizes and openings, type and construction of substrate or support to receive materials, etc. The Contractor shall furnish and install any and all additional materials as may be required to perform a complete job without additional cost to the City.

Request for approval shall, in addition to following the directions described above, list any and all deviations in the quality, criteria, characteristics or dimensions from the specified item or items. Any deviations in the quality, criteria, characteristics or dimensions that do not appear in the request for approval and subsequently appear in the shop drawings or in the product or installation, may cause the Contractor to be directed to remove the item or items in total and at his expense, and to provide and install the item or items as originally specified. The mere mention in the request for approval that the item or items will be in accord with the manufacturer's specification or catalog will not be sufficient to alter the specifications unless approval is given to requests, which
specifically list in the requesting letter where deviations in the quality, criteria, characteristics or dimensions exist.

K. ACCIDENT PREVENTION

The Contractor's attention is directed to Section 6-9 of the Standard Specifications, which requires compliance with all requirements of the California Occupational Safety and Health Act.

L. LOCATION OF EQUIPMENT AND PIPING

Drawings showing locations of equipment, piping, valves, sprinkler heads, and other appurtenances are diagrammatic only. When installation deviates from the plans and specifications, the Landscape Architect shall be notified for approval. The Contractor will be held responsible for deviations made without first obtaining the Landscape Architect's approval, and shall remove and relocate such items at his own expense if so directed by the Park Construction Inspector.

M. RELIEF FROM MAINTENANCE AND RESPONSIBILITY - RESOLUTION NO. 108 - DATED MARCH 26, 1970

Upon the written request of the Contractor and upon written approval by the City Landscape Architect, the Contractor may be relieved of the duty of maintaining and protecting certain portions of the work, which have been completed in all respects in accordance with the requirements of the contract and to the satisfaction of the City Landscape Architect, and thereafter, except with his consent, the Contractor will not be required to do further work thereon. In addition, such action by the City Landscape Architect will relieve the Contractor of responsibility for injury or damage to said completed portions of the work resulting from use by public traffic or from the action of the elements or from any other cause but not from injury or damage resulting from the Contractor's own operations or from his negligence. Nothing in this section providing for relief from maintenance and responsibility will be construed as relieving the Contractor of full responsibility for repairing or replacing defective work or materials found at any time before either the formal acceptance of the entire contract by the City Council, or during the applicable guarantee period.

N. CONFLICTS

This Section of the Special Provisions shall supersede Section 5-3 of the Standard Specifications. In case of conflict between drawings and specifications, the drawings shall govern in matters of quantity, the specifications in matters of quality. In case of conflict within the drawings involving quantities or within the specifications involving qualities, the greater quantity and the higher quality shall be furnished.

O. PROTECTION OF FACILITIES

The Contractor shall be directed to Section 7-7 of the Standard Specifications, which shall also include protecting the work and materials to be used thereon from damage or loss due to theft, vandalism and malicious mischief. The
Contractor shall be held responsible for such damages or loss, which he shall remedy at his expense.

P. PROTECTION OF DRAINAGE FACILITIES

The Contractor shall maintain all new drainage facilities so storm drainage runoff into the new system is clean. Use straw bales around inlets to minimize sediment infiltration during rainy season and control irrigation schedule to minimize runoff during initial planting of turf.

Q. CLEANING

The Contractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by his employees work, and at the completion of work, he shall remove all his rubbish from and about the site and all his tools, scaffolding and surplus materials, and shall leave his work area, including all sidewalks and paving areas "broom clean", or its equivalent, unless more exactly specified in other trade sections of the specifications. In case of dispute, the City may remove the rubbish and charge the cost to the Contractor. The Contractor at his expense shall remove spillage resulting from hauling operations along or across any public traveled way immediately. Water or dust palliative shall be applied if ordered by the Park Construction Inspector for the alleviation or prevention of dust nuisance. Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners.

R. SUBMITTALS

In accordance with the provisions of Section 5-7, Standard Specifications of the City of Sacramento (except where noted below), the Contractor shall furnish the Landscape Architect with such shop drawings and other descriptive materials as may be necessary to adequately describe the equipment, material, and fabricated items proposed to be furnished under this contract, and to determine their compliance with the specifications, design, and arrangement shown on the contract drawings. Items to conform to Special Provisions and may include but not limited to:

<table>
<thead>
<tr>
<th>Item</th>
<th>Product Data</th>
<th>Shop Drawings</th>
<th>Mock-up or Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Pavement</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Stone Veneer</td>
<td>X</td>
<td></td>
<td>X</td>
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<tr>
<td>Aggregate Base</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Masonry 6 and 8 inch</td>
<td>X</td>
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</tr>
<tr>
<td>Metal Screen</td>
<td>X</td>
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<tr>
<td>Roof Deck</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Flashing &amp; Trim</td>
<td>X</td>
<td></td>
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<tr>
<td>Door and Frames</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door Hardware</td>
<td>X</td>
<td></td>
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</tr>
<tr>
<td>Plastering</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Epoxy Flooring | X  
Toilet Accessories | X  
Signage | X  
Plumbing | X  
Electrical | X  

**One (1) copy** of such submittals shall be furnished for review by the Landscape Architect, a **digitally scanned copy** will promptly be returned with approval, rejection, or approval with modification. Neither equipment nor material shall deviate in any way from the approved drawings without prior written approval of the Landscape Architect. Any fabrication of other work performed in advance of such approval shall be done entirely at the risk of the Contractor. The approval of submitted drawings or other descriptive material shall not relieve the Contractor of any obligation or responsibility for fulfillment of the contract as prescribed.

S. RECORD DRAWINGS OF NEW CONSTRUCTION

Should the work as installed differ from the original design, the Contractor shall supply the City with a reproducible Mylar "as-built" drawing with all deviations from the original recorded thereon (layout and grades included). This "as-built" shall be found to be of acceptable quality by the Landscape Architect. Upon request, the City shall supply the Contractor with a Mylar base map for his/her "as-built" drawing. "As-built" drawings shall also be required as stated in Section 36-4 of the Standard Specifications.

T. LICENSE REQUIREMENTS

For publicly bid park projects a General Engineering Contractor "A" or "B" License is required. The "A" or "B" contractor is categorized as a general engineering or general building contractor as stated in the Business and Professions Code (B&P) Section 7056 or 7057 of Article 4. Classifications on the California Contractors State License Board website.

U. PROTECTION OF EXISTING CONCRETE AND ASPHALT PAVEMENTS

Contractor shall repair and replace to City standards any existing asphalt or concrete pavements damaged during construction activities at no expense to the City. These pavement areas include street, curb and gutter, sidewalk and park path. Contractor shall meet with City inspector prior to construction activities to document existing conditions of these paved areas.

V. PROJECT COORDINATION

Contractor shall complete all general coordination with the Project Manager the Inspector and other staff as necessary to complete the Project in an efficient workmanlike manner; Submittals; Record Drawings; Maintenance of Traffic, Public Safety, and Convenience; Protection of Existing Improvements;
Construction Facilities and Temporary Controls; Temporary Electricity; Project Closeout; and Operation and Maintenance Data for this project.

W. **City Code 3.60.020 Determination of lowest responsible bidder**

Where any provision of the city charter or this chapter requires competitive bidding and award of the contract for a public project to the lowest responsible bidder, the lowest responsible bidder shall be determined as follows:

a. In determining whether a bidder is responsible, consideration shall be given to: (i) the quality of a public project to be provided by the bidder; (ii) the ability, capacity and skill of the bidder to perform the contract; (iii) the ability of the bidder to perform the contract within the time specified, without delay; (iv) the character, integrity, reputation, judgment, experience and efficiency of the bidder; and (v) the quality of the bidder's performance on previous contracts with the city.

b. The City Council may by resolution, from time to time, adopt standard minimum qualifications for bidders on competitively bid contracts for public projects. If such standard minimum qualifications are included in the bid specifications for a contract, no bidder shall be considered "responsible" unless it is determined to be responsible in consideration of the factors set forth in subsection A, above, and also meets such standard minimum qualifications at the time of bid opening. The adoption and use of standard minimum qualifications shall not in any way limit or affect the city's ability to: (i) review information contained in a bid, and additional relevant information, and determine whether the bidder is a responsive and/or responsible bidder; or (ii) establish different and/or additional qualification requirements for specific contracts.

c. The City Council may by resolution, from time to time, adopt programs or procedures for providing bid price preferences, including but not limited to, preferences to promote the participation and utilization of **local business enterprises** in the City's contracting for public projects. The lowest responsible bidder shall be the responsible bidder whose bid is responsive to the bid requirements, including without limitation any local business enterprise program requirements included in the bid specifications, and whose bid price is the lowest, after all bid prices are calculated to include any applicable bid price preferences. (Ord. 2002-013 § 2; Ord. 99-007 § 3; prior code § 58.01.102). A 5% minimum LBE Participation is required for this project. LBE Certification Statements are due to the contract manager by the close of business two days after bid opening for bid to be responsive.

X. LBE Certification Statements are due to the contract manager by the close of business two days after bid opening for bid to be responsive.

Y. **All publicly bid projects are subject to Performance and Payment Bonds.**

Z. **California Business and Professions Code, Section 7059 states that the Public Works agency has the authority to select classifications for the project.**
AA. Contractor registration with the Department of Industrial Relations Required pursuant to Senate Bill 854 all contractors and subcontractors are required to register with the Department of Industrial Relations (DIR) to be eligible to bid on all public works projects.
SECTION 02070
SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Work required to demolish, modify, salvage, relocate, dispose, and convert existing structures, pavements, utilities, fencing, and miscellaneous items as required for the construction of the improvements as shown on the Drawings and as specified.

2. Protect all on-site personnel and the public at all areas of demolition.

3. Complete erosion and dust control measures as specified in Section 01500.

4. Protect, support, and maintain adjoining structure, utilities, sitework facilities, and miscellaneous items surrounding the demolition work from damage or harmful effects.

5. In accordance with all applicable state and local laws, properly dispose of all hazardous materials as required, obtain EPA generator number from the OWNER, and prepare safety plans.

6. CONTRACTOR shall divert construction and demolition debris from disposal in landfill by recycling and salvaging at least 50% of non-hazardous construction and demolition (C&D) or meet local construction and demolition waste management ordinance, whichever is more stringent. 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 01010 – Summary of Work.

2. Section 01045 – Cutting, Coring and Patching.

3. Section 01125 – Site Safety and Regulatory Requirements

4. Section 01500 – Temporary Facilities.

6. Section 02100 – Site Preparation.

7. Section 03600 – Grouts.


9. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

02070-1
1.02 SELECTIVE SITE DEMOLITION WORK

A. Selective demolition work includes, but is not limited to:

1. General Sitework: Asphalt and concrete paving and slabs, fencing, storm drainage structures, sidewalks, curbs, gutters, concrete walls and slabs, signs, bollards, utilities, irrigation systems, and landscaping. Demolition of existing sitework structures that conflict with the new Work shown on the Drawings.

2. Partial demolition of pavements to allow new work to connect, for conduit penetrations, or otherwise modify existing structures.

1.03 PROTECTION

A. Maintain free and safe passage for all on-site personnel at all times.

B. Prevent movement or settlement of structures or surrounding areas to demolition work. Provide bracing, shoring, and debris barriers as required and assume responsibility for the safety and support of affected structures.

C. Protect existing finishes, equipment, and adjacent work which remains from damage. Cut finish surfaces such as masonry, tile, plaster, wood, gypsum wallboard, concrete, or metals by methods which will terminate or join work in a straight line at an appropriate point of division.

D. Protect existing park features, landscaping and irrigation systems to remain.

E. Cease operations and notify the ENGINEER immediately if the safety of any structure or utility appears to be endangered. Take additional precautions to properly support such structure(s) and do not resume demolition operations until safety is restored.

F. Utility locations shown on the Drawings are approximate and may vary from where they are shown. The CONTRACTOR shall contact Underground Service Alert (800-642-2444) and obtain field marking to determine the exact locations of utilities owned by agencies. Record, preserve and protect the field markings.

G. Blasting and the use of explosives shall not be permitted for any demolition work.

H. Promptly repair any damage caused to facilities or landscaping by demolition operations as directed by the ENGINEER and at no additional cost to the OWNER. The minimum quality of repair shall be equal to that which existed prior to the start of the CONTRACTOR’s work.

1.04 SCHEDULING

A. Schedule all demolition work to meet the requirements of Section 01100 and minimize disruption to the work of OWNER staff and the public.

1.05 CONDITION OF STRUCTURES

A. Conditions existing at the structures and areas to be demolished at the time of the bid period shall be maintained by the OWNER insofar as practical. Minor variations in small piping, electrical equipment, and miscellaneous materials shall be expected by the CONTRACTOR and this work shall be completed at no additional cost to the OWNER.
1.06 DISPOSAL OF MATERIAL REMOVED BY DEMOLITION WORK

A. All materials removed by demolition work shall become the property of the CONTRACTOR as soon as actual demolition is initiated. The CONTRACTOR shall remove demolition materials as soon as possible but in no case shall store materials removed by demolition on the project site longer than 5 working days. Demolition materials other than concrete and soil shall be properly contained in covered waste disposal bins. Concrete and soil shall be tightly stockpiled until removal.

1.07 SUBMITTALS

A. All submittals shall be in accordance with Section 01300.

B. Submit letters to the ENGINEER showing proposed start and finish dates, times, and detailed descriptions of demolition work a minimum of 14 days in advance of such work.

C. Construction Management Plan

1. CONTRACTOR shall develop a construction management plan to recycle and salvage at least 50% of non-hazardous debris demolition or meet local construction and demolition waste management ordinance, whichever is more stringent. Where a local jurisdiction does not have a construction and demolition waste management ordinance, submit a construction waste management plan for approval by the enforcement agency.

2. Plan shall monitor construction waste by volume or weight; but not both. Plan shall monitor all recycled debris and mixed debris. Excavated soil and land-clearing debris are not included in this requirement.

   a. Plan shall identify the materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale.

   b. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.

3. CONTRACTOR shall divert 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing for reuse or recycling.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. See Section 03600 for non-shrink cementitious and epoxy grout to be used for patching.

PART 3 EXECUTION

3.01 SEQUENCE OF WORK

A. The CONTRACTOR shall mark all facility components to be demolished in advance of demolition to permit ENGINEER review. The purpose of this requirement is to provide an opportunity to avoid unnecessary or erroneous demolition. The CONTRACTOR remains responsible for demolition as shown and specified in the Contract Documents.
C. The CONTRACTOR shall schedule a meeting and meet with the ENGINEER at the site of the proposed demolition in advance of the start of demolition. CONTRACTOR shall ensure that subcontractors are present if necessary or requested by the ENGINEER.

3.02 **REMOVAL OF STRUCTURES**

A. CONTRACTOR shall remove all components of structures shown or required to be removed.

3.03 **REMOVAL AND ABANDONMENT OF BURIED PIPING**

A. Unless specifically noted on the Drawings to be abandoned-in-place, all abandoned buried piping shall be excavated and removed from the site.

B. Piping specifically noted to be abandoned-in-place shall have each open end filled with concrete grout to a minimum distance of 5 feet or 5 pipe diameters, whichever is greater, unless otherwise specified or shown.

3.04 **DEMOLITION OF AND ADJOINING TO ARCHITECTURAL FINISHES**

A. Demolition of finishes where adjoining finishes are to remain shall be carefully completed. Such special finishes include terrazzo, tile, stone, concrete, plaster, wood paneling, metal paneling, and drywall. Cuts shall be even, straight, and parallel to surrounding building lines. Overcuts shall not be permitted unless approved by the ENGINEER.

3.05 **WASTE SORTING AND DISPOSAL**

A. Provide for grinding of all existing asphaltic concrete paving on site to be reused for base rock on site or hauled off site by a paving recycler for grinding and reuse.

B. Provide separate waste collection containers for mixed debris for landfill and recycled materials. Materials to be considered for separate collection include cardboard, metal, plastic, clean wood, glass, gypsum wallboard, carpet and insulation.

C. Designate a particular area on site for collection and sorting of materials.

D. Co-mingling of recycled debris may be allowed confirming to the local county trash/recycling policy.

E. Identify construction haulers and recyclers to handle the designated materials. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

F. Subcontractors may be required by CONTRACTOR to recycle their own waste products off site; require subcontractors to provide documentation of recycling by weight or volume.

3.06 **CLEAN-UP**

A. The CONTRACTOR shall remove from the site all debris resulting from the demolition operations as it accumulates and at least 2 times a week. Upon completion of the immediate demolition work, the CONTRACTOR shall thoroughly clean each area, including dusting, vacuuming, sweeping, and window cleaning.

***END OF SECTION***
SECTION 02100

SITE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Clearing, grubbing, and stripping of existing vegetation over all areas to be graded, excavated, trenched, filled, or as otherwise shown on the Drawings and as specified.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 02070 – Selective Demolition.


4. Section 02221 – Trenching, Backfill and Compacting.

5. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. All work shall conform to applicable local and state laws. Coordinate work with owning utilities as required in the area of work.

B. The CONTRACTOR shall confirm that the existing site substantially matches the Drawings and conditions during bid prior to beginning work. Prior to beginning work under this Section the CONTRACTOR shall meet with the ENGINEER to identify and discuss those materials to be removed and disposed of by the CONTRACTOR.

C. All materials not removed shall be protected by the CONTRACTOR and repaired or replaced if damaged by the CONTRACTOR.

D. Complete erosion and dust control measures as described in Sections 01046 and 01575.

3.02 CLEARING AND GRUBBING

A. All brush, bushes, grasses, roots, debris, and other unacceptable material shall be cut, grubbed, removed, and disposed of from areas to be occupied by buildings, structures, roads, pipelines, ductbanks, fills, conduits, engineered fills, retaining walls, and any other areas to be stripped. Vegetation with a diameter of up to 1-inch shall be removed to a minimum depth of 6 inches below finished grade. Vegetation with a diameter greater than
1 inch shall be removed to a minimum depth of 18 inches below finished grade. Stockpile areas shall be cleared before use.

B. Protect all trees and bushes, unless designated on the Drawings to be removed, from damage by all construction operations by erecting suitable barriers, or by other comparable means. Unless otherwise shown on the Drawings, suitable barriers such as orange plastic woven fencing shall be placed at or beyond the drip lines of trees and bushes.

C. Areas outside the limits of clearing shall be protected and no equipment or materials shall be stored in or allowed to damage these areas.

D. Drawing indicated existing facilities, and those field visible (during the bid period) pipe, conduit, structural members, concrete slabs and vaults, appurtenances, poles, concrete, timber, and other utility structures shall be excavated, cut, and removed from areas to be occupied by buildings, structures, fills, roads, pipelines, and other areas to be stripped. These materials shall be disposed of as specified herein.

E. No stumps, trees, limbs, debris, or brush shall be buried in any fills or embankments.

3.03 STRIPPING

A. Strip the top 3-inch layer of surface soils (topsoil) from all areas to be occupied by buildings, structures, pavement, pipes, roadways, and all areas to be excavated or filled. Avoid mixing the top layer with lower layers and stockpile that quantity of clean topsoil necessary to provide a 6-inch compacted layer of topsoil over all areas to be landscaped. Soil so stockpiled shall be free from brush, roots, trash, large stones, and other extraneous material and protected from erosion. Fence and cover as required to protect this soil from contamination until reuse. Excess clean soils may be permanently stockpiled at the project site where designated on the Drawings until that area is filled; additional soils shall be removed from the site.

B. All exposed stripped surfaces shall be kept moist to avoid shrinkage prior to further overlying earthwork or construction.

3.04 DISPOSAL OF MATERIALS

A. Disposal of non-contaminated materials shall be performed per the requirements of Section 02070.

B. All contaminated surface soils, tree trunks, limbs, roots, stumps, brush, foliage, and other vegetation, pipe, conduits, concrete, construction materials, and other buried utilities which are cleared, grubbed, or stripped shall be hauled to a suitable landfill or offsite disposal site, in compliance with local and state laws.

C. Burning of cleared and grubbed materials will not be permitted.

***END OF SECTION***
SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Excavation, backfill, fill and grading including, but not necessarily limited to:
   excavation for structures, vaults, retaining walls, handholes, manholes, conduits,
   cables, raceways and ducts, pipes, paving; backfilling and fill; embankments and
   grading; slope protection; import of fill; stripping, storing and spreading topsoil for
   areas to be landscaped; disposal and stockpiling of waste and surplus materials;
   and all related work.

2. The CONTRACTOR shall perform exploratory excavations (potholes) to locate
   existing pipelines, electrical ducts, concrete encasement, and other utilities prior
   to trenching and general excavation.

3. No structure may be backfilled until the entire lateral load system (e.g., roof
   system, floor system, beams, walls, etc.) is in place and able to prevent wall
   deflection.

B. Related Sections. See Related Sections for additional requirements applicable to this
   Section (typical).

   1. Section 02070 – Selective Site Demolition.

   2. Section 02100 – Site Preparation.


   4. Drawings and general provisions of the Contract, including General Conditions,
      Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

   1. C131 Test Method for Resistance to Degradation of Small-size Coarse Aggregate by
      Abrasion and Impact in the Los Angeles Machine.


   3. D422 Test Method for Particle-Size Analysis of Soils.

   4. D1556 Test Method for Density and Unit Weight of Soil in Place by the Sand Cone
      Method.

   5. D1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate
      Mixtures Using 10-lb (4.54 kilogram) Rammer and 18-inch (457 millimeter) Drop.


8. D3017 Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).


1.03 SUBMITTALS

A. All submittals shall be in accordance with Section 01300.

B. Submit the source and soils data for off-site sources of import fill materials. Soils data shall include as a minimum: particle size analysis, liquid limit, plastic limit, plasticity index, moisture content, sand equivalent value, classification, and unit weight.

C. Provide representative 20 pound soil samples for testing by the ENGINEER when requested.

D. Exploratory excavation data as it is collected.

1.04 SOIL TESTING/QUALITY ASSURANCE

A. Where referred to in the Specifications, "compaction" or "relative compaction" shall refer to in-place dry density of soil expressed as a percentage of the maximum dry density of the same material as determined by ASTM D1557.

B. Prior to the general placement of any materials and during such placement, the ENGINEER will select areas within the limits of any work for testing the degree of compaction obtained. The CONTRACTOR shall cooperate fully in obtaining the information desired. The frequency of testing shall be as determined and completed by the ENGINEER. Testing shall be in accordance with the ASTM references listed above. The costs and related work associated with all initial testing shall be completed and paid for by the OWNER.

C. If test results are unsatisfactory, all costs involved in correcting the deficiencies in compacted materials shall be borne by the CONTRACTOR without additional cost to the OWNER. Costs of retesting and re-inspection required as the result of inadequate, insufficient, or incomplete work by the CONTRACTOR shall be deducted from the Contract Price.

1.05 EXPLORATORY EXCAVATIONS (POTHOLING)

A. The CONTRACTOR shall perform exploratory excavations to locate existing pipelines, electrical ducts, concrete encasement, and other utilities prior to trenching and general excavation. On the Drawings and in these Specifications "pitholing", "exploratory excavations", and similar terms have the same meaning. Reliable and accurate information on buried utilities is lacking in most areas. The objective of the exploratory excavations is to reduce the number of field changes due to unforeseen alignment conflicts, allow design adjustments prior to submittal preparation, record data on existing utilities, and aid the CONTRACTOR in completing new improvements.
B. Exploratory excavations in paved areas shall be repaired with a minimum of 2-inches of cold asphalt in asphalt concrete pavement areas and 3-inches of concrete in concrete pavement areas. Provide greater repairs if required by the authorities having jurisdiction. The CONTRACTOR shall survey underground utilities as part of the exploratory excavation and report apparent size and type, top of utility elevation, bottom of utility elevation, and surveyed horizontal location (with northing and easting coordinates to the project coordinate system). In paved areas the thickness of asphalt pavement or concrete, and the underlying aggregate base rock shall be reported. Exploratory excavation data shall be submitted to the ENGINEER in accordance with Section 01300 within 5 working days of completion of individual exploratory excavations and also with other relevant fabrication and product submittals. Exploratory excavation data shall be submitted on separate forms using the Table 02200-1 form.

C. All field markings of buried utilities made by the OWNER or other agencies responding to USA-type requests shall be permanently recorded by the CONTRACTOR onto draft record drawings. CONTRACTOR shall use this information and re-establish destroyed or obscured field markings prior to excavation and new USA-type requests.

PART 2 PRODUCTS

2.01 MATERIALS

A. See Sections 02230 for fill, backfill, bedding, drain, and embedment materials.

B. Concrete fill used for embedment, a working mat, or overexcavation repair shall be Class A concrete meeting the requirements of Section 03300.

2.02 FILTER FABRIC

A. Filter fabric shall conform to Caltrans Standard Specifications Section 88 for edge drains and underdrains, except that references to measurement and payment shall not apply. Filter fabric shall be Mirafi 140N, DeWitt 6 ounce Filter Fabric, or equal.

PART 3 EXECUTION

3.01 GENERAL EXCAVATION AND CONSTRUCTION REQUIREMENTS

A. Excavation shall be made to such widths as will give safe room for construction of structures and utilities including bracing, supporting, pumping, and draining. The bottom of the excavations shall be rendered firm and dry.

B. Existing soils at the project site that meet the requirements of these Specifications shall be used to the maximum extent possible. Imported soils, inferior in the sole opinion of the ENGINEER, shall not be used as a replacement for soils at the site that otherwise meet the requirements of these Specifications.

C. Under all concrete slabs-on-grade that are driven upon and all asphalt concrete pavements there shall be provided a minimum depth of 9-inches of class 2 aggregate base unless greater depths are shown on the Drawings.

D. The CONTRACTOR shall coordinate crossings of new and existing utilities, including work among different trades. Piping and duct banks shall be deeper than the minimum depths indicated on the Drawings where required at crossings.
E. The CONTRACTOR, as a minimum, shall have a “spotter” individual at all times at each excavation when excavating within 10 feet of any known utility (either shown on the Drawings, reference drawings, or marked in the field as a USA marking). The purpose of the spotter is to observe the progress of the excavation, communicate with the excavation equipment operators, and look for signs of buried utilities and structures so that damage to such utilities and structures is avoided.

F. The CONTRACTOR shall construct temporary ditches, embankments, barriers, pumping systems, and other means to keep surface water runoff and subsurface water percolation out of excavations.

G. Should any question arise concerning earthwork that is not described in these Specifications, the ENGINEER will enforce applicable requirements written in the Standard Specifications for Public Works Construction and State of California - Department of Transportation, Standard Specifications (versions in place as of the bid date) at the sole discretion of the ENGINEER.

H. Soils not meeting the requirements of engineered fill as defined in Section 02230 shall not be used under or within 10 feet of any structure, or any place where engineered fill is designated on the Drawings or in the Specifications.

3.02 PREPARATION OF SUBGRADE – ALL TYPES

A. Loose materials shall be removed from all cut surfaces. Unsuitable soils for foundations of structures, embankments, trenches, and fills shall be removed and replaced with engineered fill. Unsuitable soils include organic-laden topsoil (containing more than 3 percent of organic matter by weight), loose or soft soils, and undocumented fill. Excavations required to demolish pipelines and structures shall be replaced with engineered fill.

B. Exposed soils shall be over-excavated to a minimum depth of 12 inches, scarified to a minimum depth of 12 inches and moistened to 2 percent above optimum moisture content, and re-compacted to a minimum of 90 percent relative compaction based on ASTM D1557 prior to placing any required backfill, engineered fill, Class 2 permeable, drain rock, sand, concrete, or aggregate base.

C. Traffic shall be minimized on excavated subgrades prior to placement of the engineered fill, aggregate base, or concrete foundations. Sandy subgrades shall be proof rolled to achieve a competent subgrade prior to the placement of engineered fill, aggregate base, or concrete foundations. Clay or clayey subgrades shall be excavated within the final 6 inches using a smooth edge bucket or blade, or hand excavation.

D. The bottom of all excavations shall be rendered firm and dry (except as noted).

E. Any visible cracks in the bottom of the footing excavations shall be closed by wetting prior to construction of the foundation.

3.03 COMPACTION - GENERAL

A. Compaction of backfills, engineered fill, subgrade soils, aggregate base, and other soil materials shall be accomplished to the following density criteria in horizontal lifts of thicknesses noted, or if not noted, as compatible with the compaction equipment used.

<table>
<thead>
<tr>
<th>Material</th>
<th>Minimum Percent Relative Compaction (ASTM D1557)</th>
<th>Maximum Uncompacted Lift Thickness (Inches)</th>
</tr>
</thead>
</table>

02200-4

City of Sacramento
Garcia Bend Park Restroom Restoration Project

Page 58 of 312
100% Submitted
<table>
<thead>
<tr>
<th>Material</th>
<th>Minimum Percent Relative Compaction (ASTM D1557)</th>
<th>Maximum Uncompacted Lift Thickness (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subgrade soil (minimum of 12-inch depth) below roads,</td>
<td>95</td>
<td>8</td>
</tr>
<tr>
<td>parking lots, sidewalks, foundation and slabs, and asphalt pathways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not within tree drip lines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregate base course below asphalt or concrete pavement</td>
<td>95</td>
<td>8</td>
</tr>
<tr>
<td>Utility bedding and embedment</td>
<td>90</td>
<td>8</td>
</tr>
</tbody>
</table>

B. Fine-grained fill and backfill soils shall be aerated and placed at moisture contents of 2 percent over optimum. Coarse-grained fill including all engineered and aggregate base fill shall be placed at a moisture content near optimum.

C. Flooding or ponding of any fill or backfill materials and jetting of materials will not be permitted.

D. No placement or compacting shall be done when either the previously placed or the new materials are too wet from rain or excess application of water to obtain the compaction specified. At such time, work shall be suspended until the previously placed and/or new materials have dried sufficiently to permit proper compacting.

E. Uniform compaction of embankment slope faces may be developed either by: (1) overbuilding the embankments and then trimming to final slope configuration, or (2) by close attention to slope face rolling and compaction which should be accomplished after each 4 feet of vertical embankment has been built.

3.04 EXCAVATION BELOW GRADE

A. Whenever unsuitable material is encountered at the bottom of the excavation, the subgrade shall be removed below grade to the extent required by the ENGINEER and a layer of engineered fill material shall be placed to bring the bottom of the excavation to grade. Engineered fill shall be placed and compacted per Paragraph 3.03A. All work specified in this paragraph shall be performed by the CONTRACTOR at no additional cost to the OWNER when the over-excavation which is required by the ENGINEER is less than 18 inches below the limits shown. No payments for over-excavation and engineered fill shall be made when the unsuitable material is created by failure of the CONTRACTOR to provide proper groundwater control, protection from rainfall, drainage, utility breakage, or other actions within the control of the CONTRACTOR.

B. If the CONTRACTOR excavates below grade through error or for its own convenience, the CONTRACTOR may be directed by the ENGINEER to replace the over-excavated material with engineered fill or lean concrete as acceptable to the ENGINEER. The work of excavating below grade and furnishing and placing the acceptable material shall be performed at no additional cost to the OWNER.
3.05 EXCAVATION, EMBEDMENT, AND BACKFILLING FOR PIPELINES AND CONDUITS BENEATH STRUCTURES

A. Pipelines beneath structures shall be concrete encased to no less than 1 foot beyond the extent of the structure footing.

3.06 TRENCH EXCAVATION, EMBEDMENT, AND BACKFILLING

A. Excavation for all trenches required for the installation of pipes and ducts shall be made to the depths and widths indicated on the Drawings. Safe and suitable access shall be provided for all excavations in accordance with CAL-OSHA and other applicable government regulations. The CONTRACTOR shall render the bottom of the excavations firm and dry. It is the CONTRACTOR's responsibility to support or temporarily relocate, and protect existing utilities across trenches and other narrow structural excavations.

B. Rock and/or boulders shall be removed to a minimum clearance of 6 inches around the bottom and sides of all the pipes and ducts being installed.

C. Pipes and ducts are to be installed in bedding or encased in concrete. The trench may be excavated by machinery to or just below the designated subgrade, provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

D. Pipe Bedding, Embedment, and Backfill

1. After completion of the trench excavation and proper preparation of the trench bottom, bedding material shall be placed and compacted on the trench bottom for support under the pipe. Bell holes and similar excavations for appurtenances shall be hand excavated. All pipe shall be installed in such a manner as to ensure full support of the pipe barrel over its entire length and under appurtenances.

2. Material for bedding and embedment shall be as specified in Section 02230 unless otherwise shown on the Drawings. Place and/or shape material for bedding the pipe and fittings.

3. Laying and joining of pipe shall be as specified for the individual type of pipe. After joining flexible pipe it may be adjusted to line and grade as noted on the Drawings.

4. As soon as practicable after pipe has been installed and joined, embedment material shall be placed around and over the pipe to the limits as noted on the Drawings. It shall be placed with equipment and by hand, and compacted by suitable hand-operated equipment, in lift thicknesses and compaction as defined above, paying particular attention to bell holes, sling holes, and elimination of voids and to ensure uniform support for the pipe.

5. All pipe shall be embedded to a minimum height of 12 inches over the top of the pipe. The pipe bedding material shall be brought up in hand-operated equipment in compacted lifts not exceeding the thickness specified in Paragraph 3.03A, approximately equal on each side of the pipe. The compaction shall be done so as to not disturb or damage the pipe or fittings.

6. Jetting or flooding shall not be permitted.

E. The CONTRACTOR shall meet the following criteria when its installation method includes the use of a trench "box":
1. When installing rigid pipe (reinforced concrete pipe, concrete cylinder pipe, cast iron pipe, etc.), any portion of the box extending below mid-diameter shall be raised above this point prior to moving the box ahead to install the next pipe. This is to prevent the separation of installed pipe joints due to movement of the box.

2. When installing flexible pipe (PVC, steel, ductile iron, corrugated metal pipe, etc.), the bottom of the box shall not extend below mid-diameter. This is to prevent loss of soil between the box and the pipe bedding which could result in excessive deflection of the installed pipe.

F. Backfilling over pipes or ducts shall begin not less than 2 days after placing concrete encasement.

G. Where pipe or ducts are to be installed in fill of any type, including engineered fill, fill shall be placed and compacted to at least 2 feet above the top of pipe or duct and then re-excavated for pipe or duct installation.

H. As soon as practicable after the pipe or duct has been installed and jointed, embedment and backfilling shall begin and be prosecuted expeditiously.

I. Excess material shall be removed from the site or stockpiled per Section 02100 if the material is not usable in other areas of work.

J. Along the length of all pipeline and duct trenches, in the trench bottom at 300 ft intervals or at manholes and structures - whichever is less, the CONTRACTOR shall construct impervious dams (bulkheads) of clay or concrete to obstruct the free flow of any water after construction is completed. Provide impervious dams at all points where a pipe trench enters an excavated area and where a permanent underdrain system is installed.

K. The maximum length of on-site trench excavation in advance of the pipe laying operation shall be 100 feet, and the maximum amount of trench remaining open without backfill shall be 100 feet. No trench in public areas shall be left open during periods when the CONTRACTOR is not at the site of Work. Trenches in these areas shall either be backfilled and temporarily paved, where applicable, or covered with steel trench plates as specified in the permits of authorities having jurisdiction.

3.07 MISCELLANEOUS EXCAVATION

A. The CONTRACTOR shall perform all the remaining miscellaneous excavation. The CONTRACTOR shall make all excavations necessary to permit the placing of landscaping, for constructing roadways, walks, slabs, parking areas, or any other miscellaneous earth excavation required under this Contract.

3.08 BACKFILLING WITH ENGINEERED FILL, AGGREGATE BASE FILL, AND EMBANKMENT FILL

A. Place engineered fill, aggregate base fill, and class 2 permeable fill, in layers having a maximum thickness and compaction effort as specified in Paragraph 3.03A.

B. Compaction work within 8 feet of structures shall be completed using compaction equipment weighing less than 1,000 pounds. Equipment used to place fill and backfill material within 8 feet of structures shall not have wheels or tracks closer than 8 feet from structures.
3.09 **SPREADING TOPSOIL IN AREAS TO BE LANDSCAPED**

A. Topsoil stored from the original stripping work and imported topsoil as required shall be spread across all areas to the landscaped to the depth shown on the Drawings (approximate depth of 6 inches, plus or minus 1 inch). Topsoil shall be compacted to approximately 85 percent relative compaction.

3.10 **DISPOSAL OF MATERIALS**

A. Excavated material shall not be stacked on any excavation or over buried pipes or structures. Inconvenience to traffic and work by others shall be avoided as much as possible. Excavated material shall be segregated for use in backfilling as engineered fill, permanent on-site storage per Section 02100, or for off-site disposal.

B. Surplus excavated material shall be disposed of by the CONTRACTOR per Section 02200 or off the work site. Any costs associated with the hauling and disposal of this surplus material shall be borne by the CONTRACTOR. If too much suitable fill material is removed from the site, the cost of bringing it back will be the responsibility of the CONTRACTOR.

C. Material which is unsuitable for fill, including rock, cemented materials, boulders, broken concrete, asphalt and other materials, shall be removed and disposed of at the CONTRACTOR's expense at a waste disposal or landfill site conforming to all local, State, and Federal regulations.

3.11 **FILTER FABRIC INSTALLATION**

A. Surfaces to receive filter fabric, immediately prior to placement, shall be free of loose or extraneous material and sharp objects that may damage the filter fabric during installation. Adjacent rolls of filter fabric shall be overlapped a minimum of 18 inches. The preceding roll shall overlap the following roll in the direction the drain material is being spread.

B. Should the fabric be damaged during placement, the torn or punctured section shall be either completely replaced or shall be repaired by placing a piece of fabric that is large enough to cover the damaged area and to meet the overlap requirement above. Damage to the fabric resulting from the CONTRACTOR's vehicles, equipment, or operations shall be replaced or repaired by the CONTRACTOR at its expense.

C. At the top surfaces of drains and underdrains encased in filter fabric, the fabric shall be extended completely over the top of the drain material and extended down one side a minimum of 18 inches.

3.12 **FINISH GRADING**

A. Finish grading in preparation for placing of paving, walks, slabs, hydroseed, landscaping, and appurtenances shall be performed at all places that are indicated on the Drawings, to the lines, grades, and elevations shown and otherwise as acceptable to the ENGINEER. During the process of grading, the subgrade shall be maintained in a well-drained condition. Finish grading for areas underlying paving, walks, structures, and slabs on grade shall be to plus or minus 0.04 feet of the designated grade. Finish grading for areas to be hydroseeded, landscaped or left unimproved shall be completed to within plus or minus 0.16 feet of the designated grade.

B. If at the time of grading it is not possible to place any material in its proper section of the permanent embankment, fill, or excavation, such material shall be stockpiled for later use.
in designated staging areas. No extra payment will be made for the stockpiling or double handling of excavated material.

C. Stones or rock fragments larger than 3 inches in their greatest dimensions will not be permitted in the top 6 inches of the finished subgrade of fills or embankments.

D. In cuts, all loose or protruding rocks or boulders on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings.

3.13 REPORTING AND REPAIR OF DAMAGED UTILITIES

A. The CONTRACTOR shall report all damage to existing or new utilities to the ENGINEER within 1 hour of occurrence. Initial notification may be verbal, written notification to the ENGINEER is required within 4 hours. After the ENGINEER is notified or otherwise aware of the damage to a utility, the CONTRACTOR shall attend a meeting with the ENGINEER, OWNER, and others chosen by the ENGINEER or CONTRACTOR to discuss the method of temporary and permanent repair. Meeting topics may include, at the discretion of the ENGINEER, the repair procedure, firm or organization to complete the repair, water treatment plant operational impacts, and schedule for completion of repairs. If the damaged utility is OWNER owned, the OWNER at its sole discretion may elect to complete the repair with OWNER employees or OWNER-selected firm(s). In such case the actual cost of repairs shall be deducted from any money due, or which may become due, the CONTRACTOR.
**TABLE 02200-1**

**EXPLORATORY EXCAVATION REPORT FORM**

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm Completing Excavation:</td>
<td></td>
</tr>
<tr>
<td>Date of Excavation:</td>
<td></td>
</tr>
<tr>
<td>Assigned Excavation Number:</td>
<td></td>
</tr>
<tr>
<td>Description of Utility:</td>
<td></td>
</tr>
<tr>
<td>Diameter or Dimensions of Utility:</td>
<td></td>
</tr>
<tr>
<td>Apparent Utility Material (example - mortar covered steel, PVC, concrete encased duct bank, ductile iron, galvanized steel, steel CMP, VCP):</td>
<td></td>
</tr>
<tr>
<td>Adjoining Ground Surface Elevation (feet):</td>
<td></td>
</tr>
<tr>
<td>Top of Utility Elevation (feet):</td>
<td></td>
</tr>
<tr>
<td>Bottom of Utility Elevation (feet):</td>
<td></td>
</tr>
<tr>
<td>Surveyed Horizontal Location of Utility Excavation:</td>
<td></td>
</tr>
<tr>
<td>Northing:</td>
<td></td>
</tr>
<tr>
<td>Easting:</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** ATTACH ANNOTATED PORTION OF CONTRACT DRAWING SHOWING UTILITY AND EXCAVATION LOCATION TO THIS FORM

Comments on Excavation (examples - thickness of pavement and road base, groundwater found):  

---

**END OF SECTION***
SECTION 02221

TRENCHING, BACKFILL, AND COMPACTION

PART 1    GENERAL

1.01 DESCRIPTION

A. Work included: Trench, backfill, and compact as specified herein and as needed for installation of underground utilities associated with the Work.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

   1. Section 02100-Site Preparation
   2. Section 02200-Earthwork
   4. Storm Water Pollution Prevention Plan (SWPPP)
   5. Construction Drawings
   6. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in accordance with the established schedule.

C. In addition to complying with requirements of governmental agencies having jurisdiction, comply with the directions of the geotechnical engineer.

1.03 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

PART 2    PRODUCTS

2.01 SOIL MATERIALS

A. Backfill materials:

   1. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 3 inches in greatest dimension, and with not more than 15% of the rocks or lumps larger than 3 inches in their greatest dimension.

   2. Fill material is subject to the approval of the geotechnical engineer, and is that material removed from excavations or imported from off-site borrow areas, predominantly non-expansive soil free from organics and other deleterious matter.
3. Do not permit rocks having a dimension greater than 1 inch in the upper 12 inches of fill.

4. Cohesionless material used for backfill: Provide sand free from organic material and other foreign matter, and as approved by the geotechnical engineer.

5. Where aggregate backfill is called for provide aggregate complying with requirements in Section 19-3 of the California Department of Transportation Standard Specification, 2010 Edition.

2.02 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Subcontractor subject to the approval of the OWNER.

PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FINISH ELEVATIONS AND LINES

A. Comply with pertinent provision of Section 01050.

3.03 PROCEDURES

A. Utilities:

1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Subcontractor prior to trenching. If damaged, repair or replace at no additional cost to the OWNER.

2. If active utility lines are encountered, and are not shown on the Drawings or otherwise made known to the Subcontractor, promptly take necessary steps to assure that service is not interrupted.

3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the OWNER.

4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the OWNER OR ENGINEER and secure his instructions.

5. Do not proceed with permanent relocation of utilities until written instructions are received from the OWNER.

6. Notify the ENGINEER not less than ten days in advance if there are any proposed utility interruptions.

7. Do not proceed with utility interruptions without the OWNER’S written permission.
B. Protection of persons and property:
   1. Barricade and maintain protection in open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
   2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
   3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

C. Dewatering:
   1. Remove all water, including rain water, encountered during trench and substructure work to an approved location by pumps, drains, and other approved methods.
   2. Keep trenches and site construction area free from water.

D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

E. Maintain access to adjacent areas at all times.

3.04 TRENCHING

A. Comply with the pertinent provisions of Section 02200, and with provisions of this Section.

B. Provide sheeting and shoring necessary for protection of the Work and for the safety of personnel.
   1. Prior to backfilling, remove all sheeting.
   2. Do not permit sheeting to remain in the trenches.

C. Open cut:
   1. Excavate for utilities by open cut.
   2. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, backfill the voids remaining after removal of the objects as directed by the geotechnical engineer.
   3. When the void is below the subgrade for the utility bedding, use suitable earth materials and compact to the relative density as directed by the geotechnical engineer and specified in Section 02200.
   4. When the void is in the side of the utility trench or open cut, use suitable earth or sand compacted or consolidated as directed by the geotechnical engineer and specified in Section 02200.
   5. Remove boulders and other interfering objects, and backfill voids left by such removals, at no additional cost to the OWNER.
6. Excavating for appurtenances:
   
a. Excavate for manholes and similar structures to a distance sufficient to leave at least 12 inches clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.
   
b. Over-depth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the geotechnical engineer, and at no additional cost to the OWNER.

D. Trench to the minimum width necessary for proper installation of the utility, with sides as nearly vertical as possible. Accurately grade the bottom to provide uniform bearing for the utility.

E. Cover:

1. Unless otherwise identified on the Drawings, provide minimum trench depth indicated below to maintain a minimum cover over the top of the installed item below the finish grade:
   
a. Areas subject to vehicular traffic:
      1) Sanitary sewers: 36";
      2) Storm drains: 24".
   
b. Areas not subject to vehicular traffic:
      1) Sanitary sewers: 30";
      2) Storm drains: 12".
   
c. All areas:
      1) Water lines: 30";
      2) Natural gas lines: 30";
      3) Electrical cables: 42";
      4) Electrical ducts: 36".
   
d. Concrete encased:
      1) Pipe sleeves for water and gas lines: 24";
      2) Sanitary sewers and storm drains: 12";
      3) Electrical ducts: 24".

2. Where utilities are under a concrete structure slab or pavement, the minimum depth need only be sufficient to completely encase the conduit or pipe sleeve, and electrical long-radius rigid metal conduit riser, provided it will not interfere with the structural integrity of the slab or pavement.

3. Where the minimum cover is not provided, encase the pipes in concrete to 6 inches from outside diameter. Fill void between outside wall of utility and concrete.
with fine sand or other material approved by the geotechnical engineer. Provide concrete with a minimum twenty-eight (28) day compressive strength of 3500 psi. Place warning tape on top of concrete cap longitudinally with the buried utility.

3.05 **BEDDING**

A. Provide bedding as indicated in the city of Palo Alto standard drawing and specifications.

3.06 **BACKFILLING**

A. General:

1. Compaction of trenches shall be according to the project drawings.

2. Do not completely backfill trenches until required pressure and leakage tests have been performed, and until the utilities systems as installed conform to the requirements specified in the pertinent Sections of these Specifications.

3. Except as otherwise specified or directed for special conditions, backfill trenches to the ground surface with selected material approved by the geotechnical engineer.

4. Reopen trenches which have been improperly backfilled, to a depth as required for proper compaction. Refill and compact as specified, or otherwise correct to the approval of the geotechnical engineer.

5. Do not allow or cause any of the Work performed or installed to be covered up or enclosed by work of this Section prior to required inspections, tests, and approvals.

6. Should any of the Work be so enclosed or covered up before it has been approved, uncover all such Work and, after approvals have been made, refill and compact as specified, all at no additional cost to the OWNER.

B. Lower portion of trench:

1. Deposit approved backfill and bedding material in layers of 6 inch maximum thickness, and compact with suitable tampers to the density specified in Section 02200 and the Drawings, until there is a cover of not less than 24 inches over sewers and 12 inches over other utility lines.

2. Take special care in backfilling and bedding operations to not damage pipe and pipe coatings.

C. Remainder of trench:

1. Except for special materials for pavements, backfill the remainder of the trench with material free from stones larger than 3 inches or 1/2 the layered thickness, whichever is smaller, in any dimension.

2. Deposit backfill material in layers not exceeding the thickness specified in Section 02200, and compact each layer to the minimum density specified in Section 02200.
3.07 **COMPACTION**

A. Compact each layer of backfill material according to the project drawings and Section 02200.

3.08 **TEST FOR DISPLACEMENT OF STORM AND SANITARY SEWERS**

A. Check sewers and storm drains to determine whether displacement has occurred after the trench has been backfilled to above the pipe and has been compacted as specified.

B. Flash a light between manholes or, if the manholes have not yet been constructed, between the locations of the manholes, by means of a flashlight or by reflecting sunlight with a mirror.

C. If the illuminated interior of the pipe line shows poor alignment, displaced pipes, or any other defects, correct the defects to the specified conditions and at no additional cost to the OWNER.

3.09 **FIELD QUALITY CONTROL**

A. The geotechnical engineer will inspect and approve open cuts and trenches before installation of utilities, and will make the following tests:

1. Assure that trenches are not backfilled until all tests have been completed.

2. Check backfilling for proper layer thickness and compaction.

3. Verify that compaction test results conform to the specified requirements, and that at each compacted initial and final backfill layer, at least one (1) test for each 100 feet or less of trench length, but no fewer than two (2) tests are performed.

4. Assure that defective work is removed and properly replaced.

***END OF SECTION***
SECTION 03100
CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY
A. Section Includes: Concrete forms and accessories.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).
   1. Section 03250 – Concrete Joints and Joint Accessories.
   2. Section 03200 – Concrete Reinforcement.
   3. Section 03300 – Cast-in-Place Concrete.
   4. Section 03600 – Grout.
   5. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES
A. American Concrete Institute (ACI):
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 318 - Building Code Requirements for Structural Concrete.
   3. ACI 347 – Guide to Formwork for Concrete.

B. American Plywood Association (APA):
   1. Material grades and designations as specified.

1.03 DEFINITIONS
A. Architectural concrete is wall, slab, beam or column concrete which will have surfaces exposed to view in the finished work

1.04 SYSTEM DESCRIPTION
A. Design Requirements:
   1. All forms and shoring shall be designed at no additional cost to the OWNER by a professional Civil or Structural Engineer registered in the State of California.
   2. Formwork shall be designed in accordance with the requirements of ACI 301 and ACI 318 and as recommended in ACI 347 and shall comply with all applicable regulations and codes.
3. The design shall consider any special requirements due to the use of plasticized and/or retarded set concrete.

B. Performance Requirements: All forms shall be designed and constructed to provide a flat, uniform concrete surface requiring minimal finishing or repairs. Form design shall accommodate all of concrete mix designs being used by the CONTRACTOR.

1. Furnish all labor, materials, equipment and incidentals required and design, install and remove formwork for cast-in-place concrete as shown on the Drawings and as specified herein.

2. Secure to forms as required or set for embedment as required, all miscellaneous metal items, sleeves, reglets, anchor bolts, inserts and other items furnished under other Sections and required to be cast into concrete.

1.05 SUBMITTALS

A. All submittals shall be in accordance with Section 01300. Product Details: Submit to the ENGINEER, product data showing materials of construction for:

1. Form release agent
2. Form ties
3. Bond breakers

B. Shop Drawings

1. Location and sequence of the concrete placements.

2. Review of pour sequence, form system and panel layout shall be for appearance and strength of the completed structure only. Favorable review by the ENGINEER of forming plans or procedures shall not relieve the CONTRACTOR of responsibility for the strength, safety or correctness of methods used, the adequacy of equipment, or carrying out the work in full compliance with the requirements of the Drawings and as specified herein.

C. Samples

1. The CONTRACTOR shall demonstrate to the ENGINEER on a designated area of the concrete substructure exterior surface that the form release agent will not adversely affect concrete surfaces to be painted, coated or otherwise finished and will not affect the forming materials. This demonstration shall include the application of these finishes in accordance with the requirements of the Contract Documents over areas of at least 16 square feet each.

D. Quality Assurance/Control

1. Certify that all forms and shoring are designed by a professional Civil or Structural Engineer registered in the State of California.

1.06 QUALITY ASSURANCE

A. The CONTRACTOR shall construct one sample concrete wall 4 feet high by 8 feet long by 8 inches thick. The sample wall shall be complete with the form tie pattern and finish as specified. The wall will be viewed by the ENGINEER in the presence of the
PART 2 PRODUCTS

2.01 MATERIALS

A. Forms for cast-in-place concrete shall be made of wood, metal, or other approved material. Wood forms for architectural concrete and all surfaces in contact with water shall be new and unused and new plywood shall be on such forms for each use. Construct wood forms of sound lumber or plywood of suitable dimensions and free from knotholes and loose knots. Where used for exposed surfaces, dress and match boards. Sand plywood smooth and fit adjacent panels with tight joints. Metal forms may be used when approved by the ENGINEER.

C. Flatwork Forms

1. Set form to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of Work so that forms can remain in place for twenty-four hours after concrete placement.

2. Check completed formwork for grade and alignment to following tolerances:
   a. Top of forms not more than one-eighth inch in ten feet vertical elevation.
   b. Vertical face on longitudinal axis not more than one-fourth inch in ten feet horizontal width.
   c. Circular or curved formwork shall be continuous, complete radii as indicated on Drawings. No straight segments in circular/curved formwork shall be accepted.

E. Rustications shall be at the location and shall conform to the details shown on the Drawings. Moldings for chamfers and rustications shall be milled and planed smooth. Rustications and corner strips shall be of a nonabsorbent material, compatible with the form surface and fully sealed on all sides to prohibit the loss of paste or water between the two surfaces.

F. Form Release Agent

1. Coat all forming surfaces in contact with concrete which will not be painted, using an effective, non-staining, non-residual, water based, bond-breaking form coating unless otherwise noted. Form release agents used in potable water containment structures shall be suitable for use in contact with potable water, shall be non-toxic and free of taste or odor, and in compliance with ANSI/NSF61.

G. Concrete surfaces which are to be painted shall be formed with hard plastic finished plywood or a similar material which does not require a form release agent unless the CONTRACTOR can substantiate to the satisfaction of the ENGINEER that the form release agent will not remain on the formed surface after it is stripped.

H. Form Ties
1. Form ties encased in concrete shall be designed so that, after removal of the projecting part, no metal shall remain within 1-1/2-in of the face of the concrete. The part of the tie to be removed shall be at least 1/2-in diameter or be provided with a wood or plastic cone at least 1/2-in diameter and 1-1/2-in long. Form ties in concrete exposed to view shall be the cone-washer type.

2. Flat bar ties for panel forms shall have plastic or rubber inserts having a minimum depth of 1-1/2-in and sufficient dimensions to permit proper patching of the tie hole.

3. Ties for liquid containment structures shall have an integral waterstop that is welded to the tie. Tie rods with carbon content less than 0.25 percent shall be used for this application.

4. Common wire shall not be used for form ties.

5. In liquid containment structures, form tie systems other than those requiring integral waterstops may be used. As a minimum, the alternate system shall comply with the following:
   a. Tapered through-bolts at least 1-in in diameter at smallest end or through-bolts that utilize a removable tapered sleeve of the same minimum size. The smallest end shall be located on the non-liquid bearing wall face.
   b. Coat tapered rubber plug with NSF61-approved epoxy bonding agent and insert in form tie hole 3-in from the non-liquid bearing wall face.
   c. Fill both sides of taper tie hole with non-shrink cement grout.
   d. Obtain ENGINEER’s acceptance of system and spacing of ties prior to ordering or purchase of forming.

PART 3 EXECUTION

3.01 EXAMINATION

A. Forms for walls shall have removable panels at the bottom for cleaning, inspection and joint surface preparation. Forms for wall heights in excess of 16 feet shall have closable intermediate inspection ports. Tremies and hoppers for placing concrete shall be used to allow concrete inspection, prevent segregation and prevent the accumulation of hardened concrete on the forms above the fresh concrete.

B. Confirm dimensions for all concrete equipment pads (for all types of equipment, electrical, instrumentation, mechanical, etc.) with actual equipment to be installed and installation details and anchorage calculations prior to forming. Change sizes of equipment pads to match actual equipment (larger or smaller) as required at no additional cost to the OWNER.

3.02 PREPARATION

A. Wood forms in contact with concrete which are not to be painted shall be coated with an effective release agent prior to form installation.

B. Steel forms shall be thoroughly cleaned and mill scale and other ferrous deposits shall be sandblasted or otherwise removed from the contact surface for all forms, except those
utilized for surfaces receiving a rough finish. All forms shall have the contact surfaces coated with a release agent unless they are to be painted.

3.03 INSTALLATION

A. General

1. Forms shall be used for all cast-in-place concrete including sides of footings except for pipe and conduit encasements where concrete may be placed directly against the side of the trench. Forms shall be constructed and placed so that the resulting concrete will be of the shape, lines, dimensions and appearance indicated on the Drawings.

2. Molding, bevels, or other types of chamfer strips shall be placed to produce blockouts, rustications, or chamfers as shown on the Drawings or as specified herein. Chamfer strips shall be provided at horizontal and vertical projecting corners to produce a 3/4-in chamfer. Rectangular or trapezoidal moldings shall be placed in locations requiring sealants where specified or shown on the Drawings. Sizes of moldings shall conform to the sealants manufacturer's recommendations.

3. Forms shall be sufficiently rigid to withstand construction loads and vibration and to prevent displacement or sagging between supports. Construct forms so that the concrete will not be damaged by their removal. The CONTRACTOR shall be entirely responsible for the adequacy of the forming system.

4. Form material that is allowed to be reused in unexposed conditions shall have all surfaces in contact with concrete thoroughly cleaned, all damaged places repaired, all projecting nails withdrawn and all protrusions smoothed. Reuse of wooden forms for other than surfaces not exposed to view will not be permitted.

5. Metal items such as rebar, wire, or plates used to support pipe penetrations, and pipe embedments shall have minimum clearance of 1-inch from reinforcing steel bars.

B. Form Tolerances

1. Forms shall be surfaced, designed and constructed in accordance with the recommendations of ACI 347 and shall meet the following additional requirements for the specified finishes.

2. Formed Surface Exposed to View: Edges of all form panels in contact with concrete shall be flush within 1/32-in and forms for plane surfaces shall be such that the concrete will be plane within 1/16-in in 4-ft. Forms shall be tight to prevent the passage of mortar, water and grout. The maximum deviation of the finish wall surface at any point shall not exceed 1/4-in from the intended surface as shown on the Drawings. Form panels shall be arranged symmetrically and in an orderly manner to minimize the number of seams.

3. Formed surfaces not exposed to view or buried shall meet requirements of Class "C" Surface in ACI 347.

4. Formed rough surfaces including mass concrete, pipe encasement, electrical duct encasement and other similar installations shall have no minimum requirements for surface smoothness and surface deflections. The overall dimensions of the concrete shall be plus or minus 1-in.
5. Formed Concrete Surfaces to Receive Paint: Surface deflections shall be limited to 1/32-in at any point and the variation in wall deflection shall not exceed 1/16-in per 4-ft. The maximum deviation of the finish wall surface at any point shall not exceed 1/4-in from the intended surface as shown on the Drawings.

6. All textured faces or rustications to be exposed to view shall be straight, plumb and true with a variation of no more than 1/4-in in 10-ft measured in any direction.

C. Removal of Forms

1. The CONTRACTOR shall be responsible for all damage resulting from removal of forms. Forms and shoring for structural slabs or beams shall remain in place in accordance with ACI 301 and ACI 347.

2. Except as otherwise specifically authorized by the ENGINEER, forms shall not be removed before the concrete has attained the following percentage of its specified design strength, nor before reaching the following time after completion of concrete placement (whichever is the longer):

<table>
<thead>
<tr>
<th>TABLE 03100-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINIMUM TIME TO FORM REMOVAL</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Forms for</td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td>Sides of footings, slab on grade, grade beams, and encasements</td>
</tr>
<tr>
<td>Curbs and slabs</td>
</tr>
</tbody>
</table>

3. Shores for elevated slabs and beams shall not be removed until the concrete has attained its specified design strength.

3.04 FIELD QUALITY CONTROL

A. Inspection

1. The ENGINEER shall be notified when the forms are complete and ready for inspection at least 12 hours prior to the proposed concrete placement.

2. CONTRACTOR shall ensure that all metal pipeline embeds are separated from form ties and rebar by a minimum of 1-inch to keep pipelines electrically isolated.

3. Failure of the forms to comply with the requirements specified herein, or to produce concrete complying with requirements of this Section, shall be grounds for rejection of that portion of the concrete work. Rejected work shall be repaired or replaced as directed by the ENGINEER at no additional cost to the OWNER. Such repair or replacement shall be subject to the requirements of this Section and Section 03922.

***END OF SECTION***
SECTION 03200

CONCRETE REINFORCEMENT

PART 1  GENERAL

1.01  SUMMARY

A. Section Includes: Concrete Reinforcement.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.
2. Section 03250 – Concrete Joints and Joint Accessories.
3. Section 03300 – Cast-in-Place Concrete.
4. Section 03600 – Grout.
5. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02  REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
3. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
4. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

B. American Concrete Institute (ACI):

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 315 - Details and Detailing of Concrete Reinforcement.
3. ACI 318 - Building Code Requirements for Structural Concrete.
C. Concrete Reinforcing Steel Institute (CRSI):

D. American Welding Society (AWS):
   1. AWS D1.4 - Structural Welding Code Reinforcing Steel.

E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Product Data: Submit to the ENGINEER, in accordance with Section 01300, product data showing materials of construction for:
   1. Reinforcing steel.

B. Shop Drawings: Submit to the ENGINEER, in accordance with Section 01300, shop drawings showing details of installation for:
   1. Reinforcing steel placing drawings. Placement drawings shall conform to the recommendations of ACI 315 and shall not be copies of the Contract Drawings. New scaled drawings shall be prepared showing plans, all vertical structure elevations, sections, and details as required to clearly delineate the reinforcing. All reinforcement in a concrete placement shall be included on a single placement drawing or cross-referenced to the pertinent main placement drawing. The main drawing shall include bar lists, schedule, bending details, placing plans and elevations, clear concrete cover, splice locations, splice length, and the additional reinforcement (around openings, at corners, etc.) shown on the standard detail sheets. Bars to be of special steel or special yield strength are to be clearly identified.
   2. Bill of material (bar list). Clearly show the placement of each bar listed in the bill of materials on the placement drawings.
   3. Bar bending details. The bars shall be referenced to the same identification marks shown on the placement drawings. Include standard bending diagrams in the submittal, as applicable. Bars to be of special steel or special yield strength shall be clearly identified.

C. Samples
   1. Two samples of each type of mechanical reinforcing steel splicers.

D. Quality Assurance/Control: Submit test reports, in accordance with Section 01300, of each of the following items:
   1. Certified copy of mill test on each steel proposed for use showing the physical properties of the steel and the chemical analysis.
   2. Certified copy of test reports for each foreign manufactured steel proposed for use in the fabrication of reinforcement. The tests shall be specifically made for
this project at the expense of the CONTRACTOR by a domestic independent testing laboratory certified to perform the tests. The testing shall be for conformity to the applicable ASTM standard.

3. Welder's certification. The certification shall be in accordance with AWS D1.4 when welding of reinforcement required.

1.04 QUALITY ASSURANCE

A. Provide services of a manufacturer's representative, with at least 2 years experience in the use of the reinforcing fibers for a construction meeting prior to the first use and for assistance during the first placement of the material.

B. CONTRACTOR shall ensure that all metal pipeline embeds are separated from form ties and rebar by a minimum of 1-inch, in order to keep pipelines electrically isolated.

1.05 DELIVERY, STORAGE AND HANDLING

A. Reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.

B. Reinforcing steel shall be shipped and stored with bars of the same size and shape fastened in bundles with durable tags, marked in a legible manner with waterproof markings showing the same “mark” designations as those shown on the submitted placement drawings.

C. Reinforcing steel shall be stored off the ground, protected from moisture and kept free from dirt, oil, or other injurious contaminants.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials shall be new and shall comply with the following material specifications.

B. Deformed Concrete Reinforcing Bars: ASTM A615, grade 60.

C. Concrete Reinforcing Bars required on the Drawings to be Welded: ASTM A706.

D. Reinforcing Steel Accessories


3. Precast Concrete Block Bar Supports: CRSI Bar Support Specifications, Precast Blocks. Blocks shall have equal or greater strength than the surrounding concrete.

H. Tie Wire

1. Tie wires for reinforcement shall be 16-gauge or heavier, black annealed wire.
2.02 FABRICATION

A. Fabrication of reinforcement shall be in compliance with the CRSI Manual of Standard Practice and ACI 315.

B. Bars shall be cold bent. Bars shall not be straightened or rebent.

C. Bars shall be bent around a revolving collar having a diameter of not less than that recommended by the ACI 318.

D. Bar ends that are to be butt spliced, placed through limited diameter holes in metal, or threaded, shall have the applicable end(s) saw-cut. Such ends shall terminate in flat surfaces within 1-1/2 degrees of a right angle to the axis of the bar.

PART 3 EXECUTION

3.01 INSTALLATION

A. Surface condition, bending, spacing and tolerances of placement of reinforcement shall comply with the CRSI Manual of Standard Practice. The CONTRACTOR shall be solely responsible for providing an adequate number of bars and maintaining the spacing and clearances shown on the Drawings.

B. Except as otherwise indicated on the Drawings, the minimum concrete cover of reinforcement shall be as follows:

1. Concrete cast against and permanently exposed to earth: 3-in

2. Concrete exposed to soil, water, sewage, sludge and/or weather: 2-in (including bottom cover of slabs over water or sewage)

3. Concrete not exposed to soil, water, sewage, sludge and/or weather:
   a. Slabs (top and bottom cover), walls and joists – 1.5-in
   b. Beams and columns (principal reinforcement) - 2-in

C. Reinforcement which will be exposed for a considerable length of time after being placed shall be coated with a heavy coat of neat cement slurry.

D. No reinforcing steel bars shall be welded either during fabrication or erection unless specifically shown on the Drawings or specified herein, or unless prior written approval has been obtained from the ENGINEER. All bars that have been welded, including tack welds, without such approval shall be immediately removed from the work. When welding of reinforcement is approved or called for, it shall comply with AWS D1.4.

E. Reinforcing steel interfering with the location of other reinforcing steel, conduits or embedded items may be moved within the specified tolerances or one bar diameter, whichever is greater. Greater displacement of bars to avoid interference shall only be made with the approval of the ENGINEER. Do not cut reinforcement to install inserts, conduits, mechanical openings or other items without the prior approval of the ENGINEER.
F. Securely support and tie reinforcing steel to prevent movement during concrete placement. Secure dowels in place before placing concrete. Wire tie ends shall be bent away from the outer surface of all concrete elements.

G. Reinforcing steel bars shall not be field bent except where shown on the Drawings or specifically authorized in writing by the ENGINEER. If authorized, bars shall be cold-bent around the standard diameter spool specified in the CRSI. Do not heat bars. Closely inspect the reinforcing steel for breaks. If the reinforcing steel is damaged, replace, Cadweld or otherwise repair as directed by the ENGINEER. Do not bend reinforcement after it is embedded in concrete.

H. Reinforcing steel bars shall have minimum clearance of 2-in from all metal items such as rebar, wire, or plates used to support pipe penetrations and pipe embedments.

I. Reinforcing steel bars shall be cleaned before concrete placement. Reinforcing substantially (as determined by the ENGINEER) covered in rust shall be sandblasted clean prior to concrete placement.

3.02 REINFORCEMENT AROUND OPENINGS

A. Unless specific additional reinforcement around openings is shown on the Drawings, provide additional reinforcing steel on each side of the opening equivalent to one half of the cross-sectional area of the reinforcing steel interrupted by an opening. The bars shall have sufficient length to develop bond at each end beyond the opening or penetration.

3.03 SPLICING OF REINFORCEMENT

A. Lap splices shall be provided as shown on the Drawings. For lap splices not shown, request clarification from the ENGINEER.

B. Splicing of reinforcing steel in concrete elements noted to be "tension members" on the Drawings shall be avoided whenever possible. However, if required for constructability, splices in the reinforcement subject to direct tension shall be welded to develop, in tension, at least 125 percent of the specified yield strength of the bar. Splices in adjacent bars shall be offset the distance of a Class B splice.

C. Install wire fabric in as long a length as practicable. Wire fabric from rolls shall be rolled flat and firmly held in place. Splices in welded wire fabric shall be lapped in accordance with the requirements of ACI-318 but not less than 12-in. The spliced fabrics shall be tied together with wire ties spaced not more than 24-in on center and laced with wire of the same diameter as the welded wire fabric. Do not position laps midway between supporting beams, or directly over beams of continuous structures. Offset splices in adjacent widths to prevent continuous splices.

3.04 ACCESSORIES

A. The CONTRACTOR shall be solely responsible for determining, providing and installing accessories such as chairs, chair bars and the like in sufficient quantities and strength to adequately support the reinforcement and prevent its displacement during the erection of the reinforcement and the placement of concrete.

B. Use precast concrete blocks where the reinforcing steel is to be supported over soil.

C. Stainless steel bar supports or steel chairs with stainless steel tips shall be used where the chairs are set on forms for a concrete surface that will be exposed to weather, high humidity, or liquid (including bottom of slabs over liquid containing areas). Use of
galvanized or plastic tipped metal chairs is permissible in all other locations unless otherwise noted on the Drawings or specified herein.

D. Alternate methods of supporting top steel in slabs, such as steel channels supported on the bottom steel or vertical reinforcing steel fastened to the bottom and top mats, may be used if approved by the ENGINEER.

3.05 FIELD QUALITY CONTROL

A. Inspection: In no case shall any reinforcing steel be covered with concrete until the installation of the reinforcement, including the size, spacing and position of the reinforcement has been observed by the ENGINEER and the ENGINEER’s release to proceed with the concreting has been obtained. The ENGINEER shall be given a minimum of 24 hours prior notice of the readiness of placed reinforcement for observation. The forms shall be kept open until the ENGINEER has finished his/her observations of the reinforcing steel.

B. CONTRACTOR shall ensure that all metal pipeline embeds are separated from form ties and rebar by a minimum of 1-inch to keep pipelines electrically isolated.

***END OF SECTION***
SECTION 03250

CONCRETE JOINTS AND JOINT ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Furnish all labor, materials, equipment and incidentals required and install accessories for concrete joints as shown on the Drawings and as specified herein. See the related sections for additional work and requirements.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.
2. Section 03200 – Concrete Reinforcement.
3. Section 03300 – Cast-In-Place Concrete.
4. Section 03350 – Concrete Finishing.
5. Section 03600 – Grout.
7. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)


C. Federal Specifications


D. International Concrete Repair Institute (ICRI):
1. ICRI Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply unless otherwise noted.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings and product data. Submittals shall include the following:

1. Premolded joint fillers: Product data including catalogue cut, technical data, storage requirements, installation requirements, location of use and conformity to ASTM standards.

2. Bond breaker: Product data including catalogue cut, technical data, storage requirements, installation requirements, location of use and conformity to ASTM standards.

3. Expansion joint dowels: Product data on the complete assembly including dowels, coatings, lubricants, spacers, sleeves, expansion caps, installation requirements and conformity to ASTM standards.

4. Compressible joint filler: Product data including catalogue cut, technical data, storage requirements, installation requirements, location of use and conformity to ASTM standards.

5. Bonding agents: Product data including catalogue cut, technical data, storage requirements, product life, application requirements and conformity to ASTM standards.

B. Certifications

1. Certification that all materials used within the joint system are compatible with each other.

2. Certification that materials used in the construction of joints are suitable for use in contact with potable water 30 days after installation.

PART 2 - PRODUCTS

2.01 GENERAL

A. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

B. All materials used together in a given joint (bond breakers, backer rods, joint fillers, sealants, etc) shall be compatible with one another. Coordinate selection of suppliers and products to ensure compatibility. Under no circumstances shall asphaltic or bituminous bond breakers or joint fillers be used in joints receiving sealant.
2.02 MATERIALS

A. Premolded Joint Filler

1. Premolded joint filler - structures. Self-expanding cork, premolded joint filler shall conform to ASTM D1752, Type III. The thickness shall be 3/4-in unless shown otherwise on the Drawings.

2. Premolded joint filler - sidewalk and roadway concrete pavements or where fiber joint filler is specifically noted on the Drawings. The joint filler shall be asphalt-impregnated fiber board conforming to ASTM D1751. Thickness shall be 3/4-in unless otherwise shown on the Drawings. Fiber joint filler shall be sealed with a joint sealant where recommended by the joint filler manufacturer.

B. Bond Breaker

1. Bond breaker tape shall be an adhesive-backed glazed butyl or polyethylene tape which will satisfactorily adhere to the premolded joint filler or concrete surface as required. The tape shall be the same width as the joint unless otherwise noted.

2. Except where tape is specifically called for on the drawings, bond breaker for concrete shall be either bond breaker tape or a non-staining type bond prevention coating such as Williams Tilt-up Compound by Williams Distributors Inc.; Silcoseal 2000C, by SCA Construction Supply Division, Superior Concrete Accessories or equal.

C. Bonding Agent

1. Epoxy bonding agent shall be a two-component, solvent-free, moisture insensitive, epoxy resin material conforming to ASTM C881 (2002), Type V. The bonding agent shall be Sikadur 32 Hi-Mod by Sika Corporation of Lyndhurst, N.J.; Concrexive Liquid (LPL) by Master Builders of Cleveland, OH or equal.

2. Latex bonding agent shall be a non-reemulsifiable acrylic-polymer latex conforming to ASTM C1059, Type II.

D. Joint Sealant

1. Joint sealants shall be two-part urethane sealant as specified in Section 07900. Minimum sealant thickness at concrete joints shall be 3/8-in.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Construction Joints

1. Make construction joints only at locations shown on the Drawings or as approved by the ENGINEER. Any additional or relocation of construction joints proposed by the CONTRACTOR, must be submitted to the ENGINEER for written approval.
2. Additional or relocated joints should be located where they least impair strength of the member. In general, locate joints within the middle third of spans of slabs, beams and girders. However, if a beam intersects a girder at the joint, offset the joint a distance equal to twice the width of the member being connected. Locate joints in walls and columns at the underside of floors, slabs, beams or girders and at tops of footings or floor slabs. Do not locate joints between beams, girders, column capitals, or drop panels and the slabs above them. Do not locate joints between brackets or haunches and walls or columns supporting them.

3. All joints shall be perpendicular to main reinforcement. Continue reinforcing steel through the joint as indicated on the Drawings. When joints in beams are allowed, provide a shear key and inclined dowels as approved by the ENGINEER.

4. Provide sealant grooves for joint sealant where indicated on the Drawings.

5. At all construction joints and at concrete joints designated on the Drawings to be "roughened", uniformly roughen the surface of the concrete to Concrete Surface Profile (CSP) 9 per ICRI Guideline 03732 with 1/4-in minimum amplitude. This roughened surface may be accomplished by raking the plastic concrete or by bushhammering or chiseling hardened concrete surfaces or raking plastic concrete. Thoroughly clean joint surfaces of loose or weakened materials by waterblasting or sandblasting. Saturate the joints and adjacent concrete surfaces to at least 12-in past the joint with water 12 hours before and again immediately prior to concrete placement.

6. Galvanized metal stay-in-place forms shall not be used in the construction joints of any liquid-containing structures.

7. In lieu of the above method for bonding plastic concrete to hardened concrete, the following optional method may be used. Concrete must be allowed to set a minimum of 28 days. Use an epoxy bonding agent applied to roughened and cleaned surfaces of set concrete in strict accordance with manufacturer's recommendations.

8. Keyways shall not be used in construction joints unless specifically shown on the Drawings or approved by the ENGINEER.

***END OF SECTION***
SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Cast-in-place concrete. See the related sections for additional work and requirements.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.
2. Section 03200 – Concrete Reinforcement.
3. Section 03250 – Concrete Joints and Joint Accessories.
4. Section 03350 – Concrete Finishing.
5. Section 03600 – Grout.
6. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
10. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
11. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.


16. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

B. American Concrete Institute (ACI):

1. ACI 304R - Guide for Measuring, Mixing, Transporting and Placing Concrete.

2. ACI 305R - Hot Weather Concreting.


4. ACI 318 - Building Code Requirements for Structural Concrete.

5. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures.

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.


1.03 SUBMITTALS

A. Product Data: Submit to the ENGINEER, in accordance with Sections 01300, product data including the following:

1. Sources of cement, pozzolan, and aggregates.

2. Material Safety Data Sheets (MSDS) for all concrete components and admixtures.


5. High-range water-reducing admixture (superplasticizer). Product data including catalogue cut, technical data, storage requirements, product life, recommended dosage, temperature considerations, retarding effect, slump range and conformity to ASTM standards. Identify proposed locations of use.
6. Concrete mix design for each formulation of concrete proposed for use including constituent quantities per cubic yard, water-cementitious materials ratio, concrete slump, type and manufacturer of cement. See also the required test reports and certifications listed below. Provide either (a) or (b) below for each mix design proposed.
   a. Compression test results for proposed mixes. Include standard deviation data for each proposed concrete mix a statistical records.
   b. The curve of water-cementitious materials ratio versus concrete cylinder strength for each formulation of concrete proposed based on laboratory tests. The cylinder strength shall be the average of the 28 day cylinder strength test results for each mix. Provide results of 7 and 14 day tests if available.

7. Sheet curing material. Product data including catalogue cut, technical data and conformity to ASTM C171 standard.


B. Samples

1. Fine and coarse aggregates if requested by the ENGINEER.

C. Quality Assurance/Control

1. Test Reports
   a. Fine aggregates - sieve analysis, physical properties, and deleterious substance.
   b. Coarse aggregates - sieve analysis, physical properties, and deleterious substances.
   c. Cements - chemical analysis and physical properties for each type.
   d. Pozzolans - chemical analysis and physical properties.
   e. Proposed concrete mixes - compressive strength, slump, shrinkage, and air content.

2. Certifications
   a. Certify admixtures used in the same concrete mix are compatible with each other and the aggregates.
   b. Certify admixtures are suitable for use in contact with potable water after 30 days of concrete curing.
   c. Certify curing compound is suitable for use in contact with potable water after 30 days (non-toxic and free of taste or odor).

3. Work Plans
1.04 QUALITY ASSURANCE

A. Reinforced concrete shall comply with ACI 318, ACI 350 and other stated requirements, codes and standards. The most stringent requirement of the codes, standards and this Section shall apply when conflicts exist.

B. Only one source of cement and aggregates shall be used on any one structure. Concrete shall be uniform in color and appearance.

C. Concrete meeting: A meeting will be held between the ENGINEER and the CONTRACTOR to review the detailed requirements of the CONTRACTOR's proposed concrete design mixes and to determine the procedures for producing proper concrete construction. The meeting shall be held no later than 30 days prior to the first concrete placement. All parties involved in concrete work shall attend the conference including the following:

1. CONTRACTOR's superintendent and/or project manager;
2. CONTRACTOR's concrete supplier testing laboratory representative (optional as determined by the ENGINEER);
3. Concrete subcontractor;
4. Reinforcing steel subcontractor and detailer;
5. Concrete supplier;
6. Admixture manufacturer's representative(s).

Meeting discussion topics will include, but not be limited to: methods of hot and cold weather concrete placement, concrete placement during rainy weather, cleanliness of rebar before placement of concrete, concrete mix design(s) and source of concrete materials, concrete shrinkage for key structures, waterstop placement, use of admixtures, concrete curing methods, concrete finishes (Section 03350), grouts (Section 03600), and rebar submittals.

D. If, during the progress of the work, it is impossible to secure concrete of the required workability and strength with the materials being furnished, the ENGINEER may order such changes in proportions or materials, or both, as may be necessary to secure the desired properties. All changes so ordered shall be made at no additional cost to the OWNER.

E. If, during the progress of the work, the materials from the sources originally accepted change in characteristics, the CONTRACTOR shall, at no additional cost to the OWNER, make new acceptance tests of aggregates and establish new design mixes.

F. Testing of the following materials shall be furnished by CONTRACTOR to verify conformity with this Specification Section and the stated ASTM Standards.

1. Fine aggregates for conformity with ASTM C33 - sieve analysis, physical properties, and deleterious substances.
2. Coarse aggregates for conformity with ASTM C33 - sieve analysis, physical properties, and deleterious substances.

3. Cements for conformity with ASTM C150 - chemical analysis and physical properties.

4. Pozzolans for conformity with ASTM C618 - chemical analysis and physical properties.

5. Proposed concrete mix designs - compressive strength, slump, shrinkage, and air content.

G. Field testing and inspection services will be provided by the OWNER. The cost of such work, except as specifically stated otherwise, will be paid by the OWNER. The CONTRACTOR shall be responsible for the cleanup and disposal of testing waste at the project site. Testing of the following items shall be by the OWNER to verify conformity with this Specification Section.

1. Concrete placements - compressive strength (cylinders), compressive strength (cores), slump, air content, and shrinkage.

2. Other materials or products that may come under question.

H. All materials incorporated in the work shall conform to accepted samples and test reports.

1.05 DELIVERY, STORAGE AND HANDLING

A. Cement: Store in weathertight buildings, bins or silos to provide protection from dampness and contamination and to minimize warehouse set.

B. Aggregate: Arrange and use stockpiles in bunkers or other physical structures to avoid excessive segregation or contamination with other materials or with other sizes of like aggregates. Build stockpiles in successive horizontal layers not exceeding 3-ft in thickness. Complete each layer before the next is started. Do not use frozen or partially frozen aggregate.

C. Sand: Arrange and use stockpiles in bunkers or other physical structures to avoid contamination. Allow sand to drain to a uniform moisture content before using. Do not use frozen or partially frozen aggregates.

D. Admixtures: Store in closed containers to avoid contamination, evaporation or damage. Provide suitable agitating equipment to assure uniform dispersion of ingredients in admixture solutions which tend to separate. Protect liquid admixtures from freezing and other temperature changes which could adversely affect their characteristics.

E. Pozzolan: Store in weathertight buildings, bins or silos to provide protection from dampness and contamination.

F. Sheet Curing Materials: Store in weathertight buildings or off the ground and under cover.

G. Liquid Curing Compounds: Store in closed containers.

PART 2 PRODUCTS

2.01 MATERIALS

A. General
1. The use of manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration required.

2. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance and manufacturer's service.

3. Materials shall comply with this Section and any applicable State or local requirements.

B. Cement: Domestic portland cement complying with ASTM C150. Air entraining cements shall not be used. Cement brand shall be subject to approval by the ENGINEER and one brand shall be used on any one structure. The following cement type(s) shall be used:

1. Class A and Class B Concrete - Type II with the equivalent alkalies, as defined in Table 2 of ASTM C150, limited to a maximum of a 0.60% (low-alkali cement).

C. Fine Aggregate: Washed inert natural sand conforming to the requirements of ASTM C33.

D. Coarse Aggregate: Well-graded crushed stone or washed gravel conforming to the requirements of ASTM C33. Grading requirements shall be as listed in ASTM C33 Table 2 for the specified coarse aggregate size number. Limits of Deleterious Substances and Physical Property Requirements shall be as listed in ASTM C33 Table 3 for severe weathering regions. Size numbers for the concrete mixes shall be as shown in Table 03300-1 herein.

E. Water: Potable water free from injurious amounts of oils, acids, alkalis, salts, organic matter, or other deleterious substances.

F. Admixtures: Admixtures shall be free of chlorides and alkalis (except for those attributable to water). When it is required to use more than one admixture in a concrete mix, the admixtures shall be from the same manufacturer. Admixtures shall be compatible with the concrete mix including other admixtures and shall be suitable for use in contact with potable water after 30 days of concrete curing.

1. Air-Entraining Admixture: The admixture shall comply with ASTM C260. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

2. Water-Reducing Agent: The admixture shall comply with ASTM C494, Type A. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

3. High-Range Water-Reducer (Superplasticizer): The admixture shall comply with ASTM C494, Type F and shall result in non-segregating plasticized concrete with little bleeding and with the physical properties of low water/cement ratio concrete. The treated concrete shall be capable of maintaining its plastic state in excess of 2 hours. Proportioning and mixing shall be in accordance with manufacturer's recommendations.

4. Admixtures causing retarded or accelerated setting of concrete shall not be used without written approval from the ENGINEER. When allowed, the admixtures shall combine retarding or accelerating with water reducing or high range water reducing admixtures.
G. Pozzolan (Fly Ash). Pozzolan shall be Class C or Class F fly ash complying with ASTM C618 except the Loss on Ignition (LOI) shall be limited to 3 percent maximum. Pozzolan may be substituted for cement but shall not exceed 15% of the total cementous material.

H. Sheet Curing Materials. Waterproof paper, polyethylene film or white burlap-polyethylene sheeting all complying with ASTM C171.

I. Liquid Curing Compound. Liquid membrane-forming curing compound shall comply with the requirements of ASTM C309, Type 1-D (clear or translucent with fugitive dye) and shall contain no wax, paraffin, or oil. Where used on structures in contact with water, curing compound shall be NSF-61 approved and be certified for use in contact with potable water after 30 days (non-toxic and free of taste or odor).

2.02 MIXES

A. Measuring Materials

1. Concrete shall be composed of portland cement, fine aggregate, coarse aggregate, water and admixtures as specified and shall be produced by a plant acceptable to the ENGINEER. All constituents, including admixtures, shall be batched at the plant except a high-range water-reducer may also be added in the field.

2. Measure materials for batching concrete by weighing in conformity with and within the tolerances given in ASTM C94 and ACI 304R except as otherwise specified. Scales shall have been certified by the local Sealer of Weights and Measures within 1 year of use.

3. Measure the amount of free water in fine aggregates within 0.3 percent with a moisture meter. Compensate for varying moisture contents of fine aggregates. Record the number of gallons of water as-batched on printed batching tickets.

4. Admixtures shall be dispensed either manually using calibrated containers or measuring tanks, or by means of an automatic dispenser approved by the manufacturer of the specific admixture.
   a. Charge air-entraining and chemical admixtures into the mixer as a solution using an automatic dispenser or similar metering device.
   b. Inject multiple admixtures separately during the batching sequence.

B. Mix Design

1. Development of mix designs and testing shall be by an independent testing laboratory acceptable to the ENGINEER and engaged by the CONTRACTOR at no additional cost to the OWNER.

2. Select proportions of ingredients to meet the design strength and materials limits specified in Table 03300-1 and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportion ingredients to produce a homogenous mixture which will readily work into corners and angles of forms and around reinforcement without permitting materials to segregate or allowing excessive free water to collect on the surface.

3. The design mix shall be based on one of the following:
a. Standard deviation shall be based on the modification factors for standard deviation tests contained in ACI 318.

b. Trial mixtures developed by the design mix shall be based on standard deviation data of prior mixes with essentially the same proportions of the same constituents or, if such data is not available, be developed by a testing laboratory engaged by the CONTRACTOR and at no additional cost to the OWNER.

The water content of the concrete mix, determined by laboratory testing, shall be based on a curve showing the relation between water cementitious ratio and 7 and 28 day compressive strengths of concrete made using the proposed materials. The curves shall be determined by four or more points, each representing an average value of at least three test specimens at each age. The curves shall have a range of values sufficient to yield the desired data, including the specified design strengths as modified below, without extrapolation. The water content of the concrete mixes to be used, as determined from the curve, shall correspond to strengths 16 percent greater than the specified design strengths. The resulting mix shall not conflict with the limiting values for maximum water cementitious ratio and net minimum cementitious content as specified in Table 03300-1. Acceptance of mixes based on standard deviation shall be based on the modification factors for standard deviation tests contained in ACI 318.

4. Entrained air, as measured by ASTM C231, shall be as shown in Table 03300-1. If the air-entraining agent proposed for use in the mix requires testing methods other than ASTM C231 to accurately determine air content, make special note of this requirement in the admixture submittal.

5. Slump of the concrete as measured by ASTM C143, shall be as shown in Table 03300-1. If a high-range water-reducer (superplasticizer) is used, the slump indicated shall be that measured before superplasticizer is added. Plasticized concrete shall have a slump ranging from 7 to 10-in.

6. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of each other.

**TABLE 03300-1**

<table>
<thead>
<tr>
<th>Class</th>
<th>Design Strength (1)</th>
<th>Cement (2)</th>
<th>Fine Aggregate (2)</th>
<th>Coarse Aggregate (3)</th>
<th>Minimum Cementitious Content (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2500</td>
<td>C150 Type II</td>
<td>C33</td>
<td>57</td>
<td>440</td>
</tr>
<tr>
<td>B</td>
<td>3500</td>
<td>C150 Type II</td>
<td>C33</td>
<td>57</td>
<td>517</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class</th>
<th>W/C Ratio (5)</th>
<th>Fly Ash</th>
<th>AE Range (6)(7)</th>
<th>WR (8)</th>
<th>HRWR (9)</th>
<th>Slump Range Inches</th>
</tr>
</thead>
</table>

City of Sacramento
Garcia Bend Park Restroom Restoration Project
A 0.62 max. 15-20% (10) 3.5 to 5 Yes No 1-4
B 0.45 max. 15-20% (10) 3.5 to 5 Yes No 1-4

NOTES:
(1) Minimum compressive strength in psi at 28 days
(2) ASTM designation
(3) Size Number in ASTM C33
(4) Cementitious content in lbs/cu yd
(5) W/C is Water-Cementitious ratio by weight
(6) AE is percent air-entrainment
(7) AE for concrete slabs may be less than 3 percent
(8) WR is water-reducer admixture
(9) HRWR is high-range water-reducer admixture
(10) Percentage of the total cement plus pozzolan content, by weight

C. Mixing and Transporting

1. Concrete shall be ready-mixed concrete. No hand-mixing will be permitted. Clean each transit mix truck drum and reverse drum rotation before the truck proceeds under the batching plant. Equip each transit-mix truck with a continuous, nonreversible, revolution counter showing the number of revolutions.

2. Ready-mix concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of their rated capacities as stated on the name plate.

3. Keep the water tank valve on each transit truck locked at all times. Any addition of water must be approved by the ENGINEER. Added water shall be incorporated by additional mixing of at least 35 revolutions. All added water shall be metered and the amount of water added shall be shown on each delivery ticket.

4. All central plant and rolling stock equipment and methods shall comply with ACI 318, ACI 304R and ASTM C94.

5. Select equipment of size and design to ensure continuous flow of concrete at the delivery end. Metal or metal-lined non-aluminum discharge chutes shall be used and shall have slopes not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20-ft long and chutes not meeting slope requirements may be used if concrete is discharged into a hopper before distribution.

6. Retempering (mixing with or without additional cement, aggregate, or water) of concrete or mortar which has reached initial set will not be permitted.

7. Handle concrete from mixer to placement as quickly as practicable while providing concrete of required quality in the placement area. Dispatch trucks from the batching plant so they arrive at the work site just before the concrete is required, thus avoiding excessive mixing of concrete.

8. Furnish a delivery ticket for ready mixed concrete to the ENGINEER as each truck arrives. Each ticket shall provide a printed record of the weight of cement and each aggregate as batched individually. Use the type of indicator that returns for zero punch or returns to zero after a batch is discharged. Clearly indicate the weight of fine and coarse aggregate, cement and water in each batch, the quantity delivered, the time any water is added, and the numerical sequence of the delivery. Show the time of day batched and time of discharge from the truck.
Indicate the number of revolutions of the truck mixer. Annotate each delivery ticket with the structure and component where the concrete was placed.

9. Temperature and Mixing Time Control

9a. In cold weather, do not allow the as-mixed temperature of the concrete and concrete temperatures at the time of placement in the forms to drop below 40 degrees F.

9b. If water or aggregate has been heated, combine water with aggregate in the mixer before cement is added. Do not add cement to mixtures of water and aggregate when the temperature of the mixture is greater than 90 degrees F.

9c. In hot weather, cool ingredients before mixing to maintain temperature of the concrete below the maximum placing temperature of 90 degrees F. If necessary, substitute well-crushed ice for all or part of the mixing water.

9d. The maximum time interval between the addition of mixing water and/or cement to the batch and the placing of concrete in the forms shall not exceed the values shown in Table 03300-2.

**TABLE 03300-2**

MAXIMUM TIME TO DISCHARGE OF CONCRETE

<table>
<thead>
<tr>
<th>Air or Concrete Temperature (whichever is higher)</th>
<th>Maximum Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above 90 Degree F (32 Degree C) (Note 1)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>80 to 90 Degree F (27 to 32 Degree C)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>70 to 79 Degree F (21 to 26 Degree C)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>40 to 69 Degree F (5 to 20 Degree C)</td>
<td>90 minutes</td>
</tr>
</tbody>
</table>

**Note 1:** In air temperatures above 90 degrees F, the temperature of concrete being placed shall not exceed 90 degrees F.

If an approved high-range water-reducer (superplasticizer) is used to produce plasticized concrete, the maximum time interval shall not exceed 90 minutes.

**D. Concrete Appearance**

1. Concrete mix showing either poor cohesion or poor coating of the coarse aggregate with paste shall be remixed. If this does not correct the condition, the concrete shall be rejected. If the slump is within the allowable limit, but excessive bleeding, poor workability, or poor finisability are observed, changes in the concrete mix shall be obtained only by adjusting one or more of the following:

   a. The gradation of aggregate.
   b. The proportion of fine and coarse aggregate.
   c. The percentage of entrained air, within the allowable limits.
2. Concrete for the work shall provide a homogeneous structure which, when hardened, will have the required strength, durability and appearance. Mixtures and workmanship shall be such that concrete surfaces, when exposed, will require no finishing. When concrete surfaces are stripped, the concrete, when viewed in good lighting from 10-ft away, shall be pleasing in appearance, and at 20-ft shall show no visible defects.

2.03 SOURCE QUALITY CONTROL

A. Compression Tests: Provide testing of the proposed concrete mix or mixes to demonstrate compliance with the specified design strength requirements in conformity with Section 2.02B.

PART 3 EXECUTION

3.01 INSTALLATION

A. Placing

1. The class of concrete shall be per Table 03300-3 or as shown on the Drawings. Place all concrete in accordance with the recommendations contained in ACI304R. Concrete shall not be placed when rainfall (or forecast rainfall) is sufficient to cause damage to the work. Concrete placement in progress shall be stopped when rainfall occurs unless the concrete is completely protected from rainfall damage. Verify that all formwork completely encloses concrete to be placed and is securely braced prior to concrete placement. Remove ice, excess water, dirt and other foreign materials from forms. Confirm that reinforcement and other embedded items are securely in place. Have competent workers at the location of the placement. Workers shall be able to ensure that reinforcing steel and embedded items remain in designated locations while concrete is being placed. Sprinkle semi-porous subgrades or forms to eliminate suction of water from the mix. Seal extremely porous subgrades in an approved manner.

2. Deposit concrete as near its final position as possible to avoid segregation due to rehandling or flowing. Place concrete continuously at a rate which ensures the concrete is being integrated with fresh plastic concrete. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials or on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within the section. If the section cannot be placed continuously, place construction joints as specified or as approved.

3. Pumping of concrete will be permitted. Use a mix design and aggregate sizes suitable for pumping and submit for approval.

4. Remove temporary spreaders from forms when the spreader is no longer useful. Temporary spreaders may remain embedded in concrete only if it is a non-water containing structure, when made of galvanized metal or concrete, and only if prior approval from the ENGINEER has been obtained.

5. Do not place concrete for supported elements until concrete previously placed in the supporting element (columns, slabs and/or walls) has reached adequate strength.

6. Where surface mortar is to form the base of a finish, especially surfaces designated to be painted, work coarse aggregate back from forms with a suitable tool to bring the full surface of the mortar against the form. Prevent the formation of excessive surface voids.
7. Slabs
   a. After suitable bulkheads, screeds and jointing materials have been positioned, the concrete shall be placed continuously between construction joints beginning at a bulkhead, edge form, or corner. Each batch shall be placed into the edge of the previously placed concrete to avoid stone pockets and segregation.
   b. Avoid delays in casting. If there is a delay in casting, the concrete placed after the delay shall be thoroughly spaded and consolidated at the edge of that previously placed to avoid cold joints. Concrete shall then be brought to correct level and struck off with a straightedge. Bullfloats or darbies shall be used to smooth the surface, leaving it free of humps or hollows.
   c. Where slabs are to be placed integrally with the walls below them, place the walls and compact as specified. Allow 1 hour to pass between placement of the wall and the overlying slab to permit consolidation of the wall concrete. Keep the top surface of the wall moist so as to prevent cold joints.

8. Formed Concrete
   a. Place concrete in forms using tremie tubes and taking care to prevent segregation. Bottom of tremie tubes shall preferably be in contact with the concrete already placed. Do not permit concrete to drop freely more than 4-ft. Place concrete for walls in 12 to 24-in lifts, keeping the surface horizontal. If plasticized concrete is used, the maximum lift thickness may be increased to 4-ft and the maximum free fall of concrete shall not exceed 4-ft.
   b. A minimum of 48 hours shall have elapsed between casting of adjacent wall sections at a vertical construction joint.

B. Compacting

1. Consolidate concrete by vibration, puddling, spading, rodding or forking so that concrete is thoroughly worked around reinforcement, embedded items and openings and into corners of forms. Puddling, spading, etc., shall be continuously performed along with vibration of the placement to eliminate air or stone pockets which may cause honeycombing, pitting or planes of weakness.

2. All concrete shall be placed and compacted with mechanical vibrators. One vibrator shall be used for each 8 c.y. placed per hour. The type and size of the units shall be approved by the ENGINEER in advance of placing operations. No concrete shall be ordered until sufficient approved vibrators (including standby units in working order) are on the job.

3. A minimum frequency of 7000 rpm is required for mechanical vibrators. Insert and withdraw vibrators vertically at points from 18 to 30-in apart. At each insertion, vibrate sufficiently to consolidate concrete, generally from 5 to 15 seconds. Do not segregate concrete through overvibration. Keep a spare vibrator on the site during concrete placing operations.

4. Concrete Slabs: Concrete for slabs less than 8-in thick shall be consolidated with vibrating screeds; slabs 8-in and thicker shall be compacted with internal
vibrators and (optionally) with vibrating screeds. Vibrators shall always be placed into concrete vertically and shall not be laid horizontally or laid over.

5. Walls and Columns: Internal vibrators (rather than form vibrators) shall be used unless otherwise approved by the ENGINEER. In general, for each vibrator needed to melt down the batch at the point of discharge, one or more additional vibrators must be used to densify, homogenize and perfect the surface. The vibrators shall be inserted vertically at regular intervals, through the fresh concrete and slightly into the previous lift, if any.

6. Amount of Vibration: Vibrators are to be used to consolidate properly placed concrete but shall not be used to move or transport concrete in the forms. Vibration shall continue until:
   a. Frequency returns to normal.
   b. Surface appears liquefied, flattened and glistening.
   c. Trapped air ceases to rise.
   d. Coarse aggregate has blended into surface, but has not disappeared.

C. Curing

1. Protect all concrete work against injury from the elements and defacements of any nature during construction operations.

2. Curing Methods
   a. Curing Methods for Concrete Surfaces: Cure concrete to retain moisture and maintain specified temperature at the surface for a minimum of 7 days after placement. Curing methods to be used are as follows:
      1) Water Curing: Keep entire concrete surface wet by ponding, continuous sprinkling or covered with saturated burlap. Begin wet cure as soon as concrete attains an initial set and maintain wet cure 24 hours a day.
      2) Sheet Material Curing: Cover entire surface with sheet material. Securely anchor sheeting to prevent wind and air from lifting the sheeting or entrapping air under the sheet. Place and secure sheet as soon as initial concrete set occurs.
      3) Liquid Membrane Curing: Apply over the entire concrete surface except for surfaces to receive additional concrete. Curing compound shall NOT be placed on any concrete surface where additional concrete is to be placed, where concrete sealers or surface coatings are to be used, or where the concrete finish requires an integral floor product. Curing compound shall be applied as soon as the free water on the surface has disappeared and no water sheen is visible, but not after the concrete is dry or when the curing compound can be absorbed into the concrete. Application shall be in compliance with the manufacturer's recommendations.
   b. Specified Applications of Curing Methods.
1) Slabs on Grade and Footings: Water curing, sheet material curing or liquid membrane curing.

2) Structural Slabs (other than water containment): Water curing or liquid membrane curing.

3) Horizontal Surfaces which will Receive Additional Concrete, Coatings, Grout or Other Material that Requires Bond to the substrate: Water curing.

4) Formed Surfaces: None if nonabsorbent forms are left in place 7 days. Water cure if absorbent forms are used. Sheet cured or liquid membrane cured if forms are removed prior to 7 days. Exposed horizontal surfaces of formed walls or columns shall be water cured for 7 days or until next placement of concrete is made.

5) Concrete Joints: Water cured or sheet material cured.

3. Finished surfaces and slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

D. Cold Weather Concreting:

1. "Cold weather" is defined as a period when for more than 3 successive days, the average daily outdoor temperature drops below 40 degrees F. The average daily temperature shall be calculated as the average of the highest and the lowest temperature during the period from midnight to midnight.

2. Cold weather concreting shall conform to ACI 306.1 and the additional requirements specified herein. Temperatures at the concrete placement shall be recorded at 12 hour intervals (minimum).

3. The CONTRACTOR shall discuss a cold weather work plan with the ENGINEER. The discussion shall encompass the methods and procedures proposed for use during cold weather including the production, transportation, placement, protection, curing and temperature monitoring of the concrete. The procedures to be implemented upon abrupt changes in weather conditions or equipment failures shall also be discussed. Cold weather concreting shall not begin until the work plan is acceptable to the ENGINEER.

4. During periods of cold weather, concrete shall be protected to provide continuous warm, moist curing (with supplementary heat when required) for a total of at least 350 degree-days of curing.

   a. Degree-days are defined as the total number of 24 hour periods multiplied by the weighted average daily air temperature at the surface of the concrete (e.g.: 5 days at an average 70 degrees F = 350 degree-days).

   b. To calculate the weighted average daily air temperature, sum hourly measurements of the air temperature in the shade at the surface of the concrete taking any measurement less than 50 degrees F as 0 degrees F. Divide the sum thus calculated by 24 to obtain the weighted average temperature for that day.

5. Salt, manure or other chemicals shall not be used for protection.
6. The protection period for concrete being water cured shall not be terminated during cold weather until at least 24 hours after water curing has been terminated.

E. Hot Weather Concreting

1. "Hot weather" is defined as any combination of high air temperatures, low relative humidity and wind velocity which produces a rate of evaporation estimated in accordance with ACI 305R, approaching or exceeding 0.2 lbs/sqft/hr.

2. Concrete placed during hot weather, shall be batched, delivered, placed, cured and protected in compliance with the recommendations of ACI 305R and the additional requirements specified herein.
   a. Temperature of concrete being placed shall not exceed 90 degrees F and every effort shall be made to maintain a uniform concrete mix temperature below this level. The temperature of the concrete shall be such that it will cause no difficulties from loss of slump, flash set or cold joints.
   b. All necessary precautions shall be taken to promptly deliver, to promptly place the concrete upon its arrival at the job and to provide vibration immediately after placement.
   c. The ENGINEER may require the CONTRACTOR to immediately cover plastic concrete with sheet material.

3. The CONTRACTOR shall discuss with the ENGINEER a work plan describing the methods and procedures proposed to use for concrete placement and curing during hot weather periods. Hot weather concreting shall not begin until the work plan is acceptable to the ENGINEER.

F. Removal of Forms

1. Form and shoring removal shall conform to the requirements specified in Section 03100.

3.02 FIELD QUALITY CONTROL

A. The placing and curing of concrete shall be subject to the inspection of the Special Inspector at all times. The CONTRACTOR shall advise the Special Inspector of his/her readiness to proceed at least 2 working days prior to each concrete placement. The Special Inspector will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing steel and the alignment, cleanliness and tightness of formwork. No placement shall be made without the inspection and acceptance of the Special Inspector.

B. Sets of field control cylinder specimens will be taken by the OWNER (or Inspector) during the progress of the work, in compliance with ASTM C31. The number of sets of concrete test cylinders taken of each class of concrete placed each day shall not be less than one set per day, nor less than one set for each 150 cu yds of concrete nor less than one set for each 5,000 sq ft of surface area for slabs or walls.

1. A "set" of test cylinders consists of five cylinders: one to be tested at 7 days and two to be tested and their strengths averaged at 28 days. The fourth and fifth cylinders may be used for a special test at 3 days or to verify strength after 28
days if 28 day test results are low. Compressive strength tests shall comply with ASTM C39.

2. When the average 28 day compressive strength of the cylinders in any set falls below the specified design strength or below proportional minimum 7 day strengths (where proper relation between seven and 28 day strengths have been established by tests), proportions, water content, or temperature conditions shall be changed by the CONTRACTOR to achieve the required strengths.

C. The CONTRACTOR shall cooperate in the making of tests by allowing free access to the work for the selection of samples, providing an insulated and closed, wood or metal curing box for specimens, affording protection to the specimens against injury or loss through the CONTRACTOR’s operations and furnish material and labor required for the purpose of taking concrete cylinder samples. All shipping of specimens will be paid for by the OWNER. The cleanup and disposal of test waste shall be the responsibility of the CONTRACTOR.

D. Slump tests will be made in the field by the Special Inspector immediately prior to placing the concrete. Such tests shall be made in accordance with ASTM C143. Slump test shall be taken for each set of test cylinders defined above. If the slump is outside the specified range, the concrete shall be rejected.

E. Air Content: Test for air content shall be made by the Special Inspector on fresh concrete samples. Air content test shall be taken for each set of test cylinders defined above. Air content for concrete made of ordinary aggregates having low absorption shall be made in compliance with either the pressure method complying with ASTM C231 or by the volumetric method complying with ASTM C173.

F. The ENGINEER may have cores taken from any questionable area in the concrete work such as construction joints and other locations as required for determination of concrete quality. The results of tests on such cores shall be the basis for acceptance, rejection or determining the continuation of concrete work.

G. The CONTRACTOR shall cooperate in obtaining cores by allowing free access to the work and permitting the use of ladders, scaffolding and such incidental equipment as may be required. The CONTRACTOR shall repair all core holes. The work of cutting and testing the cores will be at the expense of the OWNER.

3.03 ADJUSTING

A. Failure to Meet Requirements

1. Should the strengths shown by the test specimens made and tested in compliance with the previous provisions fall below the values given in Table 03300-1, the ENGINEER shall have the right to require changes in the mix design to apply to the remainder of the work. Furthermore, the ENGINEER shall have the right to require additional curing on those portions of the structure represented by the test specimens which failed. The cost of such mix design changes and additional curing shall be at no additional cost to the OWNER. In the event that such additional curing does not give the strength required, as evidenced by core and/or load tests, the ENGINEER shall have the right to require strengthening or replacement of those portions of the structure which fail to develop the required strength. The cost of all such core borings and/or load tests and any strengthening or concrete replacement required because strengths of test specimens are below that specified, shall be entirely at no additional cost to the OWNER. In such cases of failure to meet strength requirements the CONTRACTOR and ENGINEER shall confer to determine what adjustment, if
any, can be made in compliance with Sections titled "Strength" and "Failure to Meet Strength Requirements" of ASTM C94. The "purchaser" referred to in ASTM C94 is the CONTRACTOR in this Section.

2. When the tests on control specimens of concrete fall below the specified strength, the ENGINEER will permit check tests for strengths to be made by means of typical cores drilled from the structure in compliance with ASTM C42 and C39. In the case of cores not indicating adequate strength, the ENGINEER, in addition to other recourses, may require, at no additional cost to the OWNER, load tests on any one of the slabs, beams, piles, caps, and columns in which such concrete was used. Tests need not be made until concrete has aged 60 days.

3. Should the 28-day strength of test cylinders fall below 60 percent of the required minimum 28 day strength, the concrete shall be rejected and shall be removed and replaced.

B. Patching and Repairs

1. It is the intent of this Section to require quality work including adequate forming, proper mixture and placement of concrete and curing so completed concrete surfaces will require no patching.

2. Defective concrete as determined by the ENGINEER shall be repaired at no additional cost to the OWNER.

3. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed; recesses left by the removal of form ties shall be filled; and surface defects which do not impair structural strength shall be repaired. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.

4. Immediately after removal of forms, remove plugs and break off metal ties. Promptly fill holes upon stripping as follows: Moisten the hole with water, followed by a 1/16-in brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1 to 1.5 mixture of cement and concrete sand mixed slightly damp to the touch (just short of "bailing"). Hammer the grout into the hole until dense, and an excess of paste appears on the surface in the form of a spiderweb. Trowel smooth with heavy pressure. Avoid burnishing.

5. When patching exposed surfaces, the same source of cement and sand as used in the parent concrete shall be employed. Adjust color if necessary by addition of proper amounts of white cement. Rub lightly with a fine Carbonundum stone at an age of 1 to 5 days if necessary to bring the surface down with the parent concrete. Do not damage or stain the surrounding parent concrete. Wash thoroughly to remove all rubbed matter.

3.04 **SCHEDULE**

A. The following (Table 03300-3) are the general applications for the various concrete classes and design strengths:

<table>
<thead>
<tr>
<th>TABLE 03300-3</th>
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</thead>
<tbody>
<tr>
<td>CONCRETE SCHEDULE</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Design Strength</th>
<th>03300-17</th>
</tr>
</thead>
</table>

City of Sacramento
Garcia Bend Park Restroom Restoration Project

100% Submitted 03 of 312
<table>
<thead>
<tr>
<th>Class</th>
<th>(psi)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2,500</td>
<td>Concrete fill, duct and pipe encasements, and thrust blocks</td>
</tr>
<tr>
<td>B</td>
<td>3,500</td>
<td>Footings, slabs on grade, pavements, sidewalk and curb</td>
</tr>
</tbody>
</table>
SECTION 03350

CONCRETE FINISHING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Concrete finishing and types of finishes

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.
2. Section 03200 – Concrete Reinforcement.
3. Section 03300 – Cast-in-Place Concrete.
4. Section 03600 – Grout.
5. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

2. ASTM C309 – Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Product Data: Submit to the ENGINEER, in accordance with Section 01300, product data showing materials of construction and details of installation for:

1. Concrete sealer: Submit confirmation that the sealer is compatible with other finishes that will be applied to the surfaces.

B. Field Mock-ups: The CONTRACTOR shall prepare the following mock-ups of concrete finishes at the project site for review and approval by the ENGINEER. Notify the ENGINEER one week in advance of the preparation of those finishes requiring abrasive blasting. This is to allow the ENGINEER to review and guide the amount of blast desired. CONTRACTOR shall document methods and tools used to prepare each mock-up so that finishes can be accurately reproduced onto new structures.

1. Sacked Finish -- Prepare a 4 foot wide by 4 foot high by 6-inch thick concrete test panel and mount vertically. This test panel shall be smooth on each side and free of defects. Concrete shall be Class D, per Section 03300. Cast with two tie holes per side, whether ties are required or not. Patch tie holes in accordance with Section 03300. Provide a rubbed finish on one side. When approved by the
ENGINEER, the test panel finish will be used as a standard for this finish on new structures.

1.04 QUALITY ASSURANCE

A. Pre-Installation Meetings

1. The CONTRACTOR shall make available at no additional cost to the OWNER, upon 72 hours notification, the services of a qualified field representative of the manufacturer of curing compound or sealer to instruct the user on the proper application of the product under prevailing job conditions.

B. For concrete which will receive additional applied finishes or materials, the surface finish specified is required for the proper application of the specified manufacturer's products. Where alternate products are approved for use, determine if changes in finish are required and provide the proper finish to receive these products.

C. Changes in finish made to accommodate products different from those specified shall be performed at no additional cost to the OWNER. Submit the proposed new finish and their construction methods to the ENGINEER for approval.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete sealer shall comply with ASTM C309, Type 1, Class A or B. Concrete sealer shall be compliant with State of California VOC regulations. Concrete sealer shall be Spartan-Cote WB Cure-Seal Hardener by Burke Co., San Mateo, CA; Kure-N-Seal WB by Sonneborn, Minneapolis, MN; or equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Formed Surfaces

1. Forms shall not be removed before the requirements of Section 03300 have been satisfied.

2. Exercise care to prevent damaging edges or obliterating the lines of chamfers, rustications or corners when removing the forms or performing any other work adjacent thereto.

3. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete. Surfaces to remain exposed showing white surface deposits (calcium carbonate, etc.) shall be cleaned of such deposits until a uniform gray color is achieved.

4. Cure concrete as specified in Section 03300, unless otherwise noted by the ENGINEER. Modify curing methods to be compatible with the written instructions of special concrete coating manufacturers.

B. Floors and Slabs
1. Immediately after floor or slab placement, screed concrete to the grades and surfaces shown on the Drawings. Complete Screeding before any excess moisture or bleeding water is present on the surface.

   a. Level floors and slabs to a tolerance of plus or minus 1/8-in when checked with a 10-ft straightedge placed anywhere on the slab in any direction.

   b. Pitch floors uniformly toward low points, sumps, or drains and as shown on the Drawings, such that there are no low spots left undrained.

   c. At dished floor drains, depress drain inlet one inch, and taper the one inch depression over a two foot radius, unless indicated otherwise.

   c. Failure to meet either of the above requirements shall be cause for removal, grinding, or other correction, as directed by the ENGINEER.

2. Immediately after final screeding, evenly sprinkle the surface with a dry cement/sand shake in the proportion of two sacks of portland cement to 350 lbs of coarse natural concrete sand at the rate of approximately 500 lbs /1,000 sq ft of floor. Do not sprinkle neat, dry cement on the surface.

   a. The application of the cement/sand shake may be eliminated at the discretion of the ENGINEER, if the base slab concrete exhibits adequate fattiness and homogeneity and the need is not indicated.

3. Immediately after sprinkling, bull float the surface, filling all surface voids and slightly embedding the coarse aggregate.

4. After bull floating, defer additional finishing operations until the concrete has stiffened sufficiently to sustain foot pressure with an indentation of not more than 1/4-in.

5. After all bleed water and excess moisture has left the surface, edge and joint concrete as specified or shown.

   a. Edge concrete sidewalks, driveways, and steps.

   b. Do not edge floor slabs that will be covered with tile or carpet unless noted on the Drawings. Slab edges at joints may be lightly stoned after forms are stripped and before adjacent placements are made in such areas.

   c. Place tooled joints using a straightedge at locations shown on the Drawings.

   d. Where acceptable to the ENGINEER, saw-cut contraction joints with a power blade 4 to 12 hours after slab placement and finishing.

6. Water shall not be used to supplement hand or power troweling.
3.02 CONSTRUCTION

A. Rough-Form Finish

1. Immediately after stripping forms and before concrete has changed color, carefully remove all fins and projections. Clean surfaces of tie holes.

2. Promptly fill holes left by tie cones and repair defects as specified in Section 03100 and 03300.

B. Sacked Finish

1. Provide rough-form finish as specified. While the wall is still damp apply a thin coat of medium consistency neat cement slurry by means of bristle brushes to provide a bonding coat within all pits, air holes or blemishes in the parent concrete. Avoid coating large areas of the finished surfaces with the slurry at one time.

2. Before the slurry has dried or changed color, apply a dry (almost crumbly) grout proportioned by volume and consisting of 1 part cement to 1-1/2 parts of clean masonry sand having a fineness modulus of approximately 2.3 and complying with the gradation requirements of ASTM C33 for such a material. Uniformly apply grout by means of damp pads of coarse burlap approximately 6-in square used as a float. Scrub grout into the pits and air holes to provide a dense mortar in all imperfections.

3. Allow the mortar to partially harden for 1 or 2 hours depending upon the weather. If the air is hot and dry, keep the wall damp during this period using a fine, fog spray. When the grout has hardened sufficiently so it can be scraped from the surface with the edge of a steel trowel without damaging the grout in the small pits or holes, cut off all that can be removed with a trowel.

4. Allow the surface to dry thoroughly and rub it vigorously with clean dry burlap to completely remove any dried grout. No visible film of grout shall remain after this rubbing. The entire cleaning operation for any area must be completed the day it is started. Do not leave grout on surfaces overnight. Allow sufficient time for grout to dry after it has been cut off with the trowel so it can be wiped off clean with the burlap.

5. On the day following the repair of pits, air holes and blemishes, the walls shall again be wiped off clean with dry, used pieces of burlap containing old hardened mortar which will act as a mild abrasive. After this treatment, there shall be no built-up film remaining on the parent surface. If, however, such a film is present, a fine abrasive stone shall be used to remove all such material without breaking through the surface film of the original concrete. Such scrubbing shall be light and sufficient only to remove excess material without changing the texture of the concrete.

6. A thorough wash-down with stiff bristle brushes shall follow the final bagging or stoning operation. No extraneous materials shall remain on the surface of the wall. The wall shall be sprayed with a fine fog spray periodically to maintain a continually damp condition for at least 3 days after the application of the repair grout.
C. Floated Finish

1. Float the concrete surface when the water sheen has disappeared and the concrete has hardened sufficiently to support a power float without its digging into or disrupting the surface or a finisher and knee boards with no more than 1/4-in indentation. Start floating along walls and around columns, and in areas most exposed to sun or wind, and then move systematically across the surface leaving a matte finish.

   a. Power floats shall be heavy, revolving disk type power compacting machines capable of providing a 200 lb compaction force distributed over a 24-in diameter disk.

   b. Troweling machines equipped with float (shoe) blades that are slipped over the trowel blades may be used for floating. However, floating with a troweling machine equipped with normal trowel blades will not be permitted. The use of any floating or troweling machine, which has a water attachment for wetting the concrete surface during finishing, will not be permitted.

   c. In lieu of power floating, small areas may be hand floated. While the concrete is still green, but sufficiently hardened to support a finisher and kneeboards with no more than 1/4-in indentation, wood float the surface to a true, even plane with no coarse aggregate visible. Use sufficient pressure on the wood floats to bring moisture to the surface.

2. Restore edging or jointing removed by floating. Maintain joint uniformity and line.

D. Broom Finish

1. Screed and float concrete slabs as specified in the preceding paragraphs. When the concrete has stiffened sufficiently to maintain small surface indentations, draw a bristle broom lightly across the surface in the direction of drainage, or, in the case of walks and stairs, perpendicular to the direction of traffic to provide a non-slip surface.

E. Steel Trowel Finish

1. Screed and float concrete as described in the preceding paragraphs. Immediately after floating, steel trowel to a perfectly smooth hard even finish free from high or low spots or other defects. Provide a minimum of two trowelings unless otherwise specified or noted. For surfaces to receive the traffic-bearing or other special coatings, trowel the surface to meet the recommendations of the coating manufacturer for best performance of their products. Complete the first troweling keeping the trowel blade as flat against the surface as possible. Increase the pitch or tilt between the trowel blade and the surface for each successive troweling. Permit the concrete to harden slightly between successive trowelings.

2. Restore edging or jointing removed by floating. Maintain joint uniformity and line.

F. Broom Finish on Basin Slabs with Concrete Fill Overlay

1. Screed and rough-finish slabs to grades. Provide a broomed finish with grooves aligned toward drain. Finishing tolerance shall be plus or minus 1/4-in when checked with a 10-ft straightedge.
2. Before placing grout, clean surface of debris, dust, and loose concrete, and prepare as indicated in Section 03600.

G. Concrete Sealer

1. Prepare and seal surfaces indicated to receive a sealer as follows:

   a. Finish concrete as specified in the preceding paragraphs and as scheduled herein. Surface conditions before application shall conform to the recommendations of the sealer manufacturer.

   b. Newly Placed Concrete: Surface must be sound and properly finished. Surface is application-ready when it is damp but not wet and can no longer be marred by walking worker.

   c. Newly-Cured Bare Concrete: Level any spots gouged out by trades. Remove all dirt, dust, droppage, oil, grease, asphalt and foreign matter. Cleanse with caustics and detergents as required. Rinse thoroughly and allow to dry to the conditions recommended by the sealer manufacturer.

   d. Aged Concrete: Restore surface soundness by patching, grouting, filling cracks and holes, etc. Surface must also be free of any dust, dirt and other foreign matter. Use power tools and/or strippers to remove any incompatible sealers or coatings. Cleanse as required, following the procedure indicated under cured concrete.

   e. Methods: Comply with the manufacturer’s recommendations to apply sealer so as to form a continuous, uniform film by spray, soft-bristle pushbroom, long-nap roller or lambwool applicator.

   f. Applications:

      1) Two coats are required for curing concrete. Apply first coat evenly and uniformly as soon as possible after final finishing at the rate of 200 to 400 sq ft per gallon. Apply second coat when all trades are completed and structure is ready for occupancy at the rate of 400 to 600 sq ft per gallon.

      2) Two coats are required to meet guarantee and to seal and dustproof. For sealing new concrete, both coats shall be applied full-strength. On aged concrete, when renovating, dustproofing and sealing, the first coat should be thinned 10 to 15 percent with reducer per manufacturer’s directions.

3.03 APPROVAL OF FINISHES

A. All concrete surfaces, when finished, will be inspected by the ENGINEER.

B. Surfaces which do not meet the requirements in this Section shall be refinshed or reworked.

C. After finishing horizontal surfaces, regardless of the finishing procedure specified, the concrete shall be cured in compliance with Section 03300 unless otherwise directed by the ENGINEER.
3.04 SCHEDULES

A. Concrete shall be finished as specified either to remain as natural concrete or to receive an additional applied finish or material under another Section.

B. Concrete for the following conditions shall be finished as noted on the Drawings. If not noted on the Drawings concrete shall be finished as follows:

1. Concrete to receive dampproofing or waterproofing: Rough-form finish. See Paragraph 3.02A.

2. Concrete not exposed to view in the finished work, and not scheduled to receive an additional applied finish or material: Rough-form finish. See Paragraph 3.02A.

3. Exterior vertical concrete above grade exposed to view (and to 12-in below grade): Sacked finish. See Paragraph 3.02B.

4. Interior overhead and vertical concrete exposed to view except in water containment areas and except where scheduled to be painted: Sacked finish. See Paragraph 3.02B.

5. Interior overhead and vertical concrete exposed to view and scheduled to be painted: Rough-form finish. See paragraph 3.02A.

6. Vertical and overhead concrete in water containment areas: Sacked finish on surfaces exposed to view and extending to two feet below normal operating water level; rough-form finish on remainder of submerged areas. See Paragraphs 3.02B and 3.02A.

7. Interior or exterior horizontal concrete exposed to view and not scheduled to receive an additional finish: steel-trowel finish. See Paragraph 3.02E.

8. Concrete for exterior walks, interior and exterior stairs: Broomed finish perpendicular to direction of traffic. See Paragraph 3.02D.

9. Concrete slabs on which process liquids flow or in contact with sludge: Steel trowel finish. See Paragraph 3.02E.

10. Concrete to receive floor sealer: See Paragraph 3.02G.

11. Concrete to receive an applied coating: Refer to manufacturer's written directions and on-site direction by manufacturer's representative.

***END OF SECTION***
SECTION 03600

GROUT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Grout installation, and sampling and testing of materials and products by an independent testing laboratory acceptable to the ENGINEER but engaged by and at the expense of the CONTRACTOR.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03100 – Concrete Forms and Accessories.
2. Section 03200 – Concrete Reinforcement.
3. Section 03250 – Concrete Joints and Joint Accessories.
4. Section 03300 – Cast-in-Place Concrete.
5. Section 05500 – Metal Fabrications.
6. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
2. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
3. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Submit, in accordance with Section 01300, shop drawings and product data showing materials of construction and details of installation for:

1. Commercially manufactured nonshrink cementitious grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working
time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.

2. Commercially manufactured nonshrink epoxy grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.

3. Cement grout. The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, product data on any proposed admixtures and the proposed mix of the grout.

4. Concrete grout. The submittal shall include data as required for concrete as delineated in Section 03300 and for fiber reinforcement as delineated in Section 03200. This includes the mix design, constituent quantities per cubic yard and the water/cement ratio.

B. Samples

1. Samples of commercially manufactured grout products when requested by the ENGINEER.

2. Aggregates for use in concrete grout when requested by the ENGINEER.

C. Laboratory Test Reports

1. Submit laboratory test data as required under Section 03300 for concrete to be used as concrete grout.

D. Certifications

1. Certify that commercially manufactured grout products and concrete grout admixtures are suitable for use in contact with potable water after 30 days curing.

E. Qualifications

1. Submit documentation that manufacturers of commercially manufactured grout products have at least 10 years experience in the production and use of the proposed grouts which they will supply.

1.04 QUALITY ASSURANCE

A. Qualifications

1. Manufacturers of commercially manufactured grout products shall have a minimum of 10 years experience in the production and use of the type of grout proposed for the work.

2. The independent testing laboratory shall be a reputable laboratory, acceptable to the ENGINEER, having experience with testing procedures and associated equipment as required by this Section. Laboratories affiliated with the CONTRACTOR or in which the CONTRACTOR or its officers have a beneficial interest are not acceptable.

B. Pre-installation Conference
1. Well in advance of grouting, hold a pre-installation meeting to review the requirements for surface preparation, mixing, placing and curing procedures for each product proposed for use. Parties concerned with grouting shall be notified of the meeting at least 10 days prior to its scheduled date.

C. Services of Manufacturer's Representative

1. A qualified field technician of the nonshrink grout manufacturer, specifically trained in the installation of the products, shall attend the pre-installation conference and shall be present for the initial installation of each type of nonshrink grout. Additional services shall also be provided, as required, to correct installation problems.

D. Field Testing

1. All field testing and inspection services required will be provided by the OWNER. The CONTRACTOR shall assist in the sampling of materials and shall provide any ladders, platforms, etc, for access to the work. The methods of testing will comply with the applicable ASTM Standards.

2. The field testing of Concrete Grout will be as specified for concrete in Section 03300.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers and printed instructions.

B. Store materials in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to date of installation shall be limited to 6 months or the manufacturer's recommended storage time, whichever is less.

C. Material which becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the OWNER.

D. Nonshrink cement-based grouts shall be delivered as preblended, prepackaged mixes requiring only the addition of water.

E. Nonshrink epoxy grouts shall be delivered as premeasured, prepackaged, three component systems requiring only blending as directed by the manufacturer.

1.06 DEFINITIONS

A. Nonshrink Grout: A commercially manufactured product that does not shrink in either the plastic or hardened state, is dimensionally stable in the hardened state and bonds to a clean base plate.

PART 2 - PRODUCTS

2.01 GENERAL

A. The use of a manufacturer's name and product or catalog number is for the purpose of establishing the standard of quality desired.
B. Like materials shall be the products of one manufacturer or supplier in order to provide standardization of appearance.

2.02 MATERIALS

A. Nonshrink Cementitious Grout

1. Nonshrink cementitious grouts shall meet or exceed the requirements of ASTM C1107, Grades B or C. Grouts shall be portland cement based, contain a pre-proportioned blend of selected aggregates and shrinkage compensating agents and shall require only the addition of water. Nonshrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827.

a. General purpose nonshrink cementitious grout shall conform to the standards stated above and shall be SikaGrout 212 by Sika Corp.; Set Grout by Degussa Building Systems; NS Grout by The Euclid Chemical Co.; or equal.

b. Flowable (Precision) nonshrink cementitious grout shall conform to the standards stated above and shall be Masterflow 928 by Degussa Building Systems; Hi-Flow Grout by the Euclid Chemical Co.; SikaGrout 212 by Sika Corp.; or equal.

B. Nonshrink Epoxy Grout

1. Nonshrink epoxy-based grout shall be a pre-proportioned, three component, 100 percent solids system consisting of epoxy resin, hardener, and blended aggregate. It shall have a compressive strength of 10,000 psi in 7 days when tested in conformity with ASTM C579 and have a maximum thermal expansion of 30 x 10^-6 when tested in conformity with ASTM C531. The grout shall be Masterflow 848 CP by DeGussa Building Systems; Five Star HP Epoxy Grout by Five Star Products, Inc; Sikadur 42 Grout-Pak by Sika Corp.; High Strength Epoxy Grout E3-G by the Euclid Chemical Co. or equal.

C. Cement Grout

1. Cement grouts shall be a mixture of one part portland cement conforming to ASTM C150, Types I, II, or III and 1 to 2 parts sand conforming to ASTM C33 with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow.

D. Concrete Grout

1. Concrete grout shall conform to the requirements of Section 03300 except as specified herein. It shall be proportioned with cement, coarse and fine aggregates, water, water reducer and air entraining agent to produce a mix having an average strength of 4000 psi at 28 days. Coarse aggregate size shall be 3/8-in maximum. Slump should not exceed 5-in and should be as low as practical yet still retain sufficient workability.

E. Water

1. Potable water, free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.
PART 3 - EXECUTION

3.01 PREPARATION

A. Grout shall be placed over cured concrete that has attained its full design strength unless otherwise approved by the ENGINEER.

B. Concrete surfaces to receive grout shall be clean and sound, free of ice, frost, dirt, grease, oil, curing compounds, laitance and paints and free of all loose material or foreign matter which may affect the bond or performance of the grout.

C. Roughen concrete surfaces by chipping, sandblasting, or other mechanical means to ensure bond of the grout to the concrete. Remove loose or broken concrete. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance and firmly embedded into the parent concrete.

   1. Air compressors used to clean surfaces in contact with grout shall be the oilless type or equipped with an oil trap in the airline to prevent oil from being blown onto the surface.

D. Remove all loose rust, oil or other deleterious substances from metal embedments or bottom of baseplates prior to the installation of the grout.

E. Concrete surfaces shall be washed clean and then kept moist for at least 24 hours prior to the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, flooding the surface, or other method acceptable to the ENGINEER. Upon completion of the 24 hour period, visible water shall be removed from the surface prior to grouting. The use of an adhesive bonding agent in lieu of surface saturation shall only be used when approved by the ENGINEER for each specific location of grout installation.

F. Epoxy-based grouts do not require the saturation of the concrete substrate. Surfaces in contact with epoxy grout shall be completely dry before grouting.

G. Construct grout forms or other leakproof containment as required. Forms shall be lined or coated with release agents recommended by the grout manufacturer. Forms shall be of adequate strength, securely anchored in place and shored to resist the forces imposed by the grout and its placement.

   1. Forms for epoxy grout shall be designed to allow the formation of a hydraulic head and shall have chamfer strips built into forms.

H. Level and align the structural or equipment bearing plates in accordance with the structural requirements and the recommendations of the equipment manufacturer.

I. Equipment shall be supported during alignment and installation of grout by shims, wedges, blocks or other approved means. The shims, wedges and blocking devices shall be prevented from bonding to the grout by appropriate bond breaking coatings and removed after grouting unless otherwise approved by the ENGINEER.

3.02 INSTALLATION - GENERAL

A. Mix, apply and cure products in strict compliance with the manufacturer's recommendations and this Section.
B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.

C. Maintain temperatures of the foundation plate, supporting concrete, and grout between 40 and 90 degrees F during grouting and for at least 24 hours thereafter or as recommended by the grout manufacturer, whichever is longer. Take precautions to minimize differential heating or cooling of baseplates and grout during the curing period.

D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 60 and 90 degrees F range.

E. Install grout in a manner which will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion or control joint.

F. Reflect all existing underlying expansion, control and construction joints through the grout.

3.03 INSTALLATION - CEMENT GROUITS AND NONSHRINK CEMENTITIOUS GROUITS

A. Mix in accordance with manufacturer's recommendations. Do not add cement, sand, pea gravel or admixtures without prior approval by the ENGINEER.

B. Avoid mixing by hand. Mixing in a mortar mixer (with moving blades) is recommended. Pre-wet the mixer and empty excess water. Add premeasured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.

C. Placements greater than 3-in in depth shall include the addition of clean, washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added.

D. Place grout into the designated areas in a manner which will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement should proceed in a manner which will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.

E. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix (retemper) after initial stiffening.

F. Just before the grout reaches its final set, cut back the grout to the substrate at a 45 degree angle from the lower edge of bearing plate unless otherwise approved by the ENGINEER. Finish this surface with a wood float (brush) finish.

G. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

3.04 INSTALLATION - NONSHRINK EPOXY GROUITS
A. Mix in accordance with the procedures recommended by the manufacturer. Do not vary the ratio of components or add solvent to change the consistency of the grout mix. Do not overmix. Mix full batches only to maintain proper proportions of resin, hardener and aggregate.

B. Monitor ambient weather conditions and contact the grout manufacturer for special placement procedures to be used for temperatures below 60 or above 90 degrees F.

C. Place grout into the designated areas in a manner which will avoid trapping air. Placement methods shall ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.

D. Minimize "shoulder" length (extension of grout horizontally beyond base plate). In no case shall the shoulder length of the grout be greater than the grout thickness.

E. Finish grout by puddling to cover all aggregate and provide a smooth finish. Break bubbles and smooth the top surface of the grout in conformity with the manufacturer's recommendations.

F. Epoxy grouts are self curing and do not require the application of water. Maintain the formed grout within its recommended placement temperature range for at least 24 hours after placing, or longer if recommended by the manufacturer.

3.05 INSTALLATION - CONCRETE GROUT

A. Screed underlying concrete to the grade shown on the Drawings. Provide the surface with a broomed finish, aligned to drain. Protect and keep the surface clean until placement of concrete grout.

B. Remove the debris and clean the surface by sweeping and vacuuming of all dirt and other foreign materials. Wash the surface using a strong jet of water. Flushing of debris into drain lines will not be permitted.

C. Saturate the concrete surface for at least 24 hours prior to placement of the concrete grout. Saturation may be maintained by ponding, by the use or soaker hoses, or by other methods acceptable to the ENGINEER. Remove excess water just prior to placement of the concrete grout.

D. Place concrete grout to slopes and final grade using the scraper mechanism as a guide for surface elevation and to ensure high and low spots are eliminated. Unless specifically approved by the equipment manufacturer, mechanical scraper mechanisms shall not be used as a finishing machine or screed.

E. Provide grout control joints as indicated on the Drawings.

F. Finish and cure the concrete grout as specified for cast-in-place concrete.

3.06 GROUT SCHEDULE

A. The following list indicates where the particular types of grout are to be used:

1. General purpose nonshrink cementitious grout: Use at all locations where non shrink grout is called for on the Drawings except for base plates greater in area than 3-ft wide by 3-ft long and except for the setting of anchor rods, anchor bolts or reinforcing steel in concrete.
2. Flowable nonshrink cementitious grout: Use under all base plates greater in area than 3-ft by 3-ft. Use at all locations indicated to receive flowable nonshrink grout by the Drawings. The CONTRACTOR, at his/her option and convenience, may also substitute flowable nonshrink grout for general purpose nonshrink cementitious grout.

3. Nonshrink epoxy grout: Use for the setting of anchor rods, anchor bolts and reinforcing steel in concrete and for all locations specifically indicated to receive epoxy grout.

4. Cement grout: Cement grout may be used for grouting of incidental base plates for structural and miscellaneous steel such as post base plates for platforms, base plates for beams, etc. It shall not be used when nonshrink grout is specifically called for on the Drawings or for grouting of primary structural steel members such as columns and girders.

5. Concrete grout: Use for overlaying the base concrete to allow more control in placing the surface grade. Use for concrete grout fill within liquid-containment structures and other locations where specifically indicated on the Drawings.

***END OF SECTION***
SECTION 04070

MASONRY GROUT AND MORTAR

PART 1  GENERAL

1.01  SUMMARY

A.  Section Includes:

1.  Mortar for masonry.

2.  Grouting of masonry cells, bond beams, and lintels.

B.  Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1.  Section 03200 - Concrete Reinforcement.

2.  Section 03250 – Concrete Joints and Joint Accessories.

3.  Section 04080 – Masonry Anchorage and Reinforcement.

4.  Section 04220 – Concrete Masonry Units and Masonry Assemblies.

5.  Section 05500 – Metal Fabrications.

6.  Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02  REFERENCES

A.  American Concrete Institute (ACI)

1.  ACI 530 – Building Code Requirement for Masonry Structures.

2.  ACI 530.1 - Specification for Masonry Structures

B.  American Society for Testing and Materials (ASTM)

1.  ASTM C144 - Specification for Aggregate for Masonry Mortar

2.  ASTM C150 - Specification for Portland Cement

3.  ASTM C207 - Specification for Hydrated Lime for Masonry Purposes

4.  ASTM C270 - Specification for Mortar for Unit Masonry

5.  ASTM C404 - Specification for Aggregates for Masonry Grout

6.  ASTM C476 - Specification for Mortar and Grout for Reinforced Masonry

7.  ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
8. ASTM C1019 - Method of Sampling and Testing Grout

C. California Building Standards Commission (CBSC):

1.03 SUBMITTALS

A. All submittals shall be in accordance with Section 01300.

B. Product data: Submit product data including the following:
   1. Sources of cement, hydrated lime, and aggregates.
   2. Mix designs for mortar and grout.

C. Quality Assurance/Control
   1. Test Reports. Reports by an independent testing laboratory engaged by the CONTRACTOR and acceptable to the ENGINEER shall be furnished prior to installation of mortar and grout.
      a. Sieve analysis, mechanical properties, and deleterious substance content for coarse and fine aggregate for mortar and grout in accordance with ASTM C144 and C404, as applicable.
      b. Mortar test results in accordance with ASTM C270.
      c. Grout test results in accordance with ASTM C1019.
   2. Certifications
      a. Certify that the CONTRACTOR is not associated with the independent testing laboratory and that the CONTRACTOR or its officers have no beneficial intent in the laboratory.
   3. Qualifications
      a. Independent testing laboratory: Name, address, and qualifications. Laboratories affiliated with the CONTRACTOR or in which the CONTRACTOR or its officers have a beneficial interest are not acceptable.
   4. Procedures
      a. Cold weather construction procedures. Submit a description of procedures to be used when the ambient temperature or the temperature of masonry units falls below 40°F.
      b. Hot weather construction procedures. Submit a description of procedures to be used when the ambient temperature exceeds 100°F or 90°F with a wind velocity greater than 8 mph.
      c. Review of hot and cold weather construction procedures will be for information only. The CONTRACTOR remains fully responsible for complying with the requirements of this Section and for the adequacy of procedures employed.
1.04 QUALITY ASSURANCE

A. Mortar and grout shall comply with the recommendations of ACI 530 and other stated requirements, codes and standards. The most stringent requirement of the codes, standards, and this Section shall apply when conflicts exist.

B. Testing services required to demonstrate that the materials proposed for incorporation into the work comply with this Specification Section and the stated ASTM standards shall be furnished by the CONTRACTOR. The cost of such testing, unless specifically stated otherwise, shall be paid by the CONTRACTOR.

C. All field testing and inspection services to confirm that the properties of the materials actually incorporated into the work conform to these specifications, and to satisfy the building code requirements for special inspection will be provided by the Independent Testing Agency. The cost of such work, unless specifically stated otherwise, will be paid for by the OWNER. The CONTRACTOR shall facilitate such testing and inspection as follows:

1. Advise the Independent Testing Agency’s representative of planned work at least 7 days in advance to allow for assignment and scheduling of inspection and testing personnel.

2. Furnish any labor necessary to assist the Independent Testing Agency in obtaining and handling samples.

D. Methods of testing shall conform to ASTM or other standards as indicated. Include in reports for prisms or test specimens a description of the portion of construction represented by the specimen(s), and a summary of conditions under which the specimens were stored prior to testing.

E. Special Inspection

1. All field testing and inspection services and related laboratory tests required will be provided by the OWNER Special Inspections will be performed in accordance with TMS 402/ACI 530/ASCE 5 and TMS 602/ACI 530.1/ASCE 6 quality assurance programs.

1.05 DELIVERY, STORAGE, AND HANDLING

A. All materials for the work of this Section shall be delivered, stored, and handled so as to preclude damage of any nature. Store materials off the ground and protected from weather. Prevent wetting by capillary action and rain. Manufactured materials, such as cement and lime, shall be delivered and stored in their original containers, plainly marked with identification of material and maker. Materials in broken containers, or in packages showing watermarks or other evidence of damage, shall not be used and shall be removed from the site.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. The use of a manufacturer’s name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

2. Like items of materials shall be the end products of one manufacturer in order to provide standardization for appearance, maintenance, and manufacturer’s service.
3. Materials shall conform to the standards listed herein and to any applicable state or local building code standards.

B. Cementitious materials

1. Cementitious materials for mortar and grout shall not contain epoxy resins and derivatives, phenols, asbestos fiber, or fireclays.

2. Portland cement shall conform to ASTM C150 Type II. Masonry cements, mortar cements, and plastic cement shall not be used.

3. Lime for masonry mortar shall be hydrated lime conforming to ASTM C207, Type S.

C. Aggregates

1. Sand shall be clean, durable particles, free from injurious amounts of organic matter, dust, lumps, shale, alkali, or surface coatings.
   a. Sand for mortar shall conform to ASTM C144.
   b. Sand for grout shall conform to ASTM C404, Size No. 2.

2. Coarse aggregate for grout shall conform to ASTM C404, Size No. 8.

D. Water shall be from a potable water supply. Water shall be free from deleterious amounts of oils, acids, alkalis, or organic matter, and shall be clean and fresh.

E. Admixtures and Additives

1. Additives and admixtures to mortar or grout shall not be used unless approved by the ENGINEER.

2. Antifreeze Compounds. Antifreeze liquids, chloride salts, or other such substances shall not be used in mortar or grout.

3. Air Entrainment. Air entraining substances shall not be used in mortar or grout.

4. Integral Waterproofing. Integral waterproofing for use in all exterior mortar shall be metallic stearate type, and shall be Hydrocide Powder by Sonneborn Contech; Omicron Mortarproofing by Master Builders; Integral Waterpeller by Euclid Chemical; or equal.

F. Grout and Mortar

1. Grout and Mortar used for Concrete Masonry Unit construction shall consist of normal weight aggregates in order to provide a maximum unit weight of 135 pcf, unless otherwise approved by the ENGINEER.

2.02 MIXES

A. Mortar

1. Mortar for concrete masonry shall be Type S portland cement-lime mortar providing a minimum compressive strength of 2,000 psi at 28 days. Mortar proportions shall comply with ACI 530 except that increases in lime content may be permitted to adjust the mixture for initial rate of absorption of the masonry or for temperature if mortar strength tests are performed. Admixtures shall not be used in the mortar mix.
a. Mix mortar in accordance with the requirements of ACI 530.1, using a mechanically-operated mixer in which the quantity of water added can be accurately and uniformly controlled. Accurately measure mortar constituents by volume.

b. The consistency of the mortar shall be adjusted to the satisfaction of the mason with water added as necessary to produce a workable mix. Mortar may be re-tempered one time by adding water when needed to restore the required consistency. When water is added, it shall be mixed into the mortar, not splashed over the surface.

c. Mortar which has begun to "set" or which has not been used within 2-1/2 hours after initial mixing water was added to the dry ingredients shall be discarded.

d. Mortar shall be consistently tinted to match the color selected by the ENGINEER for all work.

e. Proportion mortar integral water repellant admixture in accordance with manufacturer's recommendations.

B. Grout

1. All masonry walls shall be solid grouted with grout conforming to ASTM C476. Grout shall attain a minimum compressive strength of 2,000 psi at 28 days when tested in accordance with ASTM C1019. Admixtures shall not be used without prior approval by the ENGINEER. Control grout materials and water content to provide adequate fluidity for placement without segregation. Grout shall be classified as "fine" and shall be manufactured with fine aggregates in accordance with ASTM C476.

a. Accurately measure all ingredients according to the proportions specified for the batch and mix in a mechanically-operated batch mixer. Mix grout for at least 5 minutes but not more than 10 minutes after all ingredients have been added. Add water as required to provide the desired workability.

b. Do not handle or pump grout using aluminum equipment.

c. Transit mixed grout may be used. Continually rotate transit mixed grout from the time the water is added until the grout is discharged.

d. Grout mixing drums shall be completely emptied before the succeeding batch of materials is introduced for mixing.

e. The consistency of grout shall be adjusted so that it will flow into place without segregation of ingredients. Water may be added to compensate for loss.

f. Grout that has begun final "set" and becomes harsh or which has not been used within 1-1/2 hours after initial mixing water was added to the dry ingredients shall not be used.

2.03 SOURCE QUALITY CONTROL

A. Test for material compression strength as follows.

1. Prior to construction, the Independent Testing Agency shall perform the following tests using samples of materials that will be incorporated in the work.

a. One mortar test consisting of one set of three 2-in diameter by 4-in cylindrical specimens constructed and tested in compliance with ASTM C780.
b. One grout test consisting of one set of three specimens constructed and tested in compliance with ASTM C1019.

c. Retesting of mortar and grout as required to demonstrate compliance with this Section.

2. During construction, the Special Inspector may also perform mortar and grout testing.

B. All masonry work shall conform to the CBC and ACI 530, except as modified herein.

PART 3 EXECUTION

3.01 GENERAL

A. Before beginning masonry construction, verify that tolerances of supporting members are within allowable limits, and that any required reinforcing dowels have been placed in accordance with the requirements of the Drawings.

1. Bearing surface for masonry shall be such that the thickness of the initial bed joint shall be not less than 1/4-in nor more than 3/4-in in thickness.

B. Before laying masonry, remove laitance, loose aggregate, or anything else that would interfere with bond between the mortar and substrate.

C. Cold Weather Construction. When the ambient temperature or the temperature of masonry units falls below 40°F, conform to approved cold weather construction procedures. Provide cold weather heating and protection for both mortar and grout.

D. Hot Weather Construction. Where the ambient temperature exceeds 100°F or 90°F with a wind velocity greater than 8 mph, conform to approved hot weather construction procedures.

3.02 MORTAR INSTALLATION

A. Placing of mortar and units shall conform to ACI 530.1. Tool joints dense and neat.

B. Sizes shall be as specified and called for on the Drawings. Where “splits” are used, the space between these members and the backup material shall be slushed full of mortar.

C. Mortar fins protruding from joints shall be removed before grout is placed. The minimum clear dimensions of vertical cores to be grouted shall be 2-in by 3-in.

D. Joints of all masonry shall be tooled in accordance with the following:

1. Wait until unit mortar is thumbprint hard before tooling joint. This may require as much as 3 hours in the shade and 1 hour in the sun.

2. The required personnel shall be kept on the job after hours, if necessary, to properly tool joints.

3. Both vertical and horizontal joints shall be maintained uniform in spacing.

4. Joints for all types of CMU shall be 3/8-in. and concave.

E. Head joints of open-end units with beveled ends need not be mortared.
F. Surfaces shall be brushed as work progresses and maintained as clean as is practicable. Any mortar in contact with the face of masonry shall be removed.

3.03 GROUTING

A. General

1. Walls shall be fully grouted unless otherwise indicated on the Drawings.

2. Prior to grouting, the grout space shall be clean and free of mortar projections greater than 1/2-in, mortar droppings, or other foreign materials.

3. Reinforcement shall be in place and adequately supported before commencing grouting operations. Reinforcement shall be clean and free of mortar droppings or other debris. Notify the ENGINEER at least 24 hours prior to any grouting operations so that reinforcement placement, support, and laps may be observed before grouting. Accurately set embedded bolts with templates and hold in place to prevent movement. Provide minimum 1-in grout space between any bolt and an adjacent masonry surface.

4. Control grout materials and water content during grouting to provide adequate fluidity for placement without segregation. Place grout within 1-1/2 hours after the introduction of water into the mix and prior to initial set.

5. Consolidate grout by mechanical vibration before loss of plasticity, in a manner which will solidly fill the grout space and minimize voids due to absorption of water into the masonry. Reconsolidate grout by mechanical vibration after initial water loss and settlement has occurred.

6. Complete grouting of lintels over openings in one continuous operation.

7. Use extreme care to prevent any grout from staining the face of masonry to be left exposed or unpainted. If any grout does contact the face of such masonry, it shall be removed immediately. Protect all sills, ledges offsets, etc. from grout droppings.

8. Limitations on grout pour heights based on least clear dimensions shall be as shown in Table 04070-1. Units may be laid to the maximum height of the grout pour before grouting unless otherwise noted on the Drawings or specified. Where this table or notes on the Drawing indicate that walls are to be grouted at intervals less than their final height, use "low-lift" grouting procedures. Where walls are grouted to their final height in one pour, use "high-lift" grouting procedures.

<table>
<thead>
<tr>
<th>Grout Type</th>
<th>Grout Pour Max. Height (ft)</th>
<th>Least Clear Dimensions (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine</td>
<td>1</td>
<td>1-1/2 x 2</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>2 x 3</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>2-1/2 x 3</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>3 x 3</td>
</tr>
</tbody>
</table>

(1) The clear dimension is the cell width less mortar projections ignoring horizontal reinforcement.

(2) For grouted cells in hollow unit masonry.
B. Low-Lift Grouting Procedures

1. Between grout pours in vertical cells, form a horizontal construction joint "key" in walls by stopping all wythes at the same elevation, and stopping the grout lift a minimum of 12-in below the mortar joint, except at the top of a wall. Consolidate the grout and then continue the pour. For horizontal bond beams, grout cells below the bond beam and consolidate, then grout the bond beam itself stopping the grout pour 2-in below the top of the masonry. At the finished course of both walls and bond beams, bring the last pour flush with the top of the masonry during initial placing and again after consolidation.

C. High-Lift Grouting Procedures

1. Do not erect masonry to a height of more than 80 times the minimum clear cell or grout space dimension nor higher than 30-ft before grouting unless approval is obtained in writing from the ENGINEER.

2. Where grout pours exceed 5-ft in height, provide clean-outs in the bottom course of masonry. Clean-out openings shall be not less than 12-in² in area and the least dimension of any opening shall not be less than 3-in. In solid grouted masonry, space clean-outs at each vertical bar, but not more than 32-in on center.

3. Before grouting, clean cells and collar joints and close and seal clean-out openings. Brace closures to resist grout pressure. Pour grout at a rate which will minimize the potential for "blowouts" at the closed clean-out openings, but rapidly enough to allow consolidation before loss of plasticity.

***END OF SECTION***
SECTION 04080
MASONRY REINFORCEMENT

PART 1   GENERAL

1.01 SUMMARY

   A. Section Includes:

      1. Installation of deformed steel reinforcement provided under Section 03200.
      2. Installation of Masonry Control Joints as shown and detailed on the Drawings.

   B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

      1. Section 03200 - Concrete Reinforcement.
      2. Section 03250 – Concrete Joints and Joint Accessories.
      3. Section 04070 – Masonry Grout and Mortar.
      4. Section 04220 – Concrete Masonry Units and Masonry Assemblies.
      5. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

   A. American Concrete Institute (ACI)

      1. ACI 530 – Building Code Requirement for Masonry Structures.
      2. ACI 530.1 - Specification for Masonry Structures.

   B. American Society for Testing and Materials (ASTM)

      1. ASTM A153 - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
      2. ASTM A615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
      3. ASTM A706 – Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

   C. California Building Standards Commission:


   D. Where reference is made to one of the preceding standards, the revision in effect at the time of bid opening shall apply unless otherwise indicated.

1.03 SUBMITTALS
A. Product Data: Submit to the ENGINEER, in accordance with Section 01300, product data including the following:

1. Reinforcing steel mill certifications.

2. Masonry Control Joint Materials, including but not limited to smooth dowels and joint material.

B. Shop Drawings: Submit to the ENGINEER, in accordance with Section 01300, shop drawings showing details of installation for:

1. Reinforcing Steel Placement Drawings. Placement drawings shall conform to the recommendations of ACI 315 and shall not be copies of the Contract Drawings. New scaled drawings shall be prepared showing plans, all vertical structure elevations, sections, and details as required to clearly delineate the reinforcing. All reinforcement in a concrete placement shall be included on a single placement drawing or cross-referenced to the pertinent main placement drawing. The main drawing shall include bar lists, schedule, bending details, placing plans and elevations, clear concrete cover, splice locations, splice length, and the additional reinforcement (around openings, at corners, etc.) shown on the standard detail sheets. Bars to be of special steel or special yield strength are to be clearly identified. Masonry control joints shall be accounted for on placement drawings.

1.04 Quality Assurance

A. Masonry reinforcement shall comply with the CBC, the recommendations of ACI 530 and other stated requirements, codes and standards. The most stringent of the codes, standards, and this Section shall apply when conflicts exist.

B. Special Inspection

1. All special inspection services will be provided by the OWNER. Special Inspections will be performed in accordance with TMS 402/ACI 530/ASCE 5 and TMS 602/ACI 530.1/ASCE 6 quality assurance programs.

1.05 Delivery, Storage, and Handling

A. All materials for the work of this Section shall be delivered, stored, and handled so as to preclude damage of any nature. Store materials off the ground and protected from weather. Prevent wetting by capillary action and rain.

PART 2 PRODUCTS

2.01 Materials

A. General

1. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

2. Materials shall conform to the standards listed herein and to any applicable state or local building code standards.

B. Reinforcement
1. Deformed steel reinforcing bars conform to ASTM A706, Grade 60, unless otherwise noted on the Drawings, and shall be as specified in Section 03200.

   a. Fabricate reinforcement for masonry in accordance with the provisions of Section 03200, except as amended by the following paragraphs.

   b. Hooks. The term "standard hook" as used herein or as shown on the Drawings for masonry reinforcement shall be as defined in the following paragraphs. Inside diameter of the bend shall not be less than that shown in Table 04080-1.

      (1) A 180-degree turn plus an extension of at least 4 bar diameters, but not less than 2-1/2-in at the free end of the bar.

      (2) A 135-degree turn plus an extension of at least 6 bar diameters but not less than 4-in at the free end of the bar.

      (3) Where ties are placed in the horizontal bed joints, a 90-degree bend having a radius of not less than 4 diameters plus an extension of at least 12 bar diameters at the end of the bar.

      (4) For stirrups or ties, either a 90-degree or a 135-degree turn plus an extension of at least 6 bar diameters but not less than 2-1/2-in at the free end of the bar.

<table>
<thead>
<tr>
<th>Bar</th>
<th>Minimum Inside Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stirrups &amp; Ties:</td>
<td>#4 &amp; smaller</td>
</tr>
<tr>
<td>Other:</td>
<td>#3 through #8</td>
</tr>
<tr>
<td></td>
<td>#9 through #11</td>
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<tr>
<td></td>
<td>4 diameters</td>
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<td></td>
<td>6 diameters</td>
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<tr>
<td></td>
<td>8 diameters</td>
</tr>
</tbody>
</table>

Table 04080-1
Reinforcement Bend Diameter

PART 3  EXECUTION

3.01 PREPARATION

   A. Before beginning masonry construction, verify that tolerances of supporting members are within allowable limits, and that any required reinforcing dowels have been placed in accordance with the requirements of the Drawings.

3.02 REINFORCED MASONRY

   A. Install reinforcement of the type, size, and spacing and at locations as indicated on the Drawings and specified herein.

   B. Reinforcement shall be free of dirt, oil, and other materials that will adversely affect bond, and shall be straight except where bends or hooks are detailed on the plans. Reinforcement which, in the opinion of the ENGINEER, is bent or otherwise damaged so as to affect its structural capacity shall not be incorporated into the Work.

   C. Bond beams shall be continuous with lapped splices as specified on the Drawings.

   D. Reinforcing around Openings
1. Unless otherwise shown on the Drawings, at openings in masonry greater than or equal to 16-in in any direction, provide a minimum of two #5 in grouted cells or bond beams on all sides of the opening. Bars shall extend at least 48 bar diameters past the opening on each side.

2. See lintel schedules and miscellaneous details on the Drawings for additional requirements.

E. Reinforcing Details

1. Support and fasten masonry reinforcement to prevent displacement beyond the tolerances noted herein.

2. Position and accurately space reinforcement in units as shown on the Drawings. Maintain a clear distance between reinforcement and any masonry surface or adjacent bar of not less than 1/4-in for fine grout or 1/2-in for coarse grout.

3. Tolerances for placing reinforcement shall be as follows, where d equals distance from centerline of steel to the compression face of masonry.

   a. Walls, beams, lintels, and bond beams:

      | "d" (in) | Tolerance (in) |
      |---------|----------------|
      | d ≤ 8   | +1/2           |
      | 8 < d ≤ 24 | +1            |
      | 24 < d   | ±1-1/4        |

   b. If it becomes necessary to move reinforcement to avoid interferences with other reinforcement, conduits, or embeds, bars shall not be moved beyond their specified tolerances nor more than one diameter without prior acceptance by the ENGINEER.

4. Splices for deformed reinforcing steel shall be as shown on the Drawings.

5. Clear spacing between vertical bars, except for bar splices, shall be not less than 2-1/2 times the bar diameter nor 1-1/2-in. Stagger adjacent splices vertically.

6. Completely embed all reinforcing bars in mortar or grout with minimum cover (measured from outside of face shell) as follows:

   Interior exposure: 1-1/2-in
   Exposed to soil or weather: 2-in

7. Provide masonry dowels cast into the supporting concrete at all corners of the structure, in the first adjacent cell in each direction from the corner, at cells requiring vertical reinforcement, and elsewhere as shown on the Drawings.

***END OF SECTION***
SECTION 04220

CONCRETE MASONRY UNITS AND MASONRY ASSEMBLIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Concrete Masonry Units (CMU):
      a. Standard Smooth face masonry unit (Precision).
   2. Reinforced unit masonry assemblies.
   3. Integral waterproofing.
   4. Joint accessories.
   5. Coordination and installation of items in masonry such as window, door, and louver frames, plus vent pipes, conduits, and other items furnished and installed by other trades.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).
   1. Section 03200 – Concrete Reinforcement.
   2. Section 03250 – Concrete Joints and Joint Accessories.
   3. Section 04070 – Masonry Grout and Mortar.
   4. Section 04080 – Masonry Reinforcement.
   5. Section 05500 – Metal Fabrications.
   7. Section 07900 – Joint Sealants.
   8. Section 08100 – Hollow Metal Doors and Frames.
   9. Section 08700 – Door Hardware.
   10. Section 09900 – Painting.
   11. Section 10200 – Architectural Louvers.
   12. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

A. American Concrete Institute (ACI):
1. ACI 530 – Building Code Requirement for Masonry Structures.
2. ACI 530.1 - Specification for Masonry Structures.

B. American Society for Testing and Materials (ASTM):
   2. ASTM C33 - Specification for Concrete Aggregates.
   3. ASTM C90 - Specification for Hollow Load-Bearing Concrete Masonry Units.
   4. ASTM C140 - Sampling and Testing for Concrete Masonry Units.
   5. ASTM C144 - Specification for Aggregate for Masonry Mortar.
   8. ASTM C270 - Specification for Mortar for Unit Masonry.
   9. ASTM C331 - Specification for Lightweight Aggregates for Concrete Masonry Units.
   10. ASTM C426 - Test for Drying Shrinkage of Concrete Block.

C. California Building Standards Commission (CBSC):

D. Where reference is made to one of the preceding standards, the revision in effect at the time of bid opening shall apply unless otherwise indicated.

1.03 SUBMITTALS

A. All submittals shall be in accordance with Section 01300.

B. Product Data: Submit product data including the following:
   1. Material properties and test results letters for each different masonry unit.
   2. Documentation that masonry units meet the minimum required fire-resistance rating as indicated on the Drawings. Submit all certifications and test data as required to prove compliance with this Section and the California Building Code, 2013 Edition.
   3. Miscellaneous items: Joint filler and accessories.
   4. Integral waterproofing: Product data and test information for field-applied water repellent to be used at all exterior CMU.
C. Samples:

1. Concrete Masonry Units: Two samples, 8-in thick units.

2. Masonry joint material: Two samples, each at least 6-inches long, of each type.

D. Quality Assurance/Control

1. Test Reports. Reports by an independent testing laboratory engaged by the CONTRACTOR and acceptable to the ENGINEER shall be furnished prior to installation of masonry units and prisms.
   a. For each type of masonry unit, certified preconstruction test reports, including compressive strength, absorption, dimensional analysis, unit weight, and moisture content in accordance with ASTM C140.
   b. Compression strength testing reports for masonry prisms before and during construction in accordance with ASTM C1314.

2. Certifications
   a. Certify that the CONTRACTOR is not associated with the independent testing laboratory and that the CONTRACTOR or its officers have no beneficial intent in the laboratory.

3. Qualifications
   a. Independent testing laboratory: Name, address, and qualifications. Laboratories affiliated with the CONTRACTOR or in which the CONTRACTOR or its officers have a beneficial interest are not acceptable.
   b. Provide a list of not less than three projects utilizing integrally-colored units with integral water repellent manufactured by the same supplier.

4. Procedures
   a. Cold weather construction procedures. Submit a description of procedures to be used when the ambient temperature or the temperature of masonry units falls below 40°F.
   b. Hot weather construction procedures. Submit a description of procedures to be used when the ambient temperature exceeds 100°F or 90°F with a wind velocity greater than 8 mph.
   c. Review of hot and cold weather construction procedures will be for information only. The CONTRACTOR remains fully responsible for complying with the requirements of this Section and for the adequacy of procedures employed.

1.04 QUALITY ASSURANCE

A. Masonry shall comply with the recommendations of the CBC, ACI 530 and other stated requirements, codes and standards. The most stringent requirement of the codes, standards, and this Section shall apply when conflicts exist.

B. Testing services required to demonstrate that the materials proposed for incorporation into the work comply with this Specification Section and the stated ASTM standards shall be furnished
by the CONTRACTOR. The cost of such testing, unless specifically stated otherwise, shall be paid by the CONTRACTOR.

C. All field testing and inspection services to confirm that the properties of the materials actually incorporated into the work conform to these Specifications, and to satisfy the building code requirements for special inspection will be provided by an Independent Testing Agency. The cost of such work, unless specifically stated otherwise, will be paid by the OWNER. The CONTRACTOR shall facilitate such testing and inspection as follows:

1. Advise the ENGINEER of installation far enough in advance to allow for assignment and scheduling of inspection and testing personnel.

2. Furnish any labor necessary to assist the OWNER's testing agency in obtaining and handling samples.

D. Methods of testing shall conform to ASTM or other standards as indicated. Include in reports for prisms or test specimens a description of the portion of construction represented by the specimen(s), and a summary of conditions under which the specimens were stored prior to testing.

E. Special Inspection

1. All reinforced masonry shall be inspected by an ICC certified special inspector in accordance with the following paragraphs. Costs of inspection described in these paragraphs will be paid by the OWNER.

2. The special inspector shall observe the work of this Section for conformance with the Drawings and specifications, and shall bring any discrepancies to the immediate attention of the CONTRACTOR and the ENGINEER.

   a. The special inspector shall furnish three original copies of inspection reports on all inspections within 48 hours after the inspections are made.

   b. The special inspector shall sign and submit three original copies of a final report stating whether the work was, to the best of his/her knowledge, performed in accordance with the Drawings and the applicable workmanship provisions of the governing building code.

   c. The special inspector shall submit the original copy of the reports described in the preceding paragraphs to the ENGINEER.

3. ICC certified special inspector shall perform special inspections in accordance with the CBC, Special Inspections will be performed in accordance with TMS 402/ACI 530/ASCE 5 and TMS 602/ACI 530.1/ASCE 6 quality assurance programs. In addition, the following item shall be inspected.

   a. Observe site sampling of masonry units for compression testing.

F. Cold and Hot Weather Construction: Masonry construction in cold and hot weather shall conform to the applicable requirements of the CBC and ACI 530 unless otherwise specified herein. Heat and enclosures will be the only protection method allowed for cold weather construction. No mortar additives shall be used for this purpose.

G. All masonry work shall conform to the CBC and ACI 530, except as modified herein.

1.05 DELIVERY, STORAGE, AND HANDLING
A. All materials for the work of this Section shall be delivered, stored, and handled so as to preclude damage of any nature. Store masonry units off the ground and protected from weather.

B. All masonry shall be shipped stacked with pallets, shrink wrap, banding, plastic, and/or cardboard protection or other suitable protective device, and shall be similarly protected and stacked off the ground on the site. Masonry shall be protected from the weather and staining with the use of tarpaulins or other plastic covering approved by the ENGINEER.

1. Units shall be well covered and protected during manufacture, storage, shipping, and while on the job site to prevent contamination which may lead to efflorescence in the finished work. If efflorescence occurs in the finished work, the ENGINEER may order the removal and replacement of areas so affected at no additional cost to the OWNER.

C. Store masonry accessories including metal items to prevent corrosion and the accumulation of dirt and oil.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. Compression strength of masonry, $f_{m}$, shall be equal to or exceed 1,500 psi. The ENGINEER has selected this compression strength based on the Unit Strength Method, in accordance with the CBC.

2. The use of a Manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

3. Like items of materials shall be the end products of one Manufacturer in order to provide standardization for appearance, maintenance, and Manufacturer's service.

4. Materials shall comply with this Section and to any applicable State or local Building Code standards.

5. Concrete masonry units shall have the finishes and fire-resistance ratings (e.g. 1-hour fire-rated, etc.) as shown on the Drawings.

B. Concrete Masonry Units:

1. Concrete masonry units shall be open end (single or double) units, conforming to ASTM C90, medium weight, Type I, hollow, load bearing units of 6-in or 8-in by 16-in nominal face size as required for the project. Concrete masonry units shall be manufactured by Basalte, Calstone Company, or approved equal. Units shall have an integral water-repellent admixture at the time of manufacture.

a. Materials. Cementitious and pozzolanic (or siliceous) materials, admixtures, and aggregates shall conform to their respective ASTM Specifications.

b. Cure masonry units in an autoclave in a saturated steam atmosphere at an average temperature exceeding 350°F (176°C) for a period of time sufficient to assure that the units will meet the requirements for drying shrinkage.
c. Dimensions. Nominal block dimensions shall be 8-in high, 16-in long, and of the thickness shown on the Drawings. Provide internal corner units, external corner units, and specials shown or required.

d. Appearance. Surface texture and aggregate exposure shall be uniform within the normal range established by agreement between Manufacturer, CONTRACTOR, and the ENGINEER, and as represented by a protected sample wall panel erected at the job site.

e. Color. Masonry units shall be Color #2152WC with Ground-Face finish by Calstone Company or approved equal, as selected by the Architect or ENGINEER from custom color palette available from block Manufacturer.

f. Special Units. If required for uniform color and appearance, bond beam and other units shall be field cut from standard 8x16 units, as required to match the typical masonry wall thickness.

g. Protection. Block units shall be delivered to the job site packaged in a manner so as to prevent damage to the faces in shipment and shall be additionally protected with polyethylene protective covers, so as to maintain their pre-dried, pre-shrunk condition.

2. Provide special units required by the Drawings, corner, pilaster, lintels, bond beams, cap and jamb units.

3. Use formed "U" shaped units for reinforced masonry lintels.

4. Similar units shall be obtained from one Manufacturer to ensure even color and texture.

5. Units shall be sound and free of cracks or other defects that would interfere with the proper placing of the units or impair the strength or permanence of the construction. Minor cracks or defects incidental to the usual methods of manufacture, or minor chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection except that not more than 5 percent of a shipment shall contain chips larger than 1-in from any edge or corner on the faces.

6. Provide UL approved units where required for fire-rated construction where designated.

7. Masonry units shall have integral colored pigment and integral water repellant, as specified below, added during manufacture. Amount used shall be as recommended by manufacturer, and as submitted and approved by the ENGINEER.

8. Integral water repellant shall be a liquid polymeric admixture resistant to water penetration with a class E rating in accordance with ASTM E514 and shall be: Dry-Block Water Repellant Admixture by W.R. Grace & Company, Connecticut; Rheopel Plus by BASF Construction Chemicals, Cleveland, Ohio; or approved equal. Integral water repellant shall be compatible with the water repellent admixture specified in Section 04070 and the externally applied masonry water repellent specified herein.

9. Externally applied masonry water repellant shall be Infinisal DB by WR Grace & Company or approved equal. Masonry water repellent shall be compatible with the water repellent mortar and masonry unit admixtures specified herein.

PART 3 EXECUTION

3.01 PREPARATION
A. Before beginning masonry construction, verify that tolerances of supporting members are within allowable limits, and that any required reinforcing dowels have been placed in accordance with the requirements of the Drawings.

1. Bearing surface for masonry shall be such that the thickness of the initial bed joint shall be not less than 1/4-in nor more than 3/4-in in thickness.

B. Before laying masonry, remove laitance, loose aggregate, or anything else that would interfere with bond between the mortar and substrate.

3.02 FIELD QUALITY CONTROL

A. Sample Panel: Before masonry work is begun, provide a sample panel for the ENGINEER's approval. The panel shall be approximately 6-ft long by 4-ft high, and of the same construction as the walls shown for the building. One face shall show the workmanship, coursing, bond, thickness, and tooling of joints, range of color and texture of the masonry, and the color of the mortar, all of which shall be as specified. Include bond beam, half-blocks, and other special units in this sample panel. The accepted panel shall form the standard for acceptable finished work on the project. The panel shall be erected in a location as designated by the ENGINEER and, when directed, shall be completely removed from the job site.

B. The CONTRACTOR shall test for material compression strength as follows. Compression strength of masonry in each wythe shall equal or exceed the specified value of f'm.

1. Prior to construction, perform the following tests using samples of materials that will be incorporated in the work.

a. One prism test consisting of three test specimens. Construct and test prisms in accordance with ASTM C1314.

2. During construction, perform one prism test consisting of three test specimens for each 5,000 ft² of wall area or portion thereof. Construct and test prisms in accordance with ASTM C1314.

3.03 MASONRY - INSTALLATION

A. Cold Weather Construction. When the ambient temperature or the temperature of masonry units falls below 40°F, conform to approved cold weather construction procedures. Provide cold weather heating and protection for both mortar and grout.

B. Hot Weather Construction. Where the ambient temperature exceeds 100°F or 90°F with a wind velocity greater than 8 mph, conform to approved hot weather construction procedures.

C. Wetting Masonry Units

1. Do not wet concrete masonry units before laying unless prior approval is obtained from the ENGINEER.

D. Masonry units shall be laid in running bond. Placing of mortar and units shall conform to ACI 530.1. Tool joints dense and neat.

E. Sizes shall be as specified and called for on the Drawings. Where "soaps" and "splits" are used, the space between these members and the backup material shall be slushed full of mortar.
F. Joints of all masonry shall be tooled in accordance with the following:

1. Wait until unit mortar is thumbprint hard before tooing joint. This may require as much as 3 hours in the shade and 1 hour in the sun.

2. The required personnel shall be kept on the job after hours, if necessary, to properly too joint.

3. Both vertical and horizontal joints shall be maintained uniform in spacing.

4. Joints for all types of CMU shall be 3/8-in and concave.

G. Head joints of open-end units with beveled ends need not be mortared. The beveled ends shall form a grout key that permits grouts within 5/8-inch of the face of the unit. The unit shall be tightly butted to prevent leakage of the grout.

H. Install all frames required to be set in masonry, set masonry tightly against frames, build in all frame anchors, and fill frames with mortar.

I. Control joints shall be installed as detailed on the Drawings. The maximum length, horizontally, between vertical control joints shall be 30-feet, but joints shall be located only as shown or approved in writing. Joints shall be equal in width to the standard mortar joint. Extend control and expansion joints through bond beams and discontinue horizontal reinforcement across joint unless otherwise shown on the Drawings.

J. All masonry slots, chases, or openings required for the proper installation of the work of other Sections shall be constructed as indicated on the Drawings or in accordance with information furnished before the work is started at the points affected. No chase shall be cut into any wall constructed of hollow units after it is built, except as directed and approved by the ENGINEER.

K. Surfaces shall be brushed as work progresses and maintained as clean as is practicable. Protect sills, ledges, offsets, etc. from mortar droppings. Unfinished work shall be raked back where possible, and toothed only where acceptable to the ENGINEER. The top of partially completed work shall be covered at all times while work is not in progress. Before leaving fresh or unfinished work, walls shall be fully covered and protected against rain, wind, frost, or the elements. Covers of waterproof paper, tarpaulins, or other means acceptable to the ENGINEER, shall be draped over the wall, shall extend a minimum of 2-ft down both sides, and shall be firmly held in place.

L. Build in all miscellaneous items to be set in masonry for which placement is not specifically provided under separate Divisions, including reglets, lintels, ties, electrical panel boxes, process equipment, sleeves, vents, grilles, anchors, grounds, and exterior electric conduits and fixtures. Cooperate with other trades whose work is to be coordinated with the work under this Section.

1. Do not embed pipes or electrical conduits in masonry unless their location has been detailed on the structural drawings. Sleeves through masonry shall not be placed closer than 3 diameters, center to center, nor shall they be placed through reinforced courses or cells.

2. Do not place dissimilar metals in contact with each other.

3. Do not embed aluminum conduits, pipes, or accessories in masonry, grout, or mortar, unless they have been coated or covered with materials which will effectively prevent chemical reactions with cement or steel.
4. Do not insert through-wall flashing or other elements which stop bond in masonry joints unless approved by the ENGINEER.

M. All anchorage, attachment, and bonding devices shall be set so as to prevent slippage and shall be completely covered with mortar or grout.

N. All reinforcing for masonry shall be furnished and installed under Section 04080.

O. Furnish and place masonry lintels of the type and dimensions shown on the Drawings and specified. Extend lintels beyond the opening and firmly bed the bearing ends in mortar as shown on the Drawings.

P. Bed and grout items coming in contact with masonry where grouting is required, including, but not limited to, door bucks and frames set in masonry. Install all anchor bolts, base plates, and seats in masonry walls, and build in all items required for the completion of the building as they apply to masonry.

3.04 REINFORCED MASONRY

A. Install reinforcement of the type, size, and spacing and at locations as indicated on the Drawings and specified in Section 04080.

3.05 GROUTING

A. General

1. Walls shall be grouted as indicated on the Drawings. Grouting is specified in Section 04070.

3.06 REPAIR, POINTING, AND FINAL CLEANING

A. Exposed masonry shall be protected against staining by wall coverings, and excess mortar shall be wiped off the surface as the work progresses to reduce need for cleaning at completion of the work.

B. Where ordered, remove masonry units which are loose, chipped, broken, stained, or otherwise damaged, and units which do not match adjoining units and install new units in fresh mortar or grout, pointed to eliminate, as approved by the ENGINEER, evidence of replacement.

C. Pointing

1. During the tooling of joints, except for weep holes, enlarge any voids or holes, and completely fill with mortar matching the color of the surrounding work as approved by the ENGINEER and tool to match. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance and properly prepare joints for application of sealants where required.

2. Before final cleaning, repoint all unsatisfactory joints as specified above and as required by the ENGINEER.

D. Final Cleaning of Masonry

1. After mortar has thoroughly set and cured (three weeks minimum during the summer; five weeks minimum during the winter), a sample wall area (approximately 20-ft²), shall be cleaned, with an approved commercial masonry cleaner, diluted and mixed with potable water as recommended by the manufacturer and as approved. The sample area may be
the sample wall panel specified above or an area in the finish work as approved by the ENGINEER.

2. The ENGINEER's acceptance of sample cleaning shall be obtained before proceeding to clean remainder of masonry work. A minimum of one week of dry weather is required to evaluate effectiveness of cleaning and effect on masonry and mortar. Upon acceptance by the ENGINEER, all masonry shall be cleaned by the same method to the satisfaction of the ENGINEER.

3. Acid solutions shall not be used for cleaning any CMU. Upon completion of the work, all surfaces of CMU shall be washed with soap powder and warm water, applied with a scrubbing brush, and then rinsed thoroughly with clear water. Other cleaning methods may be ordered to obtain required appearance.

4. Masonry areas not satisfactorily cleanable will be ordered to be replaced at no extra cost to the OWNER.

3.07 MASONRY WATER REPELLANT

A. Masonry water repellant shall be applied to any exterior (exposed to outdoor weather) surface only after joints have been caulked and properly cured. Surfaces shall be clean and free from excess dust. New masonry surfaces shall be allowed to cure 30 days prior to application. Surfaces shall receive two complete coats at rates recommended by the manufacturer. The complete installation shall be in strict compliance with the manufacturer's recommendations.

***END OF SECTION***
SECTION 04810

THIN BRICK VENEER

PART 1 - GENERAL

1.1 SUMMARY:

A. Provide and install thin brick veneer where shown on the Drawings and specified herein.

1.2 GENERAL REQUIREMENTS:

A. This Section shall be performed in accordance with the General Conditions, Supplementary Conditions and all Sections in Division 1 of these Specifications. These documents must be read with the other Contract Documents and Sections as a whole to complete the intent of the contract.

1.3 SUBMITTALS:

A. Make submittals to the Architect in accordance with the provisions of Section 013323 of these specifications.

1.4 QUALITY ASSURANCE:

A. Use a subcontractor having not less than two years successful experience in installation of similar products, as approved by the Architect.

B. Mock-ups:

1. Prior to other work of this Section, prepare a sample panel of the work of this Section at a location on the site where approved by the Architect.

2. Provide one mock-up panel for each combination of brick pattern, bond pattern, and mortar color.

3. Make each mock-up panel approximately 3'-0" x 4'-0".

4. Show method of bedding, grouting, bond pattern, cleaning and other aspects of the work of this Section to the quality specified.

5. Make necessary adjustments in the mock-up panels and secure the Architect's approval.

6. The mock-up panels, when approved by the Architect, will be used as datum points for comparison with the remainder of the installation for the purpose of acceptance or rejection.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Provide all materials comprising a complete system equal to, but not necessarily limited to, the following:
1. Thin brick - H. C. Muddox Company, size and color to match existing thin brick on site with integral corner pieces.

2. Adhesive— Latacrete 253 R Gold Rapid Adhesive meeting ANSI A118.4 or equal.

3. Grout — Latacrete SpectraLock Pro or equal. Color to be selected from manufacturer’s standard color line.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Prior to commencing the installation, the Contractor shall examine the areas to be covered and advise the General Contractor and Architect of any existing conditions or surface contamination which will require correction before the work commences.

B. Before starting, surface to be covered shall be cleaned to remove soil, mortar, etc.

C. Dry or dusty concrete or masonry surfaces shall be wet down or washed and excess water removed just prior to the application of thin brick.

3.2 INSTALLATION BY THIN BED METHOD:

A. The Laticrete mortar shall be applied with a notched trowel using a scraping motion to work the material into good contact with the surface to be covered. A trowel having notches approximately 1/4" x 1/4" (6 mm x 6mm) is recommended for thin brick; 1/4" x 3/8" (6 mm x 10mm) for large brick.

B. Only as much mortar shall be applied as can be covered within 20-30 minutes, or while surface is still tacky. A small quantity of the mortar shall be troweled onto the back of each piece. Thin brick shall then be set in place and rapped or beaten with a small beating block to insure 100% fill bedding and a true surface. Pieces shall be aligned to show uniform joints and then allowed to set until firm.

C. Excess mortar shall be cleaned from the surface of the thin brick with a wet cloth or sponge while the mortar is fresh.

3.3 EXPANSION AND CONTROL JOINTS:

A. Expansion joints shall be installed where thin brick abuts restraining surfaces, such as perimeter walls, curbs, columns, corners, etc.

3.4 GROUTING AND POINTING JOINTS:

A. Joints shall be grouted or pointed with Grout.

B. Joints shall be packed full and free of all voids and pits. (Tool or rake as specified.)

C. Excess mortar shall be cleaned from the surface with water and a damp sponge as the work progresses, while mortar is fresh and before it hardens.

D. Hardened grout film or haze shall be removed using Laticrete TC-500 Tile, Grout & Masonry Cleaner per manufacturer’s recommendations. CAUTION: DO NOT USE ACID TYPE CLEANERS ON COLORED GROUT JOINTS.
3.5 PROTECTION:

A. The Contractor shall take precautions to protect the finished work from damage by other trades. Cold Weather Note: The setting of Portland cement mortars is retarded by low temperatures and finished work should be protected for an extended period of time.

***END OF SECTION***
SECTION 05120

STRUCTURAL STEEL

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Structural steel shapes and plates.
2. Structural tube.
3. Welding.
4. Structural steel accessories.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03600 – Grout.
2. Section 05310 – Steel Deck.
3. Section 05500 – Metal Fabrications.
4. Section 09900 – Painting.
5. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

A. American Institute of Steel Construction (AISC):

1. Code of Standard Practice for Structural Steel Buildings and Bridges (AISC 303)
2. Specification for Structural Steel Buildings (ANSI/AISC 360)

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

1. ASTM A36 - Standard Specification for Carbon Structural Steel
2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
4. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
5. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength


7. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes


C. American Welding Society (AWS):

1. AWS A5.1 - Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.

2. AWS D1.1 - Structural Welding Code Steel.

D. Research Council on Structural Connections of the Engineering Foundation (RCSCEF):


E. California Building Standards Commission


F. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.03 SUBMITTALS

A. Shop Drawings

1. Submit to the ENGINEER, in accordance with Section 01300, erection drawings, detailed shop drawings, schedules and data for all structural steel. Approval will be for strength only and shall not relieve the CONTRACTOR of responsibility for proper fit of members, of connections not detailed on the Drawings, or for supplying all material required by the Contract Documents. Mark numbers painted on the shop assembled pieces of steel shall be the same mark numbers used on the detailed shop and erection drawings.

B. Quality Assurance/Control Submittals

1. Certified mill test reports for the structural steel and the bolting materials.

2. Certifications that welders are qualified, in accordance with AWS D1.1 for each process, position, and joint configuration, on the shop and field welding procedures to be used.
3. Written Welding Procedure Specifications (WPS's) in accordance with AWS D1.1 for each different welded joint proposed for use whether prequalified or qualified by testing.

4. Electrode manufacturer data.
1.04 QUALITY ASSURANCE

A. Structural steel shall be in accordance with the AISC Code of Standard Practice for Structural Steel Buildings and Bridges and the Specification for Structural Steel Buildings, unless otherwise specified herein.

B. Welding shall be done by certified welders and shall be in accordance with AWS D1.1 unless otherwise specified herein or in the AISC Standard.

1. WPS's for each joint type shall indicate proper AWS qualification and be available where welding is performed.

C. Special inspection shall be provided and paid for by the Owner. Special inspections shall be provided in accordance with CBC Table 1705.2.2.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials promptly so as to cause no delay with other parts of the work.

B. Store materials on skids and not on the ground. Pile and block materials so that they will not become bent or otherwise damaged. Do not allow metals to stain concrete.

C. Handle materials with cranes or derricks as far as practicable. Do not dump steel off cars or trucks nor handle in any other manner likely to cause damage.

PART 2 PRODUCTS

2.01 MATERIALS

A. Structural wide flange shapes: ASTM A992.

B. Other structural shapes, plates, rods and bars unless otherwise noted: ASTM A36.

C. Structural tube: ASTM A500, Grade B.

D. Structural pipe: ASTM A53, Type S, Grade B.

E. Welding electrodes: AWS A5.1, E70XX.

F. High strength steel bolts, nuts and washers: ASTM A325, unless noted otherwise.

G. Cast-in anchor bolts: ASTM F1554, Grade A36 minimum.

H. Shop primer: As specified in Section 09910.

I. Galvanizing: Zinc with 0.05 percent (minimum) nickel added.

J. Galvanized surface primer: 95 percent zinc dust, organic vehicle primer.

2.02 FABRICATION

A. Match-mark materials for field assembly. Ream unmatched holes in shop assembly of field connections. Reject and replace with new pieces any piece weakened by reaming to a point where the strength of the joint is impaired.
B. Welding of parts shall be done only where shown on the Drawings or specified herein and by welders and welding operators qualified for the procedures used.

2.03 FINISHES

A. Prepare and shop prime paint non-galvanized members as specified in Section 09900. Do not prime paint faying surfaces of slip critical connections. Where fireproofing is indicated on the Drawings, do not shop prime paint steel.

B. Galvanize members and their attachments exposed in whole or part to the weather. Galvanize other members as indicated on the Drawings. Galvanizing shall be done after fabrication and in accordance with ASTM A123. Hardware galvanizing shall be in accordance with ASTM A153. Thoroughly clean, pickle, flux and immerse members in bath of molten zinc until their temperature becomes the same as the bath. Coating shall be 2-oz per sq ft.

2.04 FABRICATION FOR ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (AESS)

A. Fabricate and assemble AESS in the shop to the greatest extent possible. Locate field joints in AESS assemblies at concealed locations or as approved by the ENGINEER. Detail AESS assemblies to minimize field handling and expedite erection.

B. Fabricate AESS with exposed surfaces smooth and square. Use special care in handling and shipping of AESS both before and after shop painting.

C. In addition to special care used to handle and fabricate AESS, employ the following fabrication techniques.

1. Fabrication Tolerance: Fabricate steel to one half the normal tolerance as specified in the Code of Standard Practice section 10.

2. Welds ground smooth: Fabricator shall grind welds of AESS smooth. For groove welds, the weld shall be made flush to the surfaces each side and be within + 1/16", -0" of plate thickness.

3. Contouring and blending of welds: Where fillet welds are indicated to be ground contoured, or blended, oversize welds as required and grind to provide a smooth transition.

4. Continuous Welds: Where welding is noted on the Drawings, provide continuous welds of a uniform size and profile.

5. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.

6. Coping and Blocking Tolerance: Maintain a uniform gap of 1/8" ± 1/32 at all copes and blocks.

7. Joint Gap Tolerance: Maintain a uniform gap of 1/8" ± 1/32

8. Piece Marks Hidden: Fabricate such that piece marks are fully hidden in the final structure or made with such media to permit full removal after erection.

9. Mill Mark Removal: Fabricator shall deliver steel with no mill marks (stenciled, stamped, raised etc) in exposed locations. Mill marks shall be omitted by cutting
of mill material to appropriate lengths where possible. Where not possible, the fabricator may fill and/or grind to a surface finish satisfactory to the ENGINEER.

10. Grinding of sheared edges: Fabricator shall grind all edges of sheared, punched or flame cut steel.

PART 3 EXECUTION

3.01 INSTALLATION

A. Furnish and install temporary bracing to provide stability during erection and to prevent distortion or damage to the framing due to wind, seismic, or erection forces. Remove temporary bracing when erection is complete.

B. Use drift pins only to bring members into position and not to enlarge or distort holes.

C. Make all steel to steel connections by high strength bolting except where field welding is shown or specified. Provide not less than two 3/4-in bolts per connection and use not less than 1/4-in thick clip angles.

D. Tighten bolted connections designated as bearing-type connections to the snug tight condition. Tighten all other bolted connections to full pretension by turn-of-nut or calibrated wrench tightening.

E. Field welding shall be done only where shown or specified and only by welders qualified for the procedures used. Weld only in accordance with approved WPS’s which are to be available to welders and inspectors during the production process. No welding shall be done when surfaces are wet, exposed to rain or wind, or when welders are exposed to inclement conditions that will hamper good workmanship.

F. Each bolting crew and welder shall be assigned an identification mark. This mark shall be made at each completed connection with a paint stick.

G. After erection, prime paint abrasions, field welds and unprimed surfaces, using shop primer except surfaces designated to be unpainted or surfaces in contact with concrete.

H. After erection, prime paint abrasions and field welds on galvanized surfaces with galvanized surface primer.

3.02 FIELD QUALITY CONTROL

A. The CONTRACTOR shall allow the ENGINEER free access to the work. Notify the ENGINEER in writing 4 working days in advance of high strength bolting or field welding operations.

B. High strength bolting will be inspected visually. All high strength bolts shall have the turned portion marked with reference to the steel being connected after the nut has been made snug and prior to final tightening. Retighten rejected bolts or remove and provide new bolts. In cases of disputed bolt installations, the bolts in question shall be checked using a calibrated wrench certified by an independent testing laboratory approved by the ENGINEER. The certification shall be at no additional cost to the OWNER.

C. Field welding will be inspected visually and by non-destructive testing by AWS certified welding inspectors provided by an Independent Testing Agency. This work will be paid for by the OWNER. Testing procedures will include ultrasonic testing. Comply with all requests of inspectors to correct deficiencies.
D. The fact that steel work has been accepted at the shop and mill will not prevent its final rejection at the site, before or after erection, if it is found to be defective.

E. Remove rejected steel work from the site within 10 working days after notification of rejection.

F. Special Inspection for steel construction shall be provided and paid for by Owner and provided in accordance with CBC section 1705.2.1.

***END OF SECTION***
SECTION 05310

STEEL DECK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Steel deck for structures.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 05120 – Structural Steel.

2. Section 05500 – Metal Fabrications.

3. Section 09900 – Painting.

4. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

A. Steel Deck Institute (SDI):

1. SDI Specifications and Commentary for Steel Roof Deck.

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

1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.


C. American Iron and Steel Institute (AISI):

1. AISI SG-673 - Cold-Formed Steel Design Manual.

D. American Welding Society:

1. ANSI/AWS D1.3 - Specification for Welding Sheet Steel in Structures.

E. International Code Council (ICC):

1. Evaluation Report 2078P.

F. 2016 California Building Code (CBC)
Where reference is made to one of the above standards, the revision in effect at the time of Bid opening shall apply.

1.03 DEFINITIONS

A. Transverse supports - supports which are perpendicular to the direction of the deck ribs.

B. Longitudinal support - supports which are parallel to the direction of the deck ribs.

1.04 SUBMITTALS

A. Product Data: Submit to the Engineer, in accordance with Section 01300, product data, showing:
   1. Materials, finishes and details of construction of all members.
   2. Manufacturer’s load table including design thickness in inches, section properties, gravity load carrying capability at the spans used, diaphragm shear capacity and ICC Evaluation Service Inc. report.

B. Shop Drawings: Submit to the Engineer, in accordance with Section 01300, shop drawings, showing:
   1. Location and size of all members, including the projections and openings.
   2. Fastener types and layout patterns.
   3. Erection marks. Mark each bundle to correspond to the shop drawings.

C. Quality Assurance/Control Submittals:
   1. Certification from the Steel Deck Institute (SDI) that the steel roof deck is designed in accordance with SDI standards.
   2. Certification for welders.
   3. Written Welding Procedure Specifications (WPS’s) in accordance with AWS D1.3 and SDI requirements for each different welded joint proposed for use whether prequalified or qualified by testing.
   4. Electrode manufacturer’s data.

1.05 QUALITY ASSURANCE

A. Steel roof deck shall conform to the requirements of the SDI standard for Steel Roof Deck.

B. Field welding shall be done by certified welders and shall be in accordance with the AISI/AWS D1.3 Specification.
   1. Qualify welders in accordance with AWS D1.3 for each process, position, and joint configuration.
   2. WPS’s for each joint type shall indicate proper AWS qualification and be available for review where welding is performed.
3. Welder Qualification Records in accordance with the WPS's for each welder that will weld steel deck on the project.

1.06 DELIVERY, STORAGE AND HANDLING

A. Handle material with cranes and derricks. Do not dump materials off cars or trucks, or handle in any way likely to cause damage.

B. Store materials off the ground with one end elevated to provide drainage. Protect from the elements with a waterproof covering, ventilated to avoid condensation.

C. Damaged materials shall not be incorporated in the work. Remove and replace with new undamaged materials at no additional cost to the Owner.

1.07 PROJECT CONDITIONS

A. Bring inaccuracies in alignment or level of steel joists or steel beams to the attention of the Engineer in writing and correct before the deck is placed.

B. Coordinate size and location of openings for HVAC, and hatch penetrations with approved curb and equipment details.

C. Coordinate size, location, and details of all penetrations with the Drawings, other trades and details of approved equipment.

D. Provide headers and stiffeners and miscellaneous framing for all penetrations as shown on the Drawings.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel roof deck shall be 1-1/2-in rib depth unless otherwise shown on the Drawings. Deck sheets shall be connected with interlocking side laps formed with standing seam allowing top seam weld. Gauge shall be as shown on the Drawings. Steel deck shall be Type HSB-36, manufactured by Verco Manufacturing Company or equal. For deck to be equal, the deck gage, fastening pattern to supports, and side lap connections must be sufficient to provide the allowable diaphragm shears published in ICC evaluation report 2078P for the above deck specified using the spans, welding pattern, and type and spacing of side lap connections shown on the Drawings. An ICC evaluation report will be required to substantiate all values.

B. Steel roof deck and accessories shall be manufactured from steel conforming to ASTM A653, SS Grade 33, minimum yield strength of 38 ksi.

C. Steel deck and accessories shall be galvanized in accordance with ASTM A653, coating designation G60.

D. Except for steel deck receiving fireproofing, the galvanized deck sheets shall receive an acrylic primer applied by the roller coat process. The coating shall have a nominal dry film thickness of 0.3 mil, shall be gray in color and shall be oven cured. The steel deck manufacturer shall supply decking free of paint and amounts of lubricants or oils which would impair the adhesion of spray-applied fireproofing for that decking to receive fireproofing.
PART 3  EXECUTION

3.01  INSTALLATION

A. Install steel roof deck as shown on the Drawings, in accordance with manufacturer's instructions and in accordance with favorably reviewed shop drawings. Extend deck sheets over a minimum of three spans.

B. End laps of steel roof deck shall be at least 2-in long and shall occur over transverse supporting members.

C. Fasten steel roof deck to all interior and exterior transverse supports and at side laps and longitudinal supports as shown on the Drawings.

D. Maintain contact between deck sheets and deck sheets and steel supports while fastening steel roof deck to reduce burn holes at welded connections.

E. Welds to supporting members at end laps and side laps shall go through both sheets and fuse properly to the supporting steel. Weld only in accordance with approved WPS's which are to be available to welders and inspectors during the production process.

F. Coordinate size, location and details of all penetration with the Drawings, other trades and details of approved equipment. Pipe and conduit openings in the steel roof deck shall be reinforced as shown on the Drawings.

1. Cutting and Fitting
   a. Cut and fit steel roof deck units and accessories around projections through steel roof deck.
   b. Make cuts neat, square and trim.
   c. Cut openings in steel roof deck true to dimensions using metal saws, or drills.
   d. Do not use cutting torches.
   e. Openings greater than 8-in and less than 18-in in greatest dimension shall be reinforced with a 16 gauge flat plate centered on the opening as shown on the Drawings.

G. Weld ridge plates and roof sump pans directly to steel deck to provide a finished surface.

1. Roof Sump Pans and Reinforcing Plates
   a. Place roof sump pans and reinforcing plates over openings in steel roof deck and weld to top surface of steel roof deck.
   b. Space welds not more than 6-in on center with at least one weld at each corner.
   c. Cut openings in roof sump pan or reinforcing plate to accommodate drain or other fixture.
H. Suspended ceilings, light fixtures, ducts, piping, conduits or other utilities shall not be attached to steel roof deck.

I. Do not use deck for storage or work platforms until permanently secured into position.

J. Construction loads must not exceed safe capacity of deck.

3.02 FIELD PAINTING

A. Touch-Up Field Painting

1. Clean thoroughly and touch-up all steel surfaces which have become abraded or where galvanizing has been damaged due to welding and/or erection procedures.

2. Paint shall be approved 95 percent zinc dust, organic vehicle primer compatible with the galvanized surfaces. Conduct all repairs of galvanizing in accordance with ASTM A780.

3.03 FIELD QUALITY CONTROL - INSPECTION

A. Steel deck and welding shall have Special Inspection in accordance with table 1705.2.2 of the CBC.

B. The Engineer and/or the Special Inspector will inspect steel roof deck in the field for compliance with the requirements specified herein and the favorably reviewed shop drawings. The Engineer and the Special Inspector may reject or require repair or refabrication of any steel roof deck or accessories not meeting these requirements.

***END OF SECTION***
SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Anchors, bolts, and fastening devices.
2. Miscellaneous steel.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Section 03250 – Concrete Joints and Joint Accessories.
2. Section 05120 – Structural Steel.
3. Section 05310 – Steel Deck.
4. Section 09900 – Painting.
5. Section 10200 – Architectural Louvers.
7. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 REFERENCES

A. Aluminum Association (AA):

1. ASD-1 Aluminum Standards and Data.
2. Specifications for Aluminum Structures.

B. American Institute of Steel Construction (AISC):


C. American Society for Testing and Materials (ASTM):


14. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.


D. American National Standards Institute (ANSI):

1. ANSI B18.22.1 - Plain Washers.

E. American Welding Society (AWS):

1. AWS D1.1 - Structural Welding Code – Steel.

2. AWS D1.2 - Structural Welding Code – Aluminum.

3. AWS D1.6 - Structural Welding Code - Stainless Steel.
4. AWS A2.0 - Standard Welding Symbols.

F. Society for Protective Coatings (SSPC):
   1. SSPC SP-1 - Surface Preparation Specification No. 1 Solvent Cleaning.
   2. SSPC SP-2 - Surface Preparation Specification No. 2 Hand Tool Cleaning.
   3. SSPC SP-3 - Surface Preparation Specification No. 3 Power Tool Cleaning.
   4. SSPC SP-6 - Surface Preparation Specification No. 6 Commercial Blast Cleaning.
   5. SSPC SP-10 - Surface Preparation Specification No. 10 Near-White Blast Cleaning.

1.03 SUBMITTALS

A. Prior to fabrication, submit to the ENGINEER, in accordance with Section 01300, shop drawings, erection or setting drawings, product data, etc, showing methods of assembly, anchorage and connection to other members. Indicate welded connections in accordance with AWS A2.0. Shop drawings are required for all items included under this Section.

B. Metal fabrication submittals greater than 30 sheets will take longer than 30 days for review by the ENGINEER.

C. Submit samples as requested by the ENGINEER during the course of construction.

1.04 QUALITY ASSURANCE

A. Coordinate completely the work of this Section with the work of other Sections. Verify at the site both the dimensions and work of other trades adjoining items of work before fabrication and installation of the items specified.

B. Furnish to the pertinent trades all items that are to be built into the work of other Sections.

C. Field welding shall be done by certified welders and shall be in accordance with the appropriate AWS Specification.
   1. Qualify welders in accordance with the appropriate AWS for each process, position, and joint configuration.
   2. WPS's for each joint type shall indicate proper AWS qualification and be available where welding is performed.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver items to be incorporated into the work of other trades in sufficient time to be checked prior to installation.

B. Delivery anchorage devices with setting drawings, templates and instructions for installation.

C. Store delivered items off the ground and protected from dirt and weather.
D. Repair items which have become damaged or corroded to the satisfaction of the ENGINEER prior to incorporating them into the work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel

2. Other structural steel shapes, plates, bars and rods: ASTM A36.
4. Welded and seamless steel pipe: ASTM A53, Type S, Grade B Schedule 40. Use standard malleable iron fittings, galvanized for exterior work.
5. Welded and seamless rectangular steel tubing: ASTM A500, Grade B.
7. High strength bolts, nuts and washers for structural steel:
   a. Elevated temperature exposures: ASTM A325, Type I.
   b. General application: ASTM A325, Type I or II.
8. Headed Anchor Studs: Nelson Type H4L or S3L by Nelson Stud Welding Company or equal.
10. Galvanizing:
    a. General: ASTM A123.
    c. Assembled steel products: ASTM A123.
11. Shop and Touch-up Primer: SSPC Paint 15 Type I red oxide.

B. Stainless Steel

1. Plates, bars and structural shapes:
   a. Exterior, submerged or industrial use: ASTM A167, Type 316.
   b. Interior and architectural use: ASTM A167, Type 304.
3. Bolts, nuts and washers ASTM: A276, Type 316 or Type 304.

C. Aluminum Framing


3. Stainless steel fasteners: ASTM A276, Type 316 or Type 304.

D. Anchors, Bolts, and Fastening Devices

1. Furnish anchors, bolts, fasteners, etc, as necessary for installation of the work or for securing the work of other Sections to in-place construction.

2. The bolts used to attach the various members to the anchors shall be the sizes shown or required. Attach aluminum and stainless steel to concrete or masonry by means of stainless steel bolts. Attach iron or steel with steel bolts unless otherwise specifically noted.

3. Bolt heads and nuts shall be hex type unless noted otherwise.

4. For structural purposes, unless otherwise noted, drilled-in concrete anchors shall be adhesive type or expansion type anchor bolts. Drilled-in anchors shall have ICC certified permissible values.

a. Concrete adhesive anchors shall be a two-part stud and cartridge resin anchoring system certified for use in cracked concrete. Stud assembly spacing and minimum embedment shall be as shown on the Drawings. The assembly shall include all-thread anchor rod with nut and washer, or deformed reinforcing steel complying with the requirements of Section 03200. Provide manufacturer’s recommended drive units and adaptors for installing studs. Install anchors in full compliance with the manufacturer’s recommendations. Adhesive anchors for use in concrete shall be Hilti HIT-RE 500-SD by Hilti, Inc., Tulsa, OK; Epcon G5 by ITW Red Head, Addison, Illinois; Simpson SET-XP by Simpson Strong-Tie Company, Inc., Pleasanton, CA; or approved equal.

b. Concrete expansion anchors shall be wedge type anchors certified for use in cracked concrete. Type 316 stainless steel expansion anchors shall be used where they will be submerged or exposed to the weather or where stainless steel expansion anchors are required. Zinc plated carbon steel anchors shall be used at all other locations, unless noted otherwise. When the length or embedment of the bolt is not noted on the Drawings, provide length sufficient to place the wedge and expansion sleeve portion of the bolt at least 1-in behind the reinforcing steel within the concrete. Install anchors in full compliance with the manufacturer’s recommendations. Expansion anchors for use in concrete shall be Hilti, Kwik-Bolt TZ by Hilti, Inc., Tulsa, OK; Simpson Strong-Bolt Wedge Anchor for Cracked and Uncracked Concrete by Simpson Strong-Tie Company, Inc., Pleasanton, CA; Redhead Trubolt + Wedge Anchor by ITW Red Head, Addison, Illinois; or approved equal.

c. Masonry adhesive anchors shall be Hilti HIT HY 150 MAX by Hilti, Inc., Tulsa, OK; Simpson SET by Simpson Strong-Tie Company, Inc., Pleasanton, CA; or approved equal.

d. Masonry expansion anchors shall be Hilti Kwik-Bolt 3 by Hilti, Inc., Tulsa, OK; Simpson Wedge-All Anchors by Simpson Strong-Tie Company, Inc., Pleasanton, CA; or approved equal.
5. Headed anchor studs shall be flux ended, welded to plates or other embeds as shown on the Drawings. Studs shall be made from cold drawn steel Grades C-1010 through C-1020 per ASTM A108 and shall be welded per the manufacturer’s recommendations. Headed anchor studs shall be Nelson Stud Welding Company, Loraine, OH - Type H4L or S3L, or equal.

2.02 FABRICATION

A. Form all miscellaneous metal work true to detail, with clean, straight, sharply defined profiles, and smooth surfaces of uniform color and texture. Provide fabrications free from defects impairing strength or durability. Drill or punch holes and smooth edges. Ease exposed edges to a small, uniform radius. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitely shown or specified.

B. Supply components required for anchorage of fabrications. Connections and accessories shall be of sufficient strength to safely withstand stresses and strains to which they will be subjected. Steel accessories and connections to steel or cast iron shall be steel, unless otherwise specified. Threaded connections shall be made so that the threads are concealed by fitting.

C. Welded joints shall be rigid and continuously welded or spot welded as specified or shown. Dress the face of welds flush and smooth. Continuously weld and grind smooth welds that will be exposed. Exposed joints shall be close fitting and jointed where least conspicuous. Conceal fastenings where practical. Punch or drill for temporary field connections and for attachment of the work of other trades.

D. Welding of parts shall be in compliance with the latest edition of the AWS structural welding code for steel (D1.1); aluminum (D1.2) or stainless steel (D1.6) as appropriate, and shall only be done where shown, specified, or permitted by the ENGINEER. Welding shall be performed only by welders certified to perform the required welding in compliance with the requirements of the AWS Code. Component parts of built-up members to be welded shall be adequately supported and clamped or held by other adequate means to hold the parts in proper relation for welding.

E. Castings shall be of good quality, strong, tough, even-grained, smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Thoroughly clean castings. Castings may be subjected to a hammer inspection in the field by the ENGINEER. All finished surfaces shown on the Drawings and/or specified herein shall be machined to a true plan surface allowing pieces to seat at all points without rocking. Make allowances in the patterns so that thicknesses specified or shown will not be reduced in obtaining finished surfaces. Castings will not be acceptable if the actual weight is less than 95 percent of the theoretical weight computed from the dimensions shown. Provide facilities for weighing castings in the presence of the ENGINEER and show true weights, certified by the supplier.

F. Shop painting will not be required for galvanized metal, stainless steel, aluminum, copper, brass and bronze unless specifically specified.

G. Thoroughly clean steel fabrications of all loose mill scale, rust, grease or oil, moisture, dirt, or other foreign matter.

1. Remove scale, rust and other deleterious materials before shop coat of paint is applied.
2. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2, SSPC SP-3 or SSPC SP-6.

3. Remove oil, grease and similar contaminants in accordance with SSPC SP-1.

H. Fabricate miscellaneous aluminum shapes and plates as shown. Furnish welded and mitered angle frames and other fabrications complete with welded anchors attached. Structural shapes and extruded items shall comply with the dimensions on the Drawings within the tolerances published by the Aluminum Association. Weld aluminum work on the unexposed side when possible in order to prevent pitting or discoloration of exposed aluminum surfaces.

2.03 FINISHES

A. Steel

1. Items in areas which are not exposed to weather or moisture, shall have exposed surfaces painted with a shop coat of primer compatible with the finish coatings specified in Section 09900, after fabrication but before shipping. Apply two shop coats of primer to surfaces that will be inaccessible after erection.

   a. Remove scale, rust and other deleterious material before shop coat of paint is applied. Clean off heavy rust and loose mill scale in accordance with SSPC-2, SSPC-3 or SSPC-6. Remove oil, grease and similar contaminants in accordance with SSPC SP-1.

   b. Immediately after surface preparation, brush or spray on metal primer paint, applied in accordance with manufacturer’s instructions and at rate to provide a uniform dry film thickness of 3.0 mils per coat applied. Use painting methods which will result in full coverage of joints, corner, edges and all exposed surfaces.

   c. As soon as possible after erection, touch up any scraped, abraded or unpainted surfaces using primer as specified for shop coats.

2. Items exposed to weather, submerged in water or subject to splashing, or located in corrosive environments shall be hot dip galvanized after fabrication unless otherwise noted on the Drawings or specified.

   a. Following all manufacturing operations, items to be galvanized shall be thoroughly cleaned, pickled, fluxed and completely immersed in a bath of molten zinc. The resulting coating shall be adherent and shall be the normal coating to be obtained by immersing the items in a bath of molten zinc and allowing them to remain in the batch until their temperature becomes the same as the bath. Coating shall be not less than 2 oz/sq ft of surface.

   b. Where field welding of galvanized material is necessary, welds shall be wire brushed clean and immediately regalvanized in the field using galvanizing compound or coating. Materials shall comply with local regulations controlling use of volatile organic compounds.

B. Stainless Steel

1. Mill Finish

C. Aluminum
1. All exposed aluminum surfaces shall have fabricator's standard mill finish unless otherwise specified.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Install all items finished except items to be embedded in concrete which shall be installed under Division 3.

B. Items to be attached to concrete after such work is completed shall be installed in compliance with the details shown. Furnish to appropriate trades all anchors, sockets, or fastenings required for securing work to other construction.

C. Set metal work level, true to line and plumb as indicated.

D. Weld field connections and grind smooth where practicable. Clean and strip primed, steel items to bare metal where site welding is required. Conceal fastenings where practicable.

   1. Weld only in accordance with approved WPS’s which are to be available to welders and inspectors during the production process.

E. Secure metal to wood with lag screws or bolts, of adequate size, with appropriate washers and nuts.

F. Touch-up abrasions to finish or primer coatings immediately after erection and prior to both final coating and final acceptance.

G. Break contact between dissimilar metals as shown on the Drawings or as specified in Paragraph 3.01H below.

H. Field-apply coatings for installation of metal fabrications according to the following schedule. (For embedded items, coat the embed.)

   1. All steel surfaces in contact with exposed concrete shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in compliance with the manufacturer’s instructions prior to installation.

   2. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer followed by two coats of aluminum metal and masonry paint to the dissimilar metal.

   3. Where aluminum contacts concrete, apply a heavy coat of zinc chromate primer to the surface of the aluminum.

   4. Where aluminum contacts wood, apply two coats of aluminum metal and masonry paint to the wood.

3.02 FIELD QUALITY CONTROL - INSPECTION

A. Notify the ENGINEER in writing 4 working days in advance of high strength bolting or field welding operations.

B. High strength bolting will be inspected visually. All high strength bolts shall have the turned portion marked with reference to the steel being connected after the nut has been made snug and prior to final tightening. Retighten rejected bolts or remove and provide
new bolts. In cases of disputed bolt installations, the bolts in question shall be checked using a calibrated wrench certified by an independent testing laboratory approved by the ENGINEER. The certification shall be at no additional cost to the OWNER.

C. Field welding will be inspected visually and by non-destructive testing by AWS certified welding inspectors provided by an Independent Testing Agency. This work will be paid for by the OWNER. Testing procedures will include ultrasonic testing. CONTRACTOR shall comply with all requests of inspectors to correct deficiencies.

D. The fact that steel work has been accepted at the shop and mill will not prevent its final rejection at the site, before or after erection, if it is found to be defective.

E. Remove rejected steel work from the site within 10 working days after notification of rejection.

***END OF SECTION***
SECTION 07411

PREFORMED METAL ROOFING

PART 1  GENERAL

1.01  SUMMARY

A. Provide and install preformed metal roofing system for pitched roofs as shown on the Drawings and specified herein complete with anchorages, related flashings and accessory components. Building felt underlayment over gypsum roof board.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02  GENERAL REQUIREMENTS

A. This Section shall be performed in accordance with the General Conditions, Supplementary Conditions and all Sections in Division 1 of these Specifications. These documents must be read with the other Contract Documents and Sections as a whole to complete the intent of the contract.

1.03  SUBMITTALS

A. The CONTRACTOR shall submit to the ENGINEER as provided in Sections 01300, reports of tests of individual materials to indicate that the materials meet these specifications, prior to the materials being used in the Work.

B. Clearly indicate dimensioning, panel layout, general construction details, anchorages, and method of anchorage, method of installation.

1.04  DESIGN CRITERIA

A. Design system to provide movement of components without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to seasonal temperature ranges.

B. Design system to accommodate tolerances of structure, provided irregularities do not exceed them and clearances are maintained.

C. Provide for positive drainage to exterior, any water entering or condensation occurring within preformed metal panel system.

1.05  REFERENCE STANDARDS

A. ASTM A653 - Steel Sheet, Zinc Coated (Galvanized) by the Hot-dip Process, Physical (Structural) Quality.

C. ASTM A924 - Steel Sheet, Zinc Coated (Galvanized) by the Hot-dip Process, General Requirements.

PART 2  PRODUCTS
2.01 ACCEPTABLE MANUFACTURERS

A. Substitutions: Items of same function and performances are acceptable in conformance with Section 01300.

2.02 PREFORMED PANEL ROOFING

A. Roof System: "Span-Lok hp -Pencil Ribbed" 24 Gauge Roof Panels by AEP SPAN (a BlueScope Steel Company) 1-800-733-4955.

B. Provide all flashings, hold-down clips, anchorages, battens and accessory components to match panel finish and to provide complete installation.

C. Surface Finish:
   1. Color to be determined by owner.

2.03 GYPSUM ROOF BOARDS

A. Gypsum Roof Boards: DensDeck® Roof Boards by Georgia-Pacific Gypsum 1/2" (12.7 mm)
   1. Composition: Nonstructural, fiberglass mat-faced gypsum panel with water-resistant core.
   2. Size: Nominal 4' (1220 mm) x 8' (2440 mm). Edges: Square.
   3. Fire Resistance:
      a. Flame spread 0, smoke developed 0, when tested in accordance with ASTM E 84. Noncombustible as described and tested in accordance with ASTM E 136.

2.04 ACCESSORY MATERIALS

A. Sealants and Gaskets:
   1. Manufacturer's standard type suitable for use in conjunction with installation of panel roofing; non-staining; non-corrosive; non-shrinking and non-sagging; ultraviolet and ozone resistant for exterior applications.

B. Fasteners:
   1. Metal Roofing:
      a. Manufacturer's standard type, galvanized to ASTM A-525 2.15 oz/sf ft (380 g/sq meter), to suit application, finish to match panel roofing when exposed.

B. Building paper:
   1. Laid dry 30 pound ASTM D226, Type II, unperforated asphalt saturated felts.

2.05 COMPONENT FABRICATION
A. Internal and External Corner:
   1. Same materials, material thickness and finish as roof; of profile as detailed. Exposed fasteners are to have same finish as siding.

B. Flashings, Built-in Gutter, Closure Pieces, Fascia, Infills, Caps
   1. Same material, and where exposed of same sheet stock; brake formed to required profiles.

C. Anchorage Members:
   1. Minimum 22 gauge thick galvanized steel.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install preformed metal panels on roofs in accordance with manufacturer's recommendations.

D. Fabrication of exposed components on site is not permitted.

E. Exercise care when cutting panels on site, to ensure cuttings do not remain on finish surfaces.

F. Protect surfaces in contact with cementitious materials and other dissimilar metals with bituminous paint. Allow protective coating to dry prior to installation.

G. Permanently fasten roofing system to structural supports, properly aligned, leveled and plumb. Maximum offset from true alignment between adjacent members butting or in line to be 1/16 inch (1.6 mm). Maximum variation from plane or location indicated on drawings to be 1/8 inch (3.2 mm).

H. Locate end laps over supports. End lap panels minimum 2 inches (51 mm). Ensure sidelaps are over firm bearings.

I. Use concealed fasteners in all locations except where approved by the ENGINEER.

J. Install sealant and gaskets where required to arrest direct weather penetration.

K. Completed installation is to be free of rattles and noise due to thermal movement and wind whistling.

***END OF SECTION***
SECTION 07920

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY:

A. Provide a positive barrier against penetration of air and moisture at joints between items where sealing is essential to continued integrity of the barrier. Such sealing will normally be performed under the work of various Sections of these Specifications but shall be performed in strict accordance with the provisions of this Section. Install as shown on the Drawings and specified herein.

1.2 GENERAL REQUIREMENTS:

A. This Section shall be performed in accordance with the General Conditions, Supplementary Conditions and all Sections in Division 1 of these Specifications. These documents must be read with the other Contract Documents and Sections as a whole to complete the intent of the contract.

1.3 SUBMITTALS:

A. Make submittals to the Engineer in accordance with the provisions of Section 013323 of these specifications. The Engineer shall be the sole judge as to the acceptability of all products submitted in accordance with the provisions of Section 012500 of these specifications.

B. Samples: Submit three 12" long samples of each color required (except black) for each type of sealant exposed to view.

1.4 AIR POLLUTANT CONTROL REQUIREMENTS:

A. Per Section 5.504.4.1 of the 2013 California Green Building Standards Code, sealants and caulks used on the project shall meet the requirements of the following standards:

1. Sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Table 5.504.4.2 of the 2013 California Green Building Standards Code. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene, chloride, perchloroethylene and trichloroethylene)

PART 2 – PRODUCTS

2.1 SEALANT MATERIALS:

A. Vertical Surfaces, Hybrid Sealant:

1. MasterSeal NP 150 low-modulus, non-sag premium-grade elastomeric hybrid sealant by Master Builders Solutions (BASF Corporation), or equal. Color selected by Engineer.
B. Horizontal Concrete Joints:

1. MasterSeal SL2 two-component polyurethane sealant by Master Builders Solutions (BASF Corporation), or equal. Color selected by Engineer.

C. Backing Material:

1. Cylindrical sealant backings: ASTM C1330, type as recommended in writing by sealant manufacturer for joint application indicated and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2. Bond breaker tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.2 SEALANT EQUIPMENT:

A. All equipment shall be only such equipment as is specifically recommended by the manufacturer of the sealant material being installed.

PART 3 – EXECUTION

3.1 CHOICE OF SEALANT MATERIAL:

A. Use only that sealant material which is best suited to the installation and is so recommended by the sealant material manufacturer.

3.2 GENERAL:

A. Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

3.3 BACK-UP MATERIALS:

A. General:

1. All joints over 3/8" wide shall have back-up filler.

2. Verify the compatibility of filler material with sealant before installation.

3. Use back-up filler about 1/3 to 1/2 wider than width of joint so sufficient pressure is exerted by filler to provide substantial resistance to displacement.

B. Acceptable materials:

C. All filler materials shall be non-oily, non-staining back-up filler such as polyethylene foam rod, expanded polyurethane, neoprene, or other filler completely compatible with the sealant material.

3.4 APPLICATION OF SEALANT:

A. General: Do not seal under weather conditions or sun conditions potentially harmful to the set and curing of the sealant material.
B. Preparation: Clean joint surfaces immediately before installation of sealant. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.

C. Priming: Prime joint surfaces where recommended by sealant manufacturer. Do not allow primer to spill or migrate onto adjoining surfaces.

D. Installation: Install sealant in strict accordance with the manufacturer’s recommendations, taking care to produce beads of proper width and depth, tool as recommended by the manufacturer, and immediately remove all surplus sealant.

1. Where an irregular surface or sensitive joint border exists apply masking tape at edges of joint to insure neatness and protection. Remove masking tape prior to sealant setting.

2. Spillage: Do not allow sealants or primers to overflow or spill onto adjoining surfaces, or migrate into voids of adjoining surfaces. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

3.5 SEALANT SCHEDULE:

A. Carefully study the Drawings and furnish and install the proper sealant at each point where called for on the Drawings plus at all other points where sealing is essential in maintaining the continued integrity of the water-tight barrier including but not limited to:

1. Exterior expansion and control joints

2. Exterior sills, jambs and heads of window frames, door frames, louvers and similar openings, and where metal, wood or other materials abut or join masonry, concrete or other materials.

3. Exterior horizontal control and expansion joints in concrete slabs, masonry, precast paving units and tiles

4. Interior expansion and control joints

5. Interior horizontal control and expansion joints in concrete slabs and tile flooring

***END OF SECTION***
SECTION 08700

DOOR HARDWARE

PART 1     GENERAL

1.01  SUMMARY

A. "Hardware groups" have been assigned to the various doors required for this work. Provide and install all finish hardware described in the Hardware Schedule and all other finish hardware not described but required for a complete and operable facility.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02  GENERAL REQUIREMENTS

A. This Section shall be performed in accordance with the General Conditions, Supplementary Conditions and all Sections in Division 1 of these Specifications. These documents must be read with the other Contract Documents and Sections as a whole to complete the intent of the contract.

1.03  SUBMITTALS

A. The CONTRACTOR shall submit to the ENGINEER, as provided in Sections 01300, reports of tests of individual materials to indicate that the materials meet these specifications, prior to the materials being used in the Work.

PART 2  PRODUCTS

2.01  FASTENERS

A. Furnish all finish hardware with all necessary screws, bolts, and other fasteners of suitable size and type to anchor the hardware in position for long life under hard use.

B. Furnish fastenings where necessary with expansion shields, toggle bolts, sex bolts, and other anchors approved by the ENGINEER, according to the material to which the hardware is to be applied and the recommendations of the hardware manufacturer.

C. All fastenings shall harmonize with the hardware as to material and finish.

2.02  HINGES

A. Unless otherwise specified, provide 5 knuckle, button tip, full mortise template type butts with non-removable loose pins and ball or oiltite bearings as follows:

1. Exterior door hinges:

2. Where required to clear trim or permit doors to swing 180 degrees, furnish hinges of sufficient throw.

2.03 LOCKS AND LACHES
A. All locksets and latchsets shall be extra heavy duty commercial cylindrical locks, unless otherwise specified.
B. All locksets and cylinders shall have a minimum of six pins with interchangeable cores.
C. All cylinders shall be construction keyed. At the end of the project, the CONTRACTOR shall provide the services of a professional locksmith who shall key all locks as directed by the OWNER.

2.04 DOOR BOLTS
A. Extra Heavy duty door bolt.

2.05 FINISHES
A. The finish of all hardware shall match the finish of the locksets which shall be 626 unless noted otherwise. Special care shall be given to coordinate all the various manufactured items furnished on this Work, to ensure an acceptable uniform finish.

2.06 PROPRIETARY PRODUCTS
A. References to specific proprietary products are used to establish minimum standards of utility and quality. Unless otherwise approved by the ENGINEER, provide only the specific products. Design is based on the materials specified; other materials may be considered by the ENGINEER in accordance with the provisions of Section 01300 of these Specifications.

2.07 ACCEPTABLE MANUFACTURERS AND PRODUCTS
Astragal: "T" Type;
Pemko, 355 SN.

Closers: Surface Type;
LCN 4040XPH – Heavy-Duty Hold Open Arm Adjustable

Cylinders:
Schlage Rim Lock Cylinder

Door Shoe:
Pemko 216 AV

Electric Strike:
Von Duprin 6211

Electronic Time Switch:
Intermatic ET1105C 24 hour electronic time switch

Flush Bolt:
Trimco 3999
Hinges, Exterior Doors (Continuous):

Latch Guard:
HES 150 Strike Latch Guard

Locksets, Extra Heavy Duty Commercial: Interchangeable Core:
Schlage, ND-Series, Electrically Locked (Fail Safe), Rhodes Style, Vandigard option, full size interchangeable core, 626 Finish.

Threshold Saddle Type:
Pemko 271, PemKote Finish.

Transformer:
Altronix Plug-in Transformer, Grainger #4WCD4, In 120, Out 24, 40VA.

2.08 OTHER MATERIALS
A. All other materials, not specifically described but required for a complete and proper finish hardware installation, shall be as selected by the CONTRACTOR subject to the approval of the ENGINEER.

PART 3 EXECUTION

3.01 DELIVERIES
A. Stockpile all items sufficiently in advance to ensure their availability and make all necessary deliveries in a timely manner to ensure orderly progress of the total Work.

3.02 INSPECTION OF INSTALLATION
A. Upon completion of the installation, and as a condition of its acceptance, deliver to the ENGINEER a report signed by the approved hardware suppliers stating that his inspection was made, that all adjustments recommended by him have been completed, and that all finish hardware furnished under this Section has been installed and is in optimum working condition.

3.03 HARDWARE SCHEDULE

See Drawings

***END OF SECTION***
SECTION 09220
PORTLAND CEMENT PLASTERING

PART 1 - GENERAL

1.1 SUMMARY:

A. Provide and install portland cement plastering as shown on the Drawings and specified herein, including, but not necessarily limited to:

1. Providing three coat stucco system consisting of two coats of portland cement plaster applied on welded wire lath over building paper, complete with all required grounds and accessories and a finish coat plaster color/texture coat

2. Providing portland cement plaster skim coat over masonry or concrete consisting of bonding agent, portland cement plaster base coat and acrylic finish / texture coat.

1.2 GENERAL REQUIREMENTS:

A. This Section shall be performed in accordance with the General Conditions, Supplementary Conditions and all Sections in Division 1 of these Specifications. These documents must be read with the other Contract Documents and Sections as a whole to complete the intent of the contract.

1.3 SUBMITTALS:

A. Make submittals to the Engineer in accordance with the provisions of Section 013323 of these specifications.

B. Mock-up: Provide two 1' x 1' minimum size mockups of stucco finish color and texture for approval.

1.4 STC-RATED ASSEMBLIES:

A. Provide materials and construction identical to assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1.5 FIRE-RESISTANCE-RATED ASSEMBLIES:

A. Provide materials and construction identical to assemblies tested according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 LATH

A. Flat Rib Lath: ASTM C 847, galvanized, flat, rib depth of not more than 1/8 inch (3 mm) with minimum 3.4-lb/sq. yd. (1.8-kg/sq. m) weight.

B. 3/8-Inch (9.5-mm) Rib Lath: ASTM C 847, galvanized, with minimum 4-lb./sq. yd. (2.2-kg/sq. m) weight. or VTRUSS (Struct Rib Lath) by Structa Wire Corp or equal.
C. Welded-Wire Lath: ASTM C 1032, galvanized, self-furring, with minimum 1.95 lb/sq. yd. (1.1 kg/sq. m) weight. Megalath by Structa Wire Corp or equal.

D. Building Paper: FS UU-B-790, Type I, Grade D, Style 2, vapor-permeable paper.
   1. Provide Building Paper underlayment at all exterior applications. Provide two layers building paper over wood construction OR one layer building paper over Weather Barrier system.

E. Weather Barrier: See Section 072719 for Weather Barrier specification. See specification writer notes regarding wood construction.

2.2 ACCESSORIES

A. Comply with ASTM C 1063 and requirements indicated below; coordinate depth of accessories with thicknesses and number of plaster coats required:
   1. Zinc and Zinc-Coated (Galvanized) Accessories:
      d. Cornerbeads: [Small-nose] [Bull-nose] style, fabricated from zinc-coated (galvanized) steel.
      e. Casing Beads: [Square-edge] [Bull-nose] style, fabricated from zinc-coated (galvanized) steel with expanded flanges.
      f. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, M-shaped configuration; with perforated flanges.

B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch (13 mm) long, free of contaminants, manufactured for use in portland cement plaster.

C. Bonding Compound: ASTM C 932. La Habra Acrylic Bonder & Admix or equal.

2.3 PORTLAND CEMENT PLASTER

A. Portland Cement: ASTM C 150, Type I.

B. Masonry Cement: ASTM C 91, Type N.

C. Plastic Cement: ASTM C 1328.

D. Lime: ASTM C 206, Type S.

E. Sand Aggregate: ASTM C 897.

F. Base-Coat Mix: Manufactured base coat mix, comply with ASTM C 926. La Habra Fastwall 100 Stucco Base or equal.

G. ALUMINUM REVEALS, MOLDING, VENTS AND ACCESSORIES:
1. Shall be extruded aluminum by Fry or equal as shown on the Drawings, and coated with a protective material to permit removal of overspray at completion of the plastering. Reveal/moldings shall be attached directly to structure over the building paper, with lath broken and attached over the reveal/molding flanges.


1. Products:
   a. La Habra Custom packaged color system. Color to be selected from Manufacturer’s standard colors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fire-Resistance-Rated Assemblies: Install components according to requirements for design designations from listing organization and publication indicated on Drawings.

B. Weather Conditions: Do not apply plaster when prevailing outdoor temperature is below 40 degrees F. If freezing is expected, do not apply plaster beyond the period required for proper hydration.

C. Paper Backing: Over all elements of the construction which are to receive plaster, apply the specified building paper with the long dimension horizontal, lapping all upper courses over lower courses at least two inches, lapping building paper over the foundation at least two inches, and lapping vertical joints of the building paper at least six inches.

D. Weather Barrier: See Section 072719 for weather barrier installation.

E. Metal Lath:


2. Flat-Ceiling and Horizontal Framing: Install rib lath or V Truss lath. Lath must be broken under all control joints.


F. Welded Wire Lath Installation:

1. Install lath over paper backing or weather barrier with the long dimensional horizontal, lapping all joints at least one mesh but not less than one inch, lapping all upper courses over lower courses, and lapping all ends.

2. At exterior corners, wrap the lath around the corner and reinforce with external corner reinforcement.

3. At interior corners, fold the lath through the corner and reinforce with interior corner reinforcement.
4. In general, attach stucco lath to supports at a maximum of six inches each way, furring the netting away from the building paper at least 1/4 inch by use of standard furring attachments.

G. Control joints:

1. Space control joints in walls not to create panels more than 144 sq. ft. in area and not more than 100 sq. ft. for all ceilings, curves or angular plaster surfaces. Distance between control joints shall not exceed 18 feet in either direction or a length to width ratio of 2.5:1. Where there is an intersection of joints use continuous vertical joints and butt the horizontal joint. Caulk splices and intersections exposed to the elements with a clear silicone rubber caulking cement. In soffits and canopies, break lath and channel behind control joints.

2. Attach control joints to the stucco netting and attach all other grounds and accessories to supports, so as to provide true grounds for the plaster.

3. Wire, tie, nail or staple all accessories to supporting surfaces sufficiently to hold accessories in place during plastering.

3.2 PLASTERING/STUCCO:

A. General:

1. Perform all mixing, plastering, and plaster curing in strict accordance with the provisions of the referenced standards.

B. Scratch coat:

1. Apply the scratch coat in one or two coats to a minimum thickness of 3/8" with sufficient material and force to form good keys, embedding and filling all spaces of the lath. Score horizontally to provide key for brown coat.

2. Moist cure scratch coat for 48 hours with clean, cool, potable water and allow to dry.

C. Brown coat:

1. Do not apply the brown coat sooner than 48 hours after installation of the scratch coat.

2. Apply the brown coat to the scratch coat. Bring out to grounds, straighten to a true surface, float, compact, and leave sufficiently rough to ensure adequate bond for the finish work.

3. In hot weather conditions, moisture cure the brown coat to prevent premature drying and shrinkage.

D. Ready Mix, Finish Coat Plaster:

1. Do not apply the ready mix, finish coat plaster sooner than seven days after installation of the brown coat.

2. Apply ready mix, finish coat plaster, color and texture as selected by the Engineer.
3. Apply by stainless steel trowel in a pattern approved on the mock-up by the Engineer.

E. Tolerances:

1. Finish all plaster true and even within 1/8" inch tolerance in five feet and leave the finished surface free from tool marks and all other blemishes.

F. Cleaning metal accessories:

1. Wipe all metal accessories clean after application of each coat.

3.3 PLASTERING SKIM COAT:

A. General:

1. Perform all mixing, plastering and plaster curing in strict accordance with the provisions of the referenced standards.

B. Concrete Masonry Units:

1. Remove projecting joint mortar so it is even with the plane of the wall. Remove surface contaminants such as efflorescence, existing paint or any other bond inhibiting material by sandblasting, waterblasting, chipping or other appropriate means.

C. Bonding Agent:

1. Apply at an approximate rate of 250 square feet per gallon using a low-pressure sprayer, brush or roller.

D. Base Coat:

1. Apply base coat to a minimum thickness of 3/8", using sufficient trowel pressure to key stucco into surface and to a uniform thickness.

2. Rod surface to true plane.

3. Trowel to smooth and uniform surface to receive finish coat.

4. Moist cure stucco base with clean, cool, potable water for at least 48 hours and allow to dry.

E. Ready Mix

1. After curing, allow the base coat to dry a minimum of seven days.

2. Apply ready mix, finish coat plaster, color and texture as selected by the Engineer.

3. Apply by stainless steel trowel in a pattern approved on the mock-up by the Engineer.

F. Tolerances:

1. Finish all plaster true and even within 1/8" tolerance in five feet and leave the finished surface free from tool marks and all other blemishes.
SECTION 09671

EPOXY FLOOR TOPPING

PART 1 GENERAL

1.01 SUMMARY

A. Provide epoxy floor topping and integral cove base as indicated on the Drawings and as specified herein.

B. Related Sections. See Related Sections for additional requirements applicable to this Section (typical).

1. Drawings and general provisions of the Contract, including General Conditions, Special Provisions, and other Division 1 Specifications, apply to this section.

1.02 GENERAL REQUIREMENTS

A. This Section shall be performed in accordance with the General Conditions, Supplementary Conditions and all Sections in Division 1 of these Specifications. These documents must be read with the other Contract Documents and Sections as a whole to complete the intent of the contract.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit to the ENGINEER, as provided in Sections 01300, reports of tests of individual materials to indicate that the materials meet these specifications, prior to the materials being used in the Work.

PART 2 PRODUCTS

2.01 EPOXY FLOOR TOPPING:

A. Permatec 3000, two component resin binder with graded aggregate, ¼" thickness, textured surface finish with single glaze finish coat, as manufactured by Chemproof Polymers, Inc. Color to be selected by Architect

PART 3 EXECUTION

3.01 INSTALLATION:

A. Prepare surface of concrete as recommended by manufacturer, clean surface of all contaminants and laitence.

B. Mix and install floor topping in strict accordance with manufacturer's Floor Topping Application Bulletin.

***END OF SECTION***
SECTION 13800

AUTOMATIC LIGHTING CONTROL DEVICES

PART 1 - GENERAL

SUMMARY

A. Section Includes:

1. Remote control lighting relays.

2. Wall mounted occupancy sensors.

3. Ceiling mounted occupancy sensors.


REFERENCES

B. National Electrical Manufacturers Association:

1. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contractors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.

C. All occupancy sensor lighting controls and power packs shall be UL listed and either CSA or CUL/US listed.

D. All sensors shall be FCC compliant where applicable.

E. All sensors shall be California Energy Code compliant.
F. Building Codes: All units shall comply with applicable, California Building Codes.

SYSTEM DESCRIPTION

G. Section includes sensors including multi-technology, ultrasonic, and passive infrared (PIR) technologies. This includes self-contained PIR sensors that are switch-mounted and ceiling-mounted, as well as a low voltage line, which works with a power pack and add-a-relay units.

PART 2 - PRODUCTS

2.01 WALL MOUNTED OCCUPANCY SENSORS

A. Manufacturers:

1. Acuity.

2. Watt Stopper.


5. Substitutions: Approved Equal.

B. SINGLE SWITCH TYPE

1. Shall use microprocessor for motion signal analysis and internal, adaptive self-adjustment.

2. No manual adjustment shall be required at the time of installation or during operation.

3. Shall automatically adapt to changing room conditions—with the ability to disable adaptive features.
4. Shall save learned and adjusted settings in non-volatile memory that retains all settings during power outages.

5. Shall recognize motion detected within 20 seconds of turning off lighting as a false off. In response to a false off, the microprocessor shall increase the time-off setting.

6. Maximum adapted time-out shall not exceed 30 minutes.

7. Walk through feature shall shut off lights within 2.5 minutes after momentary occupancy.

8. Shall be Auto ON/Auto OFF, Manual ON/Auto OFF.

9. Selectable manual timer settings shall be available from 30sec to 20min.

10. Rating: 1800W/VA @ 120V, 4000VA @ 277V, and 1/4HP @ 120VAC

C. DUAL SWITCH TYPE

1. Shall provide switching for 2 separate banks from a single unit. Capable of two separate inputs.

2. Shall use microprocessor for motion signal analysis and internal, adaptive self-adjustment.

3. Shall save learned and adjusted settings in non-volatile memory that retains all settings during power outages.

4. No manual adjustment shall be required at the time of installation or during operation.

5. Shall automatically adapt to changing room conditions—with the ability to disable adaptive features.

6. Maximum adapted time-out shall not exceed 30 minutes.

13800-3

City of Sacramento
Garcia Bend Park Restroom Restoration Project 100% Submittal
7. Walk through feature shall shut off lights within 2.5 minutes after momentary occupancy.

8. Shall be Auto On/ Auto OFF, Manual On/Auto OFF.

9. Selectable manual timer settings shall be available from 30sec to 20min.

10. Ratings: Primary Relay - 800W @ 120V, 1200VA @120V, 2700VA @277V @ 120VAC; Secondary Relay - 800W @ 120V, 800VA @120V, 1200VA @ 277V.

2.02 SWITCH PLATES

A. Product Description: Specification Grade.

1. Material: Stainless Steel.


2.03 CEILING MOUNTED OCCUPANCY SENSOR

A. Manufacturers:

1. Leviton.

2. Sensor Switch.

3. Watt Stopper.


5. Substitutions: Approved Equal.

B. Low-Voltage Multi-Technology Ceiling-Mount
1. Shall incorporate Doppler shift ultrasonic and passive infrared motion detection technologies.

2. Shall mount on the ceiling.

3. Shall be available in 180° and 360° coverage patterns.

4. Infrared lenses shall have a 360° field of view.

5. Coverage pattern: 1000 square feet minimum.

6. Shall be available in 40kHz ultrasonic frequencies.

7. Shall automatically adapt to changing room conditions—including background PIR levels and continuous airflow.

8. Sensor shall have two modes of operation:

   a. Multi-technology mode: where the sensors send infrared signal to the microprocessor, which makes the decision to turn on lighting based on the level of the signal.

   b. Single technology mode: where the user chooses technology that will turn on lighting.

9. Shall incorporate a real-time motion indicator LED, which is visible from the front of unit.

10. Shall have mask inserts for PIR rejection to prevent false tripping.

C. Low-Voltage Ultrasonic Ceiling-Mount

1. Shall utilize Doppler shift ultrasonic detection technology.

2. Shall mount on the ceiling.
3. Shall be available in 180° and 360° coverage patterns.

4. Coverage pattern: 450 square feet minimum.

5. Shall be available in 40kHz ultrasonic frequencies.

6. Shall automatically adapt to continuous airflow conditions.

7. Shall incorporate a real-time motion indicator LED, which is visible from the front of unit.

8. Operating status and setting confirmation shall be available via LED motion indicators.

D. Low-Voltage Infrared Ceiling/Wall-Mount

1. Shall incorporate Doppler shift ultrasonic and passive infrared motion detection technologies.

2. Shall mount on ceiling or wall via supplied mounting bracket.

   a. Mounting bracket shall have a place to conceal the wiring connections.

3. Shall automatically adapt to changing room conditions—including background PIR levels and continuous airflow.


5. Sensor shall have two modes of operation:

   a. Multi-technology mode: where the sensors send infrared and ultrasonic signals to the microprocessor, which makes the decision to turn on lighting based on the level of each signal.
b. Single tech mode: where the user chooses technology which will turn on lighting.

6. Shall incorporate a real-time motion indicator LED, which is visible from the front of unit.

7. Shall have at least a 110° coverage pattern.

8. Shall utilize 40kHz ultrasonic frequency.

E. Power Pack

1. Shall be compatible with LED Drivers or electronic low voltage, and electronic fluorescent, as well as motor loads.

2. Ratings: 20A.

3. Power Pack shall allow for separation of Class 1 and Class 2 wiring.

F. Automatic Daylight Sensors

1. Such sensors shall be used for automatic dimming controls and daylight harvesting where required by California Energy Code.

2. It shall have self-contained relay, digitally programmable, with green LED activity Indicator.

3. Provide dual-zone control relays where so required.

4. Unit shall be programmed to turn lights on when the space’s overall light level drops below a programmable threshold called a “set-point.” The lights turn “Off” when light is above the set-point plus a 10 to 20% safety factor and deadband. The safety factor will prevent the system from cycling when the light level is very near the set-point. The deadband is the level of light contributed by the artificial lights being controlled. This level is tracked so if the lighting conditions change the point at which the lights turn off is adapted accordingly. There shall be a built-in fixed delay
before the photocell turns the lights on or off to prevent the system cycling on cloudy day.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Mount sensors as recommended by manufacturer.

B. Install wiring in accordance with Section 26 05 19.

C. Use only properly color coded, stranded wire. Install wire sizes as indicated on Drawings. Install wire in conduit in accordance with Section 26 05 33.

D. Label each low voltage wire clearly indicating connecting relay panel. Refer to Section 26 05 53.

3.02 ADJUSTING

A. Test each system component after installation to verify proper operation.

B. Test relays, contactors, and switches after installation to confirm proper operation.

C. Adjust daylight controllers to automatically turns lights on and off at dusk and dawn.

3.03 DEMONSTRATION

A. Upon completion of all line, load and interconnection wiring, and after all fixtures are installed and lamped, a qualified technician shall completely check the installation prior to energizing the system. Each installed occupancy sensor shall be tested in the test mode to see that lights turn off and on based on occupancy.
B. At the time of checkout and testing, the owner's representative shall be thoroughly instructed in the proper operation of the system.

C. Demonstrate operation of the following system components:

1. Operation of each type of occupancy sensors.

D. Furnish 4 hours to instruct Owner's personnel in operation and maintenance of system. Schedule training with Owner, provide at least 7 days notice to owner of training date.

***END OF SECTION***
SECTION 15080
PLUMBING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Thermal and acoustic insulation for pipes, ducts, plenums, equipment and supports provided under Division 15, except insulation specified in other Sections.

1.02 RELATED DOCUMENTS

A. Section 22 05 00 – Mechanical General Requirements
B. Section 22 05 23 – Piping and Valves: Pipe shields.
C. Section 22 40 00 – Plumbing Fixtures
D. Section 22 1x xx all sections – Plumbing Piping

1.03 SUBMITTALS

A. Submit in accordance with Division 1 and Section 22 05 00.
B. Product Data:
   1. Duct Insulation
   2. Piping Insulation
   3. Equipment Insulation
   4. Cements and Finishes
   5. Application Procedures

1.04 REGULATIONS

A. Underwriters’ Laboratories Test Method No. 723: Fire Hazard Classification.

PART 2 PRODUCTS

2.01 GENERAL

A. Manufacturers: Owens-Corning Fiberglass Corp., Manville Corp., Certain-Teed, or equal.
B. Fire Hazard: Provide insulation, jackets, facings adhesives and accessories acceptable to the State Fire Marshal, and meeting the requirements of NFPA 90A. Meet the following hazard classifications stated in accordance with UL Test Method of Fire Hazard Classifications of Building Materials No. 723:
   1. Flamespread: Maximum 25.
   2. Fuel Contributed: Maximum 50.

2.02 PIPE INSULATION

A. Insulate all pipe with two piece Owens Coming ASJ/SSL-II or equal 4.2# per cubic foot fiberglass jacket with integral tape sealer. The jacket where exposed to weather shall be covered with an aluminum all service jacket. Jacket to be 0.016” thick minimum. Insulate pipe in accordance with T-24 standards.
B. Thickness in inches shall be per T-24 Standards.

2.03 EQUIPMENT INSULATION
A. Block Insulation: Owens Corning Fiberglass 700 Series, Manville 800 Series, or equal 1 1/2" thick, 6#/per cubic foot unfaced board insulation suitable for an operating temperature up to 450°F.
B. Air handler cabinet insulation – See ductwork for insulation requirements. Insulation shall be installed per manufacturer's recommendations for airhandling equipment.

2.04 CEMENTS AND FINISHES
A. Insulation Cement shall be Manville No. 460 or equal mineral wool based insulating cement with good adhesion to cold surfaces and rated to 1800°F.
B. Lagging adhesives shall be Arabol E1658E, Foster 30-36 or equal thinned per manufacturer's recommendations.
C. Vapor barrier coating shall be non-flammable, fire resistant polymeric resin compatible with insulation.
D. Spray mastic shall be Insulacoistic 551, Foster 40-10 or equal.
E. Glass cloth shall be Twinberg-Miller "Glasfab" No. 2020-X, Foster "Mast-a-Fab" or equal.
F. Bonding adhesive shall be Foster 85-17 or equal.

PART 3 EXECUTION

3.01 GENERAL
A. Apply all insulation in a neat and workmanlike manner in continuous lengths with all butt and lap joints secured.

3.02 PIPE INSULATION
A. All exposed and concealed piping insulation shall be installed over clean and dry surfaces butting adjoining sections firmly together. Seal insulation smoothly and secure with self-sealing longitudinal lap using nylon sealing tool. Adhere factory furnished 3" wide pressure sealing strips to all butt joints and end joints.
B. Insulate all fittings, flanges, valves, piping ends, and strainers with PVC plastic preformed jackets with factory pre-cut insulation. In all cases where one piece factory molded PVC insulated fitting jackets are used, apply two layers of the proper factory supplied, pre-cut insulation. Tuck the ends of the fiber glass insulation snugly into the throat of the fitting and tuck in the edges of the adjacent pipe covering. Hold the fiberglass in place with twine. Fittings shall not deform permanently under pressure. Any fitting not packed or sealed completely will not be accepted. Maintain access for all serviceable items.
C. Fittings, valves, strainers and piping specialties not possible to insulate with preformed PVC jackets may be insulated with insulating cement and wire reinforcing mesh, made up to same thickness as adjacent pipe insulation.

3.03 EQUIPMENT INSULATION
A. Pumps, air separators, and other system components and all interconnecting piping shall be insulated with 1 1/2" thick insulation in block or board form. Apply two layers to the equipment operating above 250°F. Cut insulation to fit contour of the equipment. At nameplates, operators, control instruments or other devices neatly terminate and trim edges with glass cloth, 3" or more in width, glued to the equipment and to insulation. Finish with two 1/4" coats of insulating cement and wire reinforcing mesh. Wrap insulating cement with glass cloth soaked in lagging adhesive. Do not insulate TEFC or open drive motors.
B. Unions, strainer caps, and valve bonnets shall have removable sections of insulation. Termination at unions, strainer caps, nameplates etc., shall be neatly trimmed with glass cloth soaked in lagging adhesive. All insulated unions, strainers and valves shall be marked.

***END OF SECTION***
SECTION 15110

MASTER VALVES

PART 1 - GENERAL

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.03 SUMMARY

A. Section Includes:

1. Bronze angle valves.
2. Iron angle valves.
3. Bronze ball valves.
4. Steel ball valves.
5. Ductile-iron, single-flange butterfly valves.
6. Ductile-iron, wafer butterfly valves.
7. Ductile-iron, grooved-end butterfly valves.
8. Iron, flanged butterfly valves.
12. Iron swing check valves.
13. Iron swing check valves with closure control.
15. Iron, center-guided check valves.
17. Bronze gate valves.
21. Lubricated plug valves.
22. Chainwheels.

B. Related Sections:

1. Division 22 water distribution piping Sections for general-duty and specialty valves for site construction piping.
2. Division 15 plumbing piping Sections for specialty valves applicable to those Sections only.
3. Division 15 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.04 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene diene terpolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
D. NRS: Nonrising stem.
E. PTFE: Polytetrafluoroethylene plastic.
F. OS&Y: Outside screw and yoke.
G. RS: Rising stem.
H. SWP: Steam working pressure.

1.05 SUBMITTALS
A. Product Data: For each type of valve indicated.

1.06 QUALITY ASSURANCE
A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
B. ASME Compliance:
   1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
   2. ASME B31.1 for power piping valves.
   3. ASME B31.9 for building services piping valves.
C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Prepare valves for shipping as follows:
   1. Protect internal parts against rust and corrosion.
   2. Protect threads, flange faces, grooves, and weld ends.
   3. Set angle, gate, and globe valves closed to prevent rattling.
   4. Set ball and plug valves open to minimize exposure of functional surfaces.
   5. Set butterfly valves closed or slightly open.
   6. Block check valves in either closed or open position.
B. Use the following precautions during storage:
   1. Maintain valve end protection.
   2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
PART 2 - PRODUCTS

2.02 GENERAL REQUIREMENTS FOR VALVES

A. Refer to valve schedule articles for applications of valves.

B. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

C. Bronze Valves: NPS 2 (DN 50) and smaller with threaded ends, unless otherwise indicated.

D. Ferrous Valves: NPS 2-1/2 (DN 65) and larger with flanged ends, unless otherwise indicated.

E. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

F. Valve Sizes: Same as upstream piping unless otherwise indicated.

G. Valve Actuator Types:

1. Gear Actuator: For quarter-turn valves NPS 8 (DN 200) and larger.

2. Handwheel: For valves other than quarter-turn types.

3. Handlever: For quarter-turn valves NPS 6 (DN 150) and smaller except plug valves.


5. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.

2.03 Valves in Insulated Piping: With 2-inch (50-mm) stem extensions and the following features:

1. Gate Valves: With rising stem.

2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation and memory stops that are fully adjustable after insulation is applied.

   a. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Nib-seal handle extension or comparable product by one of the following:


B. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves, ASME B16.5 for steel valves.

2. Grooved: With grooves according to AWWA C606.


4. Threaded: With threads according to ASME B1.20.1.
C. Valve Bypass and Drain Connections: MSS SP-45.

2.04 BRONZE ANGLE VALVES

A. Class 150, Bronze Angle Valves with Nonmetallic Disc:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model T-335-Y or a comparable product by one of the following:
   
   a. Crane Co.; Crane Valve Group; Crane Valves.
   
   b. Powell Valves.

2. Description:

   a. Standard: MSS SP-80, Type 2.
   
   b. CWP Rating: 300 psig (2070 kPa).
   
   
   d. Ends: Threaded.
   
   e. Stem: Copper-Silicon Bronze.
   
   f. Disc: PTFE or TFE.
   
   g. Packing: Asbestos free.
   
   h. Handwheel: Malleable iron.

2.05 IRON ANGLE VALVES

A. Class 125, Cast-Iron Angle Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model F-818-B or a comparable product by one of the following:

   a. Crane Co.; Crane Valve Group; Crane Valves.
   
   b. Powell Valves.

2. Description:

   a. Standard: MSS SP-85, Type II.
   
   b. CWP Rating: 200 psig (1380 kPa).
   
   c. Body Material: ASTM A 126, gray iron with bolted bonnet.
   
   d. Ends: Flanged.
   
   e. Trim: Bronze.
   
   f. Disc: Bronze mounted.
   
   g. Packing and Gasket: Asbestos free.

2.06 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-585-70-66 or T-585-70-66 or a comparable product by one of the following:

   
   b. Jamesbury, Inc.
B. Description:

2. SWP Rating: 150 psig (1035 kPa).
3. CWP Rating: 600 psig (4140 kPa).
4. Body Design: Two piece steel with threaded body packnut design (no threaded stem designs allowed) with adjustable stem packing.
6. Ends: Threaded or Solder.
7. Seats: PTFE or TFE.

2.07 Safety-Exhaust, Bronze Ball Valves:

A. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model T-585-70-SV or a comparable product by one of the following:

2. Jamesbury, Inc.

B. Description:

2. CWP Rating: 600 psig (4140 kPa).
3. Body Design: Two piece steel with threaded body packnut design (no threaded stem designs allowed) with adjustable stem packing.
5. Ends: Threaded.
6. Seats: PTFE or TFE.
7. Stem: Stainless steel.
8. Ball: Chrome-plated brass, with exhaust vent opening for pneumatic applications.

2.08 STEEL BALL VALVES

A. Class 150, Full-Port, Steel Ball Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model F-515-CS-F-66-FS or a comparable product by one of the following:
   
b. Jamesbury, Inc.

2. Description:
   
d. Body Material: Carbon Steel ASTM A 216 Type WCB.
e. Ends: Flanged.
f. Seats: PTFE or TFE.
g. Stem: Stainless steel.
h. Ball: Stainless steel, vented.
i. Port: Full.
2.09 DUCTILE IRON, SINGLE-FLANGE BUTTERFLY VALVES

A. 200 CWP, Iron, Single-Flange Butterfly Valves with EPDM Seat and Aluminum-Bronze Disc:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model LD-2000-3/5 & LD-1000-5 or a comparable product by one of the following:
   a. Cooper Cameron Corp.; Cooper Cameron Valves Div.

2. Description:
   a. Standard: MSS SP-67, Type I.
   b. NPS 12 (DN 300) and Smaller CWP Rating: 200 psig (1380 kPa).
   c. NPS 14 (DN 350) and Larger CWP Rating: 150 psig (1034 kPa).
   d. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
   e. Body Material: ASTM A 536, ductile iron.
   f. Seat: EPDM.
   g. Stem: One- or two-piece stainless steel.
   h. Disc: Aluminum bronze.

B. 200 CWP, Iron, Single-Flange Butterfly Valves with Buna-N Seat and Aluminum-Bronze Disc:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model LD-2100-3/5 & LD-1100-5 or a comparable product by one of the following:
   a. Cooper Cameron Corp.; Cooper Cameron Valves Div.

2. Description:
   a. Standard: MSS SP-67, Type I.
   b. NPS 12 (DN 300) and Smaller CWP Rating: 200 psig (1380 kPa).
   c. NPS 14 (DN 350) and Larger CWP Rating: 150 psig (1034 kPa).
   d. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
   e. Body Material: ASTM A 536, ductile iron.
   f. Seat: Buna-N.
   g. Stem: One- or two-piece stainless steel.
   h. Disc: Aluminum bronze.

2.10 DUCTILE IRON, GROOVED-END BUTTERFLY VALVES

A. 300 CWP, Iron, Grooved-End Butterfly Valves with EPDM Disc:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model GD-4765-3/5 or a comparable product by one of the following:
   b. Victaulic Company.

2. Description:
a. Standard: MSS SP-67, Type I.
b. NPS 8 (DN 200) and Smaller CWP Rating: 300 psig (2070 kPa).
c. NPS 10 (DN 250) and Larger CWP Rating: 200 psig (1380 kPa).
e. Stem: Two-piece stainless steel.
f. Disc: EPDM-Encapsulated, ductile iron.
g. Seal: EPDM.

B. 300 CWP, Iron, Grooved-End Butterfly Valves with Buna-N Disc:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model GD-4775-3/5 or a comparable product by one of the following:
      b. Victaulic Company.
   2. Description:
      a. Standard: MSS SP-67, Type I.
      b. NPS 8 (DN 200) and Smaller CWP Rating: 300 psig (2070 kPa).
      c. NPS 10 (DN 250) and Larger CWP Rating: 200 psig (1380 kPa).
      e. Stem: Two-piece stainless steel.
      f. Disc: Buna-N-Encapsulated, ductile iron.
      g. Seal: Buna-N.

2.11 HIGH-PERFORMANCE BUTTERFLY VALVES
A. Single-Flange, Class 150, Full-Lug, High-Performance Butterfly Valves:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model LCS6822-3/5 or a comparable product by one of the following:
      a. Jamesbury, Inc.
      b. Xomox Corporation.
   2. Description:
      a. Standard: MSS SP-68, API 609 seat pressure and temperature ratings.
      b. CWP Rating: 285 psig (1964 kPa), Maximum steam rating of 50 psig (345 kPa).
      c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
      e. Stem: One-piece stainless steel.
      f. Seat: Graphite and modified PTFE.
      g. Disc: Stainless steel, offset design.

2.12 BRONZE LIFT CHECK VALVES
A. Class 125, Lift Check Valves with Nonmetallic Buna-N Disc:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-480 or T-480 or a comparable product by one of the following:

City of Sacramento
Garcia Bend Park Restroom Restoration Project

15150-7

100% Submittal
Page 200 of 312
a. Crane Co.; Crane Valve Group; Crane Valves.
b. Powell Valves.

2. Description:
   a. Standard: MSS SP-80, Type 2.
   b. CWP Rating: 200 psig (1380 kPa).
   e. Ends: Threaded or Solder.
   f. Disc: Buna-N.

B. Class 125, Lift Check Valves with Nonmetallic TFE Disc:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-480-Y or T-480-Y or a comparable product by one of the following:
      a. Crane Co.; Crane Valve Group; Crane Valves.
      b. Powell Valves.

2. Description:
   a. Standard: MSS SP-80, Type 2.
   b. CWP Rating: 200 psig (1380 kPa).
   e. Ends: Threaded or Solder.
   f. Disc: PTFE, or TFE.

2.13 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Nonmetallic Buna-N Disc:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-413-W or T-413-W or a comparable product by one of the following:
      a. Crane Co.; Crane Valve Group; Crane Valves.
      b. Powell Valves.

2. Description:
   a. Standard: MSS SP-80, Type 4.
   b. CWP Rating: 200 psig (1380 kPa).
   e. Ends: Threaded or Solder.
   f. Disc: Buna-N.

B. Class 125, Bronze Swing Check Valves with Nonmetallic TFE Disc:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-413-Y or T-413-Y or a comparable product by one of the following:
      a. Crane Co.; Crane Valve Group; Crane Valves.
      b. Powell Valves.
2. Description:

a. Standard: MSS SP-80, Type 4.
b. CWP Rating: 200 psig (1380 kPa).
e. Ends: Threaded or Solder.
f. Disc: PTFE or TFE.

C. Class 150, Bronze Swing Check Valves with Nonmetallic Disc:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-433-Y or T-433-Y or a comparable product by one of the following:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. Powell Valves.

2. Description:

a. Standard: MSS SP-80, Type 4.
b. CWP Rating: 300 psig (2070 kPa).
e. Ends: Threaded or Solder.
f. Disc: PTFE or TFE.

2.14 IRON SWING CHECK VALVES

A. Class 125, Cast-Iron Swing Check Valves with Metal Seats:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model F-918-B or a comparable product by one of the following:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. Powell Valves.

2. Description:

a. Standard: MSS SP-71, Type I.
b. CWP Rating: 200 psig (1380 kPa).
c. Body Design: Clear or full waterway.
d. Body Material: ASTM A 126, gray iron with bolted bonnet.
e. Ends: Flanged.
f. Trim: Bronze.
g. Gasket: Asbestos free.

2.15 IRON SWING CHECK VALVES WITH CLOSURE CONTROL

A. Class 125, Iron Swing Check Valves with Lever- and Weight-Closure Control:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model F-918-B-L&W or a comparable product by one of the following:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. Powell, Wm. Co.
2. Description:
   a. Standard: MSS SP-71, Type I.
   b. CWP Rating: 200 psig (1380 kPa).
   c. Body Design: Clear or full waterway.
   d. Body Material: ASTM A 126, gray iron with bolted bonnet.
   e. Ends: Flanged.
   f. Trim: Bronze.
   g. Gasket: Asbestos free.
   h. Closure Control: Factory-installed, exterior lever and weight.

2.16 IRON, GROOVED-END SWING CHECK VALVES

A. 250 CWP, Iron, Grooved-End Swing Check Valves:

   1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model G-917-W or a comparable product by one of the following:
      a. Crane Co.; Crane Valve Group; Crane Valves.
      b. Powell, Wm. Co.

2. Description:
   a. CWP Rating: 250 psig (1725 kPa).
   b. Body Material: Gray iron.
   c. Seal: EPDM.
   d. Disc: Spring-operated, stainless steel with EPDM.

2.17 IRON, CENTER-GUIDED CHECK VALVES

A. Class 125, Iron, Globe, Center-Guided Check Valves with Resilient Seat:

   1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model F-910-B or a comparable product by one of the following:
      a. Metraflex Co.
      b. Val-Matic Valve & Manufacturing Corp.

2. Description:
   b. CWP Rating: 200 psig (1380 kPa).
   d. Style: Globe, spring loaded.
   e. Ends: Flanged.
   f. Seat: Buna-N.

2.18 IRON, PLATE-TYPE CHECK VALVES

A. Class 125, Iron, Dual-Plate Check Valves with Resilient Seat:

   1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model W-920-W or a comparable product by one of the following:
2. Description:

b. CWP Rating: 200 psig (1380 kPa).
d. Body Material: ASTM A 126, gray iron.
e. Seat: Buna-N.

2.19 BRONZE GATE VALVES

A. Class 150, RS Bronze Gate Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-134 or T-134 or a comparable product by one of the following:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. Powell Valves.

2. Description:

a. Standard: MSS SP-80, Type 2.
b. CWP Rating: 300 psig (2070 kPa).
d. Ends: Threaded or Solder.
e. Stem: Copper-Silicon Bronze.
f. Disc: Solid wedge; bronze.
g. Packing: Asbestos free.
h. Handwheel: Malleable iron.

2.20 IRON GATE VALVES

A. Class 125, OS&Y, Cast-Iron Gate Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model F-617-O or a comparable product by one of the following:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. Powell Valves.

2. Description:

a. Standard: MSS SP-70, Type I.
b. CWP Rating: 200 psig (1380 kPa).
c. Body Material: ASTM A 126, gray iron with bolted bonnet.
d. Ends: Flanged.
e. Trim: Bronze.
f. Disc: Solid wedge.
g. Packing and Gasket: Asbestos free.
2.21 BRONZE GLOBE VALVES

A. Class 150, Bronze Globe Valves with Nonmetallic Disc:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-235-Y or T-235-Y or a comparable product by one of the following:
   a. Crane Co.; Crane Valve Group; Crane Valves.
   b. Powell Valves.

2. Description:
   a. Standard: MSS SP-80, Type 2.
   b. CWP Rating: 300 psig (2070 kPa).
   d. Ends: Threaded or Solder.
   e. Stem: Copper-Silicon Bronze.
   f. Disc: PTFE or TFE.
   g. Packing: Asbestos free.
   h. Handwheel: Malleable iron.

2.22 IRON GLOBE VALVES

A. Class 125, Iron Globe Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model F-718-B or a comparable product by one of the following:
   a. Crane Co.; Crane Valve Group; Crane Valves.
   b. Powell Valves.

2. Description:
   a. Standard: MSS SP-85, Type I.
   b. CWP Rating: 200 psig (1380 kPa).
   c. Body Material: ASTM A 126, gray iron with bolted bonnet.
   d. Ends: Flanged.
   e. Trim: Bronze.
   f. Packing and Gasket: Asbestos free.

2.23 LUBRICATED PLUG VALVES

A. Class 125, Regular-Gland, Lubricated Plug Valves with Threaded Ends:

1. Manufacturers:

2. Description:
   a. Standard: MSS SP-78, Type II.
   b. CWP Rating: 200 psig (1380 kPa).
   c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
d. Pattern: Regular or short Venturi.
e. Plug: Cast iron or bronze with sealant groove.

B. Class 125, Regular-Gland, Lubricated Plug Valves with Flanged Ends:

1. Manufacturers:

2. Description:
   a. Standard: MSS SP-78, Type II.
   b. CWP Rating: 200 psig (1380 kPa).
   c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
   d. Pattern: Regular or short Venturi.
   e. Plug: Cast iron or bronze with sealant groove.

C. Class 125, Cylindrical, Lubricated Plug Valves with Threaded Ends:

1. Manufacturers:
   a. Homestead Valve; a division of Olson Technologies, Inc.
   b. Milliken Valve Company.
   c. R & M Energy Systems; a unit of Robbins & Myers, Inc.

2. Description:
   a. Standard: MSS SP-78, Type IV.
   b. CWP Rating: 200 psig (1380 kPa).
   c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
   d. Pattern: Regular or short Venturi.
   e. Plug: Cast iron or bronze with sealant groove.

D. Class 125, Cylindrical, Lubricated Plug Valves with Flanged Ends:

1. Manufacturers:
   a. Homestead Valve; a division of Olson Technologies, Inc.
   b. Milliken Valve Company.
   c. R & M Energy Systems; a unit of Robbins & Myers, Inc.

2. Description:
   a. Standard: MSS SP-78, Type IV.
   b. CWP Rating: 200 psig (1380 kPa).
   c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
   d. Pattern: Regular or short Venturi.
   e. Plug: Cast iron or bronze with sealant groove.

E. Class 250, Regular-Gland, Lubricated Plug Valves with Threaded Ends:

1. Manufacturers:
2. Description:
   a. Standard: MSS SP-78, Type II.
   b. CWP Rating: 400 psig (2760 kPa).
   c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
   d. Pattern: Regular or short Venturi.
   e. Plug: Cast iron or bronze with sealant groove.

F. Class 250, Regular-Gland, Lubricated Plug Valves with Flanged Ends:
   1. Manufacturers:

2. Description:
   a. Standard: MSS SP-78, Type II.
   b. CWP Rating: 400 psig (2760 kPa).
   c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
   d. Pattern: Regular or short Venturi.
   e. Plug: Cast iron or bronze with sealant groove.

G. Class 250, Cylindrical, Lubricated Plug Valves with Threaded Ends:
   1. Manufacturers:
      a. Homestead Valve; a division of Olson Technologies, Inc.
      b. Milliken Valve Company.
      c. R & M Energy Systems; a unit of Robbins & Myers, Inc.

2. Description:
   a. Standard: MSS SP-78, Type IV.
   b. CWP Rating: 400 psig (2760 kPa).
   c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
   d. Pattern: Regular or short Venturi.
   e. Plug: Cast iron or bronze with sealant groove.

H. Class 250, Cylindrical, Lubricated Plug Valves with Flanged Ends:
   1. Manufacturers:
      a. Homestead Valve; a division of Olson Technologies, Inc.
      b. Milliken Valve Company.
      c. R & M Energy Systems; a unit of Robbins & Myers, Inc.

2. Description:
   a. Standard: MSS SP-78, Type IV.
   b. CWP Rating: 400 psig (2760 kPa).
   c. Body Material: ASTM A 48/A 48M or ASTM A 126, Grade 40 cast iron with lubrication-sealing system.
   d. Pattern: Regular or short Venturi.
   e. Plug: Cast iron or bronze with sealant groove.
2.24 CHAINWHEELS

A. Manufacturers:
   1. Babbitt Steam Specialty Co.
   2. Roto Hammer Industries.
   3. Trumbull Industries.

B. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
   1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
   2. Attachment: For connection to ball butterfly and plug valve stems.
   3. Sprocket Rim with Chain Guides: ductile iron, of type and size required for valve,
      zinc coated in wet environments and in steam and boiler rooms.

C. Chain: hot dipped galvanized steel of size required to fit sprocket rim.

2.25 GAGE COCKS

A. Terlance No. 735. or equal, brass needle valve with Teflon packing, 2000 PSI at 480 degrees F.

PART 3 - EXECUTION

3.02 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion.
   Remove special packing materials, such as blocks, used to prevent disc movement during
   shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made
   accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for
   proper size, length, and material. Verify that gasket is of proper size, that its material
   composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.03 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service,
   maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install chainwheels on operators for all valves 6" and larger and more than 96" above floor.
   Extend chains to within 46" above finished floor.
F. Install check valves for proper direction of flow and as follows:

1. Swing Check Valves: In horizontal position with hinge pin level.
2. Center-Guided and Plate-Type Check Valves: In horizontal or vertical position, between flanges.
3. Lift Check Valves: With stem upright and plumb.

3.04 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.05 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball valves 4" and smaller, globe or gate 5" and larger. Butterfly valves may be used in for valves 5" and larger where pressures, fluid and temperatures allow.
3. Throttling Service: Globe or angle, ball, or butterfly valves. See note 1 for sizes.
4. Pump-Discharge Check Valves:
   a. NPS 2 (DN 50) and Smaller: Bronze swing or spring-loaded lift check valves with bronze disc.
   b. NPS 2-1/2 (DN 65) and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring or iron, center-guided, or dual-plate resilient-seat check valves.
   c. NPS 2-1/2 (DN 65) and Larger for Sanitary Waste and Storm Drainage: Iron swing check valves with lever and weight or spring.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:

1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Copper Tubing, NPS 5 (DN 125) and Larger: Flanged ends.
4. For Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.
5. For Steel Piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
6. For Steel Piping, NPS 5 (DN 125) and Larger: Flanged ends.
7. For Grooved-End: Valve ends may be grooved.

3.06 LOW-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE (150 PSIG (1035 kPa) OR LESS)

A. Pipe NPS 2 (DN 50) and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
4. Bronze Lift Check Valves: Class 125, nonmetallic Buna-N disc.
5. Bronze Swing Check Valves: Class 125, nonmetallic Buna-N disc.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.
3. Ductile-Iron, Grooved-End Butterfly Valves: 300 CWP, Buna-N.
4. Iron, Grooved-End Swing Check Valves: 300 CWP.
5. Iron, Center-Guided Check Valves: Class 125, globe, resilient seat.
6. Iron, Plate-Type Check Valves: Class 125; dual plate; resilient seat.

3.07 HIGH-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE (150 TO 200 PSIG (1035 TO 1380 kPa))

A. Pipe NPS 2 (DN 50) and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
4. Bronze Lift Check Valves: Class 125, nonmetallic Buna-N disc.
5. Bronze Swing Check Valves: Class 150, nonmetallic TFE disc.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.
3. Ductile-Iron, Grooved-End Butterfly Valves: 300 CWP.
4. Iron, Grooved-End Swing Check Valves: 300 CWP.
5. Iron, Center-Guided Check Valves: Class 125, globe, resilient seat.
6. Iron, Plate-Type Check Valves: Class 125; dual plate; resilient seat.

3.08 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 (DN 50) and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze Angle Valves: Class 150, nonmetallic disc.
3. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
4. Bronze Lift Check Valves: Class 125, nonmetallic TFE disc.
5. Bronze Swing Check Valves: Class 150, nonmetallic TFE disc.
6. Bronze Gate Valves: Class 150, RS.
7. Bronze Globe Valves: Class 150, nonmetallic disc.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.

2. Iron Angle Valves: Class 125.
3. Steel Ball Valves: Class 150, full-port.
5. Ductile-Iron, Grooved-End Butterfly Valves: 300 CWP.
6. High-Performance Butterfly Valves: Class 150, 285 CWP.
7. Iron Swing Check Valves: Class 125, metal seats.
8. Iron Swing Check Valves with Closure Control: Class 125, lever and weight.
9. Iron, Grooved-End Swing Check Valves: 300 CWP.
10. Iron, Center-Guided Check Valves: Class 125, globe, resilient seat.
11. Iron, Plate-Type Check Valves: Class 125; dual plate; resilient seat.
12. Iron Gate Valves: Class 125, OS&Y.

3.09 SANITARY-WASTE AND STORM-DRAINAGE VALVE SCHEDULE

A. Pipe NPS 2 (DN 50) and Smaller:
   1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
   2. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
   3. Bronze Swing Check Valves: Class 125, nonmetallic TFE disc.
   4. Bronze Gate Valves: Class 150, RS.

B. Pipe NPS 2-1/2 (DN 65) and Larger:
   1. Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.
   2. Steel Ball Valves: Class 150, full port.
   3. Iron Swing Check Valves: Class 125, metal seats.
   4. Iron Swing Check Valves with Closure Control: Class 125, lever and weight.
   5. Iron, Grooved-End Swing Check Valves: 300 CWP.
   6. Iron Gate Valves: Class 125, OS&Y.
   7. Lubricated Plug Valves: Class 125 regular gland or cylindrical, threaded or flanged.
SECTION 15140
DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

Section Includes:

1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
2. Encasement for piping.
4. Flexible connectors.
5. Escutcheons.
6. Sleeves and sleeve seals.
7. Wall penetration systems.
8. Transitions fittings.
9. Dielectric fittings.

Related Section:

10. Division 22 Section "Facility Water Distribution Piping" for water-service piping outside the building from source to the point where water-service piping enters the building.

1.3 PERFORMANCE REQUIREMENTS

Seismic Performance: Domestic water piping and support and installation shall withstand effects of earthquake motions determined according to ASCE/SEI 7.

1.4 SUBMITTALS

The manufacturer, contractor or supplier shall include a written statement that the submitted equipment, hardware or accessory complies with the requirement of this particular specification section.

1. The manufacturer shall resubmit this specification section showing compliance with each respective paragraphs and specified items and features.
2. All exceptions shall be clearly identified by referencing respective paragraph and other requirements along with proposed alternative.
3. INDIVIDUAL OR PARTIAL SUBMITTALS ARE NOT ACCEPTABLE AND WILL BE RETURNED WITHOUT REVIEW.

Product Data: For the following products:
4. Specialty valves.
5. Transition fittings.
6. Dielectric fittings.
7. Flexible connectors.
8. Backflow preventers and vacuum breakers.
10. Sleeves and sleeve seals.
11. Water penetration systems.

Coordination Drawings: For piping in equipment rooms and other congested areas, drawn to ¼" scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

12. Domestic water piping.
13. HVAC hydronic piping.
14. HVAC Ductwork.
15. Fire Sprinkler piping
16. Conduit 2" and larger.
17. Lab equipment.

Field quality-control reports.

1.5 QUALITY ASSURANCE

Piping materials shall bear label, stamp, or other markings of specified testing agency.

Comply with NSF 61 for potable domestic water piping and components.

1.6 PROJECT CONDITIONS

Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without Owner's written permission.

1.7 COORDINATION

Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
2.2 PIPE

Copper Tube and Fittings

1. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
   c. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

2. Soft Copper Tube: ASTM B 88, Type K water tube, annealed temper.

PVC Pipe and Fittings

3. Schedule 80 CPVC pipe and fittings as made by JM manufacturing conforming to ASTM D1785 IPS sizes and materials shall conform to ASTM D 1784.
   a. Fittings shall conform to ASTM D2467 and be fabricated by spears or the same manufacturer as the pipe.
   b. Valves shall be bronze ball type with threaded fittings 4" and smaller and cast or ductile iron butterfly valves 5" and larger with lug flanges. Valves underground shall be gate type with no rising stem. See specifications section 220523.

2.3 PIPING JOINING MATERIALS

Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.

Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

Plastic pipe cement – Solvent type cement for use with PVC, CPVC and ABS pipe, conforming to ASTM D 2564.

2.4 ENCASEMENT FOR PIPING

Standard: ASTM A 674 or AWWA C105.

Form: Tube.

Material: High-density, cross-laminated PE film of 0.004-inch minimum thickness.
2.5 SPECIALTY VALVES

Comply with requirements in Division 220523 Section "General-Duty Valves for Plumbing Piping" for general-duty metal valves.

Comply with requirements in Division 221119 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

2.6 TRANSITION FITTINGS

General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

Sleeve-Type Transition Coupling: AWWA C219.

4. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   Dresser, Inc.; Dresser Piping Specialties.
   Romac Industries, Inc.
   Smith-Blair, Inc; a Sensus company.
   Viking Johnson; c/o Mueller Co.

2.7 DIELECTRIC FITTINGS

General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   Watts Regulator Co.; a division of Watts Water Technologies, Inc.
   Zurn Plumbing Products Group; Wilkins Water Control Products.

2. Description:

   Pressure Rating: 150 psig at 180 deg F.
   End Connections: Solder-joint copper alloy and threaded ferrous.

2.8 FLEXIBLE CONNECTORS

Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Flex-Hose Co., Inc.
2. Hyspan Precision Products, Inc.
3. Metraflex, Inc.
4. Proco Products, Inc.
5. Universal Metal Hose; a Hyspan company

Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.

7. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
8. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.

Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.

11. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

2.9 ESCUTCHEONS

General: Manufactured ceiling, floor, and wall escutcheons and floor plates.

One Piece, Cast Brass: Polished, chrome-plated finish with setscrews.


One Piece, Stamped Steel: Chrome-plated finish with setscrew.

Split Casting, Cast Brass: Polished, chrome-plated finish with concealed hinge and setscrew.

Split Plate, Stamped Steel: Chrome-plated finish with concealed hinge, setscrew.

One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

Split-Casting Floor Plates: Cast brass with concealed hinge.

2.10 SLEEVES

Cast-Iron Wall Pipes: Fabricated of cast iron, and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

Molded-PE Sleeves: Reusable, PE, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.

Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
1. Underdeck Clamp: Clamping ring with setscrews.

2.11 SLEEVE SEALS

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Calipco, Inc.
2. Metraflex, Inc.
3. Pipeline Seal and Insulator, Inc.

Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.

4. Pressure Plates: Stainless steel.
5. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.12 WALL PENETRATION SYSTEMS

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. SIGMA.

Description: Wall-sleeve assembly, consisting of housing and gland, gaskets, and pipe sleeve.

2. Carrier-Pipe Deflection: Up to 5 percent without leakage.
3. Housing: Ductile-iron casting with hub, waterstop, anchor ring, and locking devices. Include gland, bolts, and nuts.
4. Housing-to-Sleeve Gasket: NBR.
5. Housing-to-Carrier-Pipe Gasket: AWWA C111, NBR.

2.13 GROUT


Characteristics: Nonshrink; recommended for interior and exterior applications.

Design Mix: 5000-psi, 28-day compressive strength.

Packaging: Premixed and factory packaged.
PART 3 - EXECUTION

3.1  PIPING INSTALLATION

Coordinate piping installations and specialty arrangements with schematics on Drawings and with requirements specified. If Drawings are explicit enough, these requirements may be reduced or omitted.

Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

Install copper tubing under building slab according to CDA’s "Copper Tube Handbook."

Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.

Install underground copper tube and ductile-iron pipe in PE encasement according to ASTM A 674 or AWWA C105.

Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages and Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.

Install shutoff valve immediately upstream of each dielectric fitting.

Install domestic water piping level and plumb.

Rough-in domestic water piping for water-meter installation according to utility company’s requirements.

Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

Install piping adjacent to equipment and specialties to allow service and maintenance.

Install piping to permit valve servicing.

Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.

Install piping free of sags and bends.

Install fittings for changes in direction and branch connections.

Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

3.2  JOINT CONSTRUCTION

Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

Brazed Joints: Join copper tube and fittings according to CDA’s “Copper Tube Handbook,” “Brazed Joints” Chapter.

Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA’s “Copper Tube Handbook.”

Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.

Copper-Tubing, Push-on Joints: Clean end of tube. Measure insertion depth with manufacturer’s depth gage. Join copper tube and push-on-joint fittings by inserting tube to measured depth.

Copper-Tubing Grooved Joints: Roll groove end of tube. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for roll-grooved joints.

Ductile-Iron-Piping Grooved Joints: Cut groove end of pipe. Assemble coupling with housing, gasket, lubricant, and bolts. Join ductile-iron pipe and grooved-end fittings according to AWWA C606 for ductile-iron-pipe, cut-grooved joints.

Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

Plastic Joints: Installer shall wear rubber gloves during all process. Joints shall not be assembled if the outside air temperature is less than 50 degrees Fahrenheit. Clean ends of plastic pipe free of burrs and debris. Clean end of pipe and socket of fitting with primer to soften pipe. Apply liberal amount of cement to end of pipe to the depth of fitting and 1” inside of fitting. Press pipe together and twist pipe ¼ to ½ turn during assembly. Hold pipe to prevent pipe from pushing out of fitting a minimum of 1 minute. Do not move fitting for 10 minutes. Do not pressurize for 24 hours.

3.3 VALVE INSTALLATION

General-Duty Valves: Comply with requirements in Division 22 Section “General-Duty Valves for Plumbing Piping” for valve installations.

Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.
3.4 TRANSITION FITTING INSTALLATION

Install transition couplings at joints of dissimilar piping.

Transition Fittings in Underground Domestic Water Piping:

1. NPS 1-1/2 and Smaller: Fitting-type coupling.
2. NPS 2 and Larger: Sleeve-type coupling.

3.5 DIELECTRIC FITTING INSTALLATION

Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.

Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.

Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.6 FLEXIBLE CONNECTOR INSTALLATION

Install flexible connectors in suction and discharge piping connections to each domestic water pump and in suction and discharge manifold connections to each domestic water booster pump.

Install bronze-hose flexible connectors in copper domestic water tubing.

Install stainless-steel-hose flexible connectors in steel domestic water piping.

3.7 HANGER AND SUPPORT INSTALLATION

Comply with requirements in Division 22059 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs: 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls.
   Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

Support vertical piping and tubing at base and at each floor.

Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

5. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
6. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
7. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
8. NPS 2-1/2: 108 inches with 1/2-inch rod.
9. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
10. NPS 6: 10 feet with 5/8-inch rod.

Install supports for vertical copper tubing every 10 feet.

Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

11. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
13. NPS 2: 10 feet with 3/8-inch rod.
14. NPS 2-1/2: 11 feet with 1/2-inch rod.
15. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
16. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
17. NPS 6: 12 feet with 3/4-inch rod.

Install supports for vertical steel piping every 15 feet.

Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.8 CONNECTIONS

Drawings indicate general arrangement of piping, fittings, and specialties.

It is the responsibility of the Contractor to coordinate the precise and location of all Owner furnished equipment in the field prior to final RI and installation. Make all necessary adjustments as required at no additional charge to the Owner.

Install piping adjacent to equipment and machines to allow service and maintenance.

Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
2. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.9 ESCUTCHEON INSTALLATION

Install escutcheons for penetrations of walls, ceilings, and floors.

Escutcheons for New Piping:

1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.
2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
4. Bare Piping in Unfinished Service Spaces: One piece, cast brass with polished chrome-
5. Bare Piping in Equipment Rooms: One piece, cast brass.
6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.

3.10 SLEEVE INSTALLATION

General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, roofs, and walls.

Sleeves are not required for core-drilled holes.

Permanent sleeves are not required for holes formed by removable PE sleeves.

Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.

Install sleeves in new partitions, slabs, and walls as they are built.

For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.

For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.

For exterior wall penetrations below grade, seal annular space between sleeve and pipe using wall penetration systems specified in this Section.

Seal space outside of sleeves in concrete slabs and walls with grout.

Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated.

Install sleeve materials according to the following applications:

1. Sleeves for Piping Passing through Concrete Floor Slabs: Steel pipe.
2. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: Steel pipe.

Extend sleeves 2 inches above finished floor level.

For pipes penetrating floors with membrane waterproofing, extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing.

3. Sleeves for Piping Passing through Concrete Roof Slabs: Steel pipe.
4. Sleeves for Piping Passing through Exterior Concrete Walls:

Steel pipe sleeves for pipes smaller than NPS 6.
Cast-iron wall pipe sleeves for pipes NPS 6 and larger.
Install sleeves that are large enough to provide 1-inch annular clear space between sleeve and pipe or pipe insulation when sleeve seals are used.
Do not use sleeves when wall penetration systems are used.
3.11 SLEEVE SEAL INSTALLATION

Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building.

Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.12 WALL PENETRATION SYSTEM INSTALLATION

Install wall penetration systems in new, exterior concrete walls.

Assemble wall penetration system components with sleeve pipe. Install so that end of sleeve pipe and face of housing are flush with wall. Adjust locking devices to secure sleeve pipe in housing.

3.13 IDENTIFICATION

Identify system components. Comply with requirements in Division 220523 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

Label pressure piping with system operating pressure.

3.14 FIELD QUALITY CONTROL

Perform tests and inspections.

Piping Inspections:
1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
   Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
   Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

Piping Tests:
5. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
6. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
7. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or
concealed before it was tested.

8. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

9. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.

10. Prepare reports for tests and for corrective action required.

Domestic water piping will be considered defective if it does not pass tests and inspections.

Prepare test and inspection reports.

3.15 ADJUSTING

Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

   Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.

   Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.16 CLEANING

Clean and disinfect potable and non-potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

Flush piping system with clean, potable water until dirty water does not appear at outlets. Fill and isolate system according to either of the following:

   Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine.
   Isolate with valves and allow to stand for 24 hours.

   Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine.
   Isolate and allow to stand for three hours.

Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
Prepare and submit reports of purging and disinfecting activities.
Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.17 PIPING SCHEDULE

Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
The "Piping Schedule" Article below is organized to first present the service and pipe size or size range;

Under-building-slab, domestic water, building service entrance piping, NPS 3 and smaller, shall be one of the following:

1. Soft copper tube, ASTM B 88, Type K with no joints to location where water is shown stubbed up. All other piping to be run overhead.

Under-building-slab, domestic water, building-service entrance piping, NPS 4 to NPS 8 and larger, shall be the following:

2. Mechanical-joint, ductile-iron pipe; standard or compact-pattern mechanical-joint fittings; and mechanical joints.

Aboveground domestic water piping, NPS 6 and smaller, shall be the following:

3. Hard copper tube, ASTM B 88, Type L with wrought-copper solder-joint fittings; and soldered joints.

Aboveground domestic water piping, NPS 8" and larger shall be the following:

4. Ductile Iron Pipe with grooved fittings.

3.18 VALVE SCHEDULE

Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball valves for piping NPS 4 and smaller. Use butterfly or gate valves with flanged ends for piping NPS 5" and larger.

2. Throttling Duty: Use ball or globe valves for piping NPS 4 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 6 and larger.


Use check valves to maintain correct direction of domestic water flow to and from equipment.

Iron grooved-end valves may be used with grooved-end piping.

***END OF SECTION***
SECTION 15150
SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pipe, tube, and fittings.
B. Special pipe fittings
C. Valves
D. Pipe Support Devices

1.02 RELATED DOCUMENTS

A. Section 220523 – Valves.
B. Section 220529 – Supports and Anchors, Including Resilient support and Seismic Restraint.
C. Section 220719 - Insulation.
D. Division 26 – Electrical material and electrical connections to equipment.

1.03 DEFINITIONS

B. EPDM: Ethylene-propylene-diene terpolymer rubber.
C. LLDPE: Linear, low-density polyethylene plastic.
D. NBR: Acrylonitrile-butadiene rubber.
E. PE: Polyethylene plastic.
F. PVC: Polyvinyl chloride plastic.
G. TPE: Thermoplastic elastomer.
H. NPS: Nominal Pipe Size

1.04 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
   1. Soil, Waste, and Vent Piping: 10 foot head of water per riser stack per floor.
B. Seismic Performance: Soil, waste, and vent piping and support and installation shall be capable of withstanding the effects of seismic events determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures."

1.05 SUBMITTALS

A. Submit in accordance with Division 1 and Section 22 00 00.
   1. Manufacturer’s equipment
   2. Piping materials
   3. Valves
   4. Insulation
   5. Control panels

1.06 Shop Drawings

A. Submit complete, detailed shop drawings at 1/8" & 1/4" -1’0" scale. Give complete dimensions for location, elevation, and clearances to work of other trades.
1.07 OPERATION AND MAINTENANCE DATA

1. Manufacturer's equipment
2. Piping materials
3. Valves
4. Insulation
5. Control panels

PART 2 - PRODUCTS

2.01 PIPE

A. Sanitary Sewers, Grease Lines and Roof Drains

1. Inside Building
   a. Service weight cast iron pipe and no hub fittings. The use of ABS pipe and fittings is permitted in the upper two floors of buildings over three stories in height, buildings that are not "I" occupancies, where pipe will not be installed between the outer layers of fire rated assemblies, and where permitted by local code.

2. Outside building and Under Slab
   a. Service weight cast iron pipe and no hub fittings. ABS pipe and fittings will be allowed where permitted by local code.

2.02 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.03 PIPING MATERIALS

A. Sanitary sewer and vent and storm water under building piping material shall be service weight cast iron pipe and fittings. Where permitted by code and the local jurisdictions, the use of ABS/SDR/CPVC pipe and fittings shall be permitted in installation in A, S, H, R and B occupancies in buildings of two stories or less, and outdoor patios. Where ABS/SDR/CPVC pipe and fitting are not allowed in buildings, their use is limited to underground piping outside building.

B. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.04 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and fittings in this Article are available in NPS 1-1/2 to NPS 15 (DN 50 to DN 375).

B. Pipe and Fittings: ASTM A 74, Service and Extra-Heavy classes.

C. Gaskets: ASTM C 564, rubber.

D. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.05 HUBLESS CAST-IRON SOIL PIPE AND FITTINGS
A. Pipe, fittings, and couplings in first two paragraphs below are available in NPS 1-1/2 to NPS 15 (DN 40 to DN 375).

B. Pipe and Fittings: ASTM A 888 or CISP 301.

C. Solvent stack fittings in first paragraph below are available in NPS 2 to NPS 8 (DN 50 to DN 200). Use of solvent fittings does not eliminate need for standard hubless cast-iron pipe fittings.

D. Solvent Stack Fittings: ASME B16.46 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.

E. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.

   a. Available Manufacturers:
   b. ANACO.
   c. Clamp-All Corp.
   d. Ideal Div.; Stant Corp.
   e. Mission Rubber Co.
   f. Tyler Pipe; Soil Pipe Div.

2. Couplings in subparagraph below are available in NPS 1-1/2 to NPS 10 (DN 40 to DN 250).

3. Heavy-Duty, Shielded, Cast-Iron Couplings: ASTM A 48/A 48M, two-piece, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve.
   a. Available Manufacturers:
   b. MG Piping Products Co.

4. Couplings in paragraph below are available in NPS 1-1/2 to NPS 4 (DN 40 to DN 100), and should not be used for liquids at temperatures below 0 deg F (minus 18 deg C) or above 130 deg F (54 deg C).

5. Rigid, Unshielded Couplings: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling molded from ASTM C 1440, TPE material with corrosion-resistant-metal tension band and tightening mechanism on each end.

6. Manufacturers:
   a. ANACO.

2.06 STEEL PIPE AND FITTINGS

A. Pipe in paragraph below is available in NPS 1/8 to NPS 26 (DN 6 to DN 650).

B. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade A or B, Standard Weight or Schedule 40, galvanized. Include ends matching joining method.

C. Fittings in first paragraph below are available in NPS 1-1/4 to NPS 8 (DN 32 to DN 200).

D. Drainage Fittings: ASME B16.12 DWV galvanized, threaded, cast-iron drainage pattern.

E. Pressure Fittings:

   1. Fittings in subparagraph below are available in NPS 1/8 to NPS 12 (DN 6 to DN 300).

3. Fittings in subparagraph below are available in NPS 1/8 to NPS 4 (DN 6 to DN 100).


5. Fittings in subparagraph below are available in NPS 1/4 to NPS 12 (DN 8 to DN 300).


7. Fittings in subparagraph below are available in NPS 1 to NPS 96 (DN 25 to DN 2400).


9. Fittings in subparagraph below are available in NPS 4 to NPS 72 (DN 100 to DN 1800).


F. Fittings and couplings in paragraph and subparagraphs below are available in NPS 3/4 to NPS 24 (DN 20 to DN 600).

G. Grooved-Joint Systems:

1. Manufacturers:
   a. Anvil International.
   b. Star Pipe Products; Star Fittings Div.
   c. Victaulic Company.
   d. Ward Manufacturing, Inc.

2. Fittings
   a. Grooved-End, Steel-Piping Fittings: ASTM A 47/A 47M, galvanized, malleable-iron casting; ASTM A 106, galvanized-steel pipe; or ASTM A 536, galvanized, ductile-iron casting; with dimensions matching steel pipe.

   b. Grooved-End, Steel-Piping Couplings: AWWA C606, for steel-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.

2.07 STAINLESS-STEEL PIPE AND FITTINGS

A. Pipe and fittings in this Article are available in NPS 2 to NPS 6 (DN 50 to DN 150).

B. Pipe and Fittings: ASME A112.3.1, drainage pattern with socket and spigot ends.

C. Gaskets: Lip seals shaped to fit socket groove, with plastic backup ring.

   1. Material: EPDM, unless NBR is indicated.

2.08 DUCTILE-IRON PIPE AND FITTINGS

A. Pipe and fittings in paragraph and subparagraphs below are available in NPS 3 to NPS 24 (DN 80 to DN 600).
B. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell and plain spigot end, unless grooved or flanged ends are indicated.

1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

C. Pipe and fittings in paragraph and subparagraphs below are available in NPS 3 to NPS 48 (DN 80 to DN 1200).

D. Push-on-Joint, Ductile-Iron Pipe: AWWA C151, with push-on-joint bell and plain spigot end, unless grooved or flanged ends are indicated.

1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

2. Gaskets: AWWA C111, rubber.

E. Fittings and couplings in paragraph and subparagraphs below are available in NPS 4 to NPS 24 (DN 100 to DN 600).

F. Grooved-Joint Systems:

1. Acceptable manufacturer's
   a. Victaulic Company.
      2. Grooved-End, Ductile-Iron-Piping Couplings: AWWA C606, for ductile-iron-pipe dimensions. Include ferrous housing sections, gasket suitable for water, and bolts and nuts.
   b. Flanges in paragraph below are available in NPS 1 to NPS 96 (DN 25 to DN 2400).
      1. Flanges: ASME 16.1, Class 125, cast iron.

2.09 COPPER TUBE AND FITTINGS

A. Tube and fittings in first paragraph and subparagraph below are available in NPS 1-1/4 to NPS 8 (DN 32 to DN 200).

B. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.


C. Hard Copper Tube: ASTM B 88, Types L and M, water tube, drawn temper.


2. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.

3. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

D. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.

2.10 Fittings

A. Nipples: Cut from pipe as specified above. Close nipples in steel pipe shall be Schedule 40 for gas, schedule 40 for chilled and hot water.

B. Threaded Malleable Iron Fittings: ANSI B16.3, black or galvanized, Class 150 unless specified otherwise.

C. Soldered Fittings, for Copper Tubing: Wrought copper, ANSI Specification B16.22.

D. Grooved Fittings: ANSI B16.9, 125 psi primed unless galvanized.

E. Cast Iron Flanges and Flanged Fittings: ANSI B16.9, 125 psi Black, unless specified galvanized.

F. Flange Gaskets: Full faced or flat ring, to suit flange facings, Garlock Style 3000, 1/16" thick TFE, or equal, suitable for 500 psi at 500 degree F.

G. Flange Bolting: Bolts, studs, and washers shall be carbon steel, ASTM A-307, Grade B, with heavy hex heads. Nuts shall be heavy hexagon series alloy steel, ASTM A-194, Grade 1 or better. All bolts and nuts shall be cadmium or zinc plated.

H. Welding outlets: Grinnell, Weld-O-Let, or equal, forged welding outlets for butt welding or threaded connection as required. Use only for 2" and smaller outlets on 4" and larger pipes.

I. Unions for Steel Pipe: 2 inch and smaller in size, malleable iron, ground joint pattern, brass to iron seat, 150 psi. Unions over 2 1/2" in size, standard 150 psi flanges with gaskets and bolts.


K. Solder Silver, for Copper Tubing: 95-5 tin-antimony, or Englehard "Liverbrite 100R" 95.5/4.5 tin/copper/silver with non-acid flux. Solder to be lead free. Pipe and fittings charred or collapsed due to excessive heating will not be permitted and shall be removed from the jobsite.

L. Cooper to Ferrous Connections: Ecco, Valley, or Ecoff dielectric pipe unions, threaded or flanged as required with gaskets rated at 250 degrees F. at 250 PSIG.

M. Grooved Joint Couplings: Victaulic Style 77 couplings, or equal.

N. Threaded to Solder Adapters: As specified for soldered fittings.

O. Escutcheon Plates: Chromium-plated steel plates with set screw to hold securely in place, installed on pipes passing through exposed ceilings, floors, and walls in visible locations.

P. Thread Lubricant: Rector seal, or equal rated for the glass and temperature of service.

2.11 VALVES (WATER, AIR AND GAS SERVICE)

A. Per 22 05 23.

2.12 PIPE SUPPORT DEVICES

A. PER 22 05 29

PART 3 - EXECUTION

3.01 PIPE

A. Trenching and Backfilling

1. Dig all trenches straight and true. Install minimum 4" bed of sand prior to placing pipe. Pipe which slopes to drain shall be sloped by the use of the sand bed. All interior drain lines unless noted otherwise shall be installed with a minimum 1/4'ft slope towards drain.

2. Backfill all trenches with sand. Compact sand to 90% in 12" lifts prior to pouring slab. Place 2" wide trace tape 12" above pipe on all lines installed outside building.

15150-6
City of Sacramento
Garcia Bend Park Restroom Restoration Project
100% Submittal
B. Pressure piping material, fabrication and support shall comply with ANSI B31, American National Standard Code for Pressure Piping, latest edition, including addenda. All pipe shall be installed and supported per SMACNA’s Seismic Restraint Guidelines for the Bracing of Pipe and Ductwork. All pipe shall be installed and tested per the manufacturer’s recommendations.

C. Use American Standard pipe threads for IPS threaded work. Use no caulking or packing of any kind. Ream out burrs formed by cutting tools and, before installing, examine each section of pipe to see that it is clean and clear. Pipes shall be free from tool marks. In making up screwed joints, apply specified thread lubricant to male threads only.

D. Indirect Drain Piping: Install drains for all equipment requiring drains, full size of equipment connection, and terminate over roof drain as indicated and/or as directed. Slope 1/4” per foot down to drain. Provide suitable traps in plenum areas.

E. Install dielectric unions at all connections of ferrous to non-ferrous systems.

F. Carry all exposed and concealed horizontal lines of pipe on specified hangers properly spaced and set to allow the pipe to adjust for expansion and contraction. Use trapeze hangers for supporting groups of pipes. Piping and conduit running parallel shall be evenly spaced and supported on trapeze hangers.

G. Conceal all piping in furred walls, partitions, above ceilings, and pipe spaces except where specifically noted otherwise. Check all piping runs beforehand with all trades. Run piping to maintain proper clearance for maintenance and to clear openings in exposed areas.

3.02 JOINTS

A. Threaded joints – Threaded joints shall be sealed using a minimum of 3 layers of Teflon tape over the length of the threads and covered with teflon paste. Pipe shall be assembled to prevent torquing of joints when placed in service.

B. Welded joints – Welded joints shall be three pass. Bevel end of pipe/fitting and adjoining pipe/fitting to 60° min included angle, ending 1/16” from inside edge of pipe. Tack pipe together with 1/16” separation in three locations using 3/4” welds spaced 60° apart. Check pipe alignment to ensure joint is square and plumb. When pipe(s) and fitting(s) are square and plumb after tack welding, weld per AWA standards for pipe and fittings.

C. Solvent Joints - Observe all temperatures and only solvent weld pipe during the conditions dictated by the manufacturer. Apply softening primer to pipe first, let set per manufacturer’s recommendations based on the temperature and then apply cement to pipe and to the inner 3/8 of the fitting. Insert pipe and twist pipe or fitting a minimum of ¾ turn clockwise or counterclockwise minimum. All pipe not exhibiting a complete filet of solvent between the joined pipe and the fitting shall be cut out, thrown away and a new fitting installed.

3.03 Placing Piping in Service

A. Pressure test all new pipe as follows. Where possible, contractor shall test joints under pressure with soap and water. If any section fails, contractor shall locate leak, repair and replace section of pipe and fittings at no additional cost to owner:

1. Sewer, vent and other Drain Lines – Plug openings, Fill pipe with water and test for leaks by observing the water level over a 24 hour period. Water level shall remain unchanged.

3.04 INSULATING

A. Insulate Storm drain lines concealed in walls and where exposed in building to prevent condensation per 22 07 19 with R=2.1 insulation.

3.05 PIPING APPLICATIONS
A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 8 and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
3. ABS pipe and fittings where permitted by code and the local jurisdiction.

C. Aboveground, soil and waste piping NPS 10 and larger shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings, shielded, stainless-steel couplings; and hubless-coupling joints.
3. Dissimilar Pipe-Material Couplings: [Flexible] nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

D. Aboveground, vent piping NPS 8 and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
3. Steel pipe, drainage fittings, and threaded joints.
4. Stainless-steel pipe and fittings gaskets, and gasketed joints.
5. Copper DWV tube, copper drainage fittings, and soldered joints.
6. ABS pipe and fittings where permitted by code and the local jurisdiction.

E. Aboveground, vent piping NPS 10 and larger shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless cast-iron soil pipe and fittings; standard, and heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
3. Steel pipe, drainage fittings, and threaded joints.
4. Solid-wall Cellular-core PVC pipe, PVC socket fittings, and solvent-cemented joints.
5. Dissimilar Pipe-Material Couplings: Flexible, Shielded, nonpressure pipe couplings for joining dissimilar pipe materials with small difference in OD.

F. Underground, soil, waste, and vent piping NPS 2 and larger shall be any of the following:

1. Extra-Heavy Service class, cast-iron soil piping; gaskets; and gasketed calking materials; and calked joints.
2. Hubless cast-iron soil pipe and fittings; stainless-steel heavy-duty shielded couplings, stainless-steel heavy-duty shielded, cast-iron and rigid, unshielded couplings; and hubless-coupling joints.
3. Closed Cellular ABS pipe and fittings where permitted by code and local jurisdiction.

3.06 PIPING INSTALLATION

A. Sanitary sewer piping outside the building is existing and contractor shall connect to stub inside basement.
B. Install seismic restraints on piping. Seismic-restraint devices are specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."

C. Install cleanout at grade and extend to where building sanitary drains connect to building sanitary sewers.

D. Install cleanout fitting with closure plug inside the building in sanitary force-main piping.

E. Install underground, ductile-iron, force-main piping according to AWWA C600. Install buried piping inside the building between wall and floor penetrations and connection to sanitary sewer piping outside the building with restrained joints. Anchor pipe to wall or floor. Install thrust-block supports at vertical and horizontal offsets.

1. Install encasement on piping according to ASTM A 674 or AWWA C105.

F. Install wall-penetration fitting at each service pipe penetration through foundation wall. Make installation watertight.


1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.

H. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

I. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

J. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

K. Install engineered soil and waste drainage and vent piping systems as follows:

2. Solvent Drainage System: Comply with ASSE 1043 and solvent fitting manufacturer's written installation instructions.
3. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.

L. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

M. Install ABS soil and waste drainage and vent piping according to ASTM D 2661.
N. Install PVC soil and waste drainage and vent piping according to ASTM D 2665.

O. Install underground soil and waste drainage piping according to ASTM D 2321.

P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.07 JOINT CONSTRUCTION


B. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum caulked joints.

C. Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

D. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

E. Grooved Joints: Assemble joint with keyed coupling, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

3.08 VALVE INSTALLATION

A. Shutoff Valves: Install shutoff valve on each sewage pump discharge.

B. Install gate or full-port ball valve for piping NPS 2 and smaller.

C. Install gate valve for piping NPS 2-1/2 and larger.

D. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.

E. Backwater Valves: Install backwater valves in piping subject to sewage backflow.

   1. Horizontal Piping: Horizontal backwater valves. [Use normally closed type, unless otherwise indicated.]
   2. Floor Drains: Drain outlet backwater valves, unless drain has integral backwater valve.
   3. Install backwater valves in accessible locations.
   4. Backwater valve are specified in Division 22 Section "Sanitary Waste Piping Specialties."

3.09 HANGER AND SUPPORT INSTALLATION

A. Seismic-restraint devices are specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Pipe hangers and supports are specified in section 220529. Install the following:

   1. Vertical Piping: MSS Type 8 or Type 42, clamps.
   2. Install individual, straight, horizontal piping runs according to the following:
      a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
      b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
      c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

E. Maximum spans below were taken from MSS SP-69 for water service and from model plumbing codes. Most restrictive piping and spacing dimensions are shown.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. NPS 6: 60 inches with 3/4-inch rod.
5. NPS 8 to NPS 12: 60 inches with 7/8-inch rod.

G. Install supports for vertical cast-iron soil piping every 15 feet.

H. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 84 inches with 3/8-inch rod.
2. NPS 1-1/2: 108 inches with 3/8-inch rod.
3. NPS 2: 10 feet with 3/8-inch rod.
4. NPS 2-1/2: 11 feet with 1/2-inch rod.
5. NPS 3: 12 feet with 1/2-inch rod.
6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
7. NPS 6: 12 feet with 3/4-inch rod.
8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.

I. Install supports for vertical steel piping every 15 feet.

J. Install hangers for stainless-steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 2: 84 inches with 3/8-inch rod.
2. NPS 3: 96 inches with 1/2-inch rod.
3. NPS 4: 108 inches with 1/2-inch rod.
4. NPS 6: 10 feet with 5/8-inch rod.

K. Install supports for vertical stainless-steel piping every 10 feet.

L. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 72 inches with 3/8-inch rod.
2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
3. NPS 2-1/2: 108 inches with 1/2-inch rod.
4. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
5. NPS 6: 10 feet with 5/8-inch rod.
6. NPS 8: 10 feet with 3/4-inch rod.

M. Install supports for vertical copper tubing every 10 feet.

3.10 CONNECTIONS

A. Coordinate piping installations and specialty arrangements with schematics on Drawings and with requirements specified. If Drawings are explicit enough, these requirements may be reduced or omitted.

B. Drawings indicate general arrangement of piping, fittings, and specialties.

C. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

D. Connect drainage and vent piping to the following:
   1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
   2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
   3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
   4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

E. Connect force-main piping to the following:
   1. Sanitary Sewer: To exterior force main or sanitary manhole.
   2. Sewage Pumps: To sewage pump discharge.

3.11 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
   1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
   2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Re-inspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for re-inspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
   1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

6. Prepare reports for tests and required corrective action.

E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

4. Prepare reports for tests and required corrective action.

3.12 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION
SECTION 15400

PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Provide all plumbing fixtures and work as indicated on the Drawings and specified herein. Determine all items and quantities required. At completion of work, all plumbing systems shall be complete, continuous, operational, and functioning in the proper manner. Work includes, but is not necessarily limited to the following:

1. Plumbing fixtures, and trim.
2. Furnishing access panels.
3. Testing and adjusting plumbing fixtures and trim.

1.02 RELATED WORK

1. 26 00 00 ET. AL. – Electrical material and electrical connections to equipment.
2. 22 00 00 ET AL – Plumbing Piping.

1.03 GENERAL REQUIREMENTS:

A. As specified in Section 22 00 00 et al..

1.04 AS-BUILT DRAWINGS:

A. As specified in Section 22 00 00 and division 1.

1.05 SUBMITTALS: Submit in accordance with Division 1 and 22 00 00 et al.

A. Plumbing fixtures and trim.
B. ADA Insulation.
C. Sterilization procedures.

1.06 OPERATION AND MAINTENANCE DATA

A. As specified in Section 1.

1.07 WARRANTY

A. Project one year warranty for this section.

PART 2 PRODUCTS

2.01 SHOCK ABSORBERS (WATER HAMMER ARRESTORS):

A. J.R. Smith 5000, Zurn, Josam or equal, all stainless steel, with threaded connections, and shall meet P.D.I. standard WH201, and ASSE standard 1010. Shock absorbers shall be installed in accessible locations behind 12-inch wall access panels.

2.02 HOSE BIBBS:

A. Provide hose bibbs as noted on the drawings, integral vacuum breaker, 3/4-inch threaded nozzle, bronze or brass parts throughout, female key operated valve with composition washer and renewable seat. See schedule for type and manufacturer.
2.03 PIPE SUPPORTING DEVICES:
   A. As Specified in Section 22 05 29.

2.04 CLEANOUTS:
   A. See schedule on drawings.
   B. J.R. Smith, Zurn, Josam or equal.
   C. Provide cast bronze cleanouts in accordance with ANSI A112.36.2 full size up to 4 inches and at least half size for larger pipes with 4 inches minimum.

2.05 ROOF AND OVERFLOW DRAINS
   A. See schedule on drawings.
   B. J.R. Smith, Zurn, Josam or equal.
   C. Provide coated cast iron body roof drains with an inside caulked bottom outlet, except as noted and in accordance with ANSI A112.21.2.

2.06 FLOOR DRAINS:
   A. See Schedule on drawings.
   B. J.R. Smith, Zurn, Josam or equal.
   C. Provide floor drains in accordance with ANSI A112.21.1 and where required for the following construction types. For built up membrane, provide a flashing clamp. Provide strainers with a nickel bronze finish except as noted.
   D. Provide a coated cast iron body, except as noted, with integral double drainage flange and weep holes, inside caulked outlet or hub outlet for compression gasket connection, or hubless outlet except as noted.

2.07 PLUMBING FIXTURES:
   A. L-1's, WC's - Security stainless steel type,
      1. Manufacturer's
         a. Acorn
         b. Bradley
         c. Metcraft
   B. DF's - Drinking Fountains,
      1. Manufacturer's
         a. Haws
         b. Sunroc
         c. Elkay
   C. Mop Sinks
      1. Manufacturer's
         a. Florestone
         b. Fiat
         c. Stern-Williams
   D. Furnish and install Zurn carriers for all wall mounted toilets, lavatories and urinals matching items submitted. Minimum carrier capacity shall be 1000#s.
   E. All plumbing fixtures shall be certified by and comply with the State of California Energy Commission (CEC) water conservation regulations.
   F. Point up joints between fixtures and wall or floor with white mastic. Mastic shall have sufficient resiliency to prevent cracking or pulling away from wall due to fixture movement.
   G. Provide tubing supplies, traps, pipe flanges and wastes to wall of not less than #17 B & S gauge polished chromium-plated brass. Provide exposed fixture trim and water and waste piping to lavatories, unless noted otherwise, supplies and traps shall be centered, plumb, and perpendicular to wall for lavatories.
H. All fixtures for handicapped personnel shall be mounted in accordance with ANSI A117.1-1980 handicapped access regulations. See fixture schedule on drawings for fixture types.

2.08 TRAP SEAL PRIMER VALVES

A. Provide floor drains or deep-seal P-traps, water saver type with brass body built-in air gap and adjustable manual priming knob, similar to Watts No. 200. Provide access door where concealed. Provide in accordance with ASSE Standard No. 1018.

PART 3 EXECUTION

3.01 FIXTURE MOUNTING

A. Fixture Mounting: Where required, provide and set 1/8" steel plate backing and bolt or tack weld to studs, for lavatories, and drinking fountains. Fixture hangers shall be bolted to steel backing which shall extend continuously across back of studs, and fixture or fixtures. Fixtures shall be immobile and shall not be able to be moved on or from wall.

B. Carriers shall be used where scheduled in drawings for lavatories and drinking fountains and braced to framing at top of carrier. Fixtures shall be immobile and shall not be able to be moved on or from wall.

C. Install floor drains in with trap primers in all RR's. Floor drains shall be Zurn or Equal Z-415 with nickel bronze strainer, complete with trap primer fitting. Trap primer shall Precision Plumbign Products PR-500 mounted in the common space behind the RR's. Attach to line feeding flush vavle with 3/8" compression fittings, provide air gap fitting.

3.02 INSULATION

A. As specified in Section 22.07.19.

B. Insulate all domestic hot and recirculating water piping.

3.03 STENCILING AND IDENTIFICATION:

A. As specified in Section 22.05.00.

3.04 CLEANING:

A. Clean plumbing fixtures with soap and water. Remove marks and labels. Clean and polish chrome. Remove paint, concrete, plaster, and other foreign materials.

B. Clean all drains, and sumps of dirt and debris.

C. Remove shipping paper from cleanout covers and drain strainers and polish.

D. Remove and clean out all dirt and debris from pipe spaces, including all wire, and blocking.

E. All equipment and materials furnished by this Section shall be completely dust and paint free, clean and rust free, and freshly painted or polished when the final acceptance inspection is made.

F. Thoroughly clean and flush interior and exterior of all piping systems (wet systems, and drainage systems) of any nature of all pipe contaminates such as cuttings, filings, lubrication, rust, scale, grease, solder, flux, welding residue, debris, etc., and thoroughly flush out with clear clean water until clean in the opinion of the Owner's Representative. Any piece of equipment or part of any system which malfunctions or is damaged due to failure or neglect to observe this paragraph shall be repaired or replaced to the satisfaction of the Owner. Purge natural gas piping with compressed air to remove dirt and debris. Replace air in piping with an inert gas such as nitrogen, and close all openings.

3.05 ADJUSTMENTS:
A. Adjust water closets and combo units to provide proper flush.
B. Adjust all outlets, faucets, drinking fountains to their normal working condition.
C. Adjust domestic water heater to 120 degrees F., and set time clock.
D. Demonstrate correct operation of water softener equipment.
E. Demonstrate correct operation of all equipment operating controls and alarm functions.
F. Assist in the testing and adjusting of equipment furnished and installed under other Divisions, but served and connected under this Section.

3.06 TESTING:

A. Before conducting tests, valve-off or disconnect any equipment and apparatus which may be damaged by the test pressures higher than normal working pressures. All testing shall be witnessed and approved by the Owner's inspecting authority.
B. All testing shall be witnessed and approved by the inspecting authority.
C. Sanitary Soil, Waste, Vent, Rainwater Leader, Overflow Drain, and Storm Drainage Piping: Test and prove tight in accordance with the local Plumbing Code.
D. Natural Gas Piping: 7" WC - Pressurize to 15 psi and check joints with soapy water. Plastic piping and test per NFPA 54.
E. Apply tests for minimum period of two (2) hours, and until tests are complete, in the opinion of the inspecting authority.
F. Work may be tested in sections, if necessary, for convenience. In this case, test of last section shall include all connections between previously tested sections and section under test.
G. Test hot and cold water piping under normal city pressure.
H. Furnish all labor and all other utilities required to make tests. Make compliance tests in the presence of the Owner's representative.
I. When the various systems are completed, run operation test to demonstrate proper operating conditions. Run these tests under the observation of the inspecting authority. Operate each system through all cycles of operation for this period of 8 hours. Instruct the Owner's operators during this period. Perform operation tests under actual service conditions.
J. Should any piece of equipment, apparatus, materials, or work fail in any of these tests, immediately remove and replace with perfect material, and retest the portion of the work replaced.

3.07 STERILIZATION:

A. At completion of the testing and adjusting, and before domestic water systems are put into use, they shall be sterilized. Until sterilization of the water system has been made, all water outlets shall have signs posted at their locations stating the water system has not been sterilized and shall not be used for human consumption. This Section shall furnish and install all valves, outlets, and devices required by the sterilization sub-contractor to complete the sterilization work. Provide independent lab results showing water system is bacteria free.

***END OF SECTION***
SECTION 16050

GENERAL REQUIREMENTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 CONDITIONS:

A. The Requirements of General Conditions and Special Conditions apply to Work of this Section as if fully repeated herein.

B. Drawings and specifications take precedence when they call for materials or construction methods of better quality or larger size than required by codes laws, rules or regulations.

C. The Requirements of this Section apply to all Work of Division 26 AND 27.

1.02 WORK INCLUDED:

A. Provide a complete working installation with all material and equipment as shown and specified. The Contract Documents do not undertake to show or specify every item to be provided. When an item not shown or specified is necessary for proper operation of equipment shown or specified, provide the item, which will allow the system to function properly, at no increase in Contract Price.

B. Make electrical connections for equipment furnished as part of Work of other Sections.

C. Perform necessary equipment seismic anchorage in compliance with the California Building Code Title 24, and requirements of any local agency having jurisdiction.

1.03 QUALITY ASSURANCE:

16050-1

City of Sacramento

Garcia Bend Park Restroom Restoration Project 100% Submittal
A. Requirements of Regulatory Agencies:

1. Nothing in the Contract Documents shall be construed to permit Work not
   conforming to applicable laws, ordinances, rules or regulations.

2. When the Contract Documents exceed requirements of applicable laws,
   ordinances, rules or regulations, Contract Documents shall take
   precedence.

3. It is not the intent of the Contract Documents to repeat requirements of
   Codes except where necessary for completeness or clarity.

4. All installed or connected equipment shall be labeled or certified for its
   use by a nationally recognized testing laboratory. Where equipment is
   not furnished with a factory installed label or certification, it shall be the
   responsibility of the contractor to obtain and pay for the necessary tests
   and approvals.

1.04 PROJECT EXAMINATION AND CONDITIONS:

A. Examine project; verify dimensions and locations against Drawings and become
   informed of all conditions under which Work is to be done before submitting
   proposals.

B. Information shown relative to services is based upon available records and data
   but shall be regarded as approximate only. Make deviations found necessary to
   conform with actual locations and conditions with no increase in Contract Sum.
   Verify locations and elevation of utilities prior to commencement of excavation for
   new underground installations.

1.05 DRAWINGS AND COORDINATION WITH OTHER WORK:

A. Drawings:

1. For purposes of clarity and legibility, Drawings are essentially
   diagrammatic to the extent that many offsets, bends, special fittings, and
   the exact locations of items are not shown, unless specifically
   dimensioned.
2. Exact routing of wiring and locations of outlets, panels, and other items, shall be governed by structural conditions, and materials and equipment already in place. Use data in the Contract Documents. In addition, the Architect reserves the right, at no increase in Contract Sum, to make any reasonable change in locations of exposed electrical items, to group them into orderly relationships and/or increase their utility. Verify the Architect's requirements in this regard prior to roughing-in.

3. Dimensions, locations of doors, partitions and similar physical features shall be taken from Architectural Drawings, and verified at the site as part of the Work of this Division. Consult the Architectural Drawings for exact location of outlets to center with architectural features, panels, and similar items, at the approximate locations shown on the Electrical Drawings.

4. Drawings indicate, generally, routes of all branch circuits. All runs to panels are indicated as starting from nearest outlet, pointing to direction of panel. Continue all such circuits, conduits to panel as though routes were indicated in their entirety.

B. Coordination:

1. Work out all "tight" conditions involving Work of this Division and Work of other Divisions in advance of installation. Provide additional Work necessary to overcome "tight" conditions, at no increase in Contract Sum.

2. Provide adequate working space around electrical equipment in compliance with all applicable codes.

3. Coordinate electrical interface of mechanical equipment with the Mechanical Specifications.

4. Provide templates, information and instructions for Work of other Divisions to properly locate holes and openings to be cut or provided for Electrical Work.

5. Size all feeders (conduit and wiring), motor starters, overload protection and circuit breakers to suit horsepower of motors or wattages of equipment furnished as part of the Work of the various Sections of the
Specifications. In no case shall feeders and branch circuits (conduit and wiring) and circuit breakers be of smaller capacities or sizes than those shown or specified.

C. Equipment Rough-In:

1. Rough-in locations shown on Electrical Drawings for equipment furnished by the Owner and for equipment furnished under other Divisions are approximate only. Obtain exact rough-in locations from the following sources:
   a. From Shop Drawings for Contractor-furnished and installed equipment.
   b. From the Architect for Owner-furnished, Contractor-installed equipment.
   c. From the Architect for existing equipment where such equipment is relocated as part of the Work of this Contract.

2. Verify electrical characteristics of equipment before starting rough-in.

3. Unless otherwise shown or specified, equipment which requires electrical connection shall be installed as part of the Work of the Division in which specified. Internal components shall be wired to a single point with wiring in raceway direct connection (hardwired) to building electrical system or internal wiring and connections with cord and plug for receptacle connection to building wiring.

4. Unless otherwise shown or specified, provide direct raceway and conductor connections from building wiring system to equipment terminals for direct connected equipment which is Contractor-furnished and Contractor-installed, Owner-furnished and Contractor-installed, and for existing equipment relocated by the Contractor.

5. Insert plug in receptacle for cord-connected equipment which is Contractor-furnished and Contractor-installed, Owner-furnished and Contractor-installed and for existing equipment relocated by the Contractor.
Contractor. Provide new cord and plug if required on Owner-furnished and Contractor-installed equipment.

6. Provide disconnect switches, flush type in finished spaces, where shown or required by Codes for direct-connected equipment.

7. Disconnect existing equipment from building electrical system, including internal wiring required for relocation and reconnection at new location.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Identify materials and equipment by manufacturer's name and nameplate data. Remove unidentified materials and equipment from site.

B. Equipment specified by manufacturer's number shall include all accessories, controls and other components, listed in catalog as standard with equipment. Furnish optional or additional accessories as specified. All materials shall be UL labeled and in accordance with NEMA Standards.

C. Where no specific make of material or equipment is mentioned, any high quality product of a reputable manufacturer may be used, provided it conforms to requirements of system and meets with Architect's acceptance.

D. Conflicts between Plans and Specifications, exclusive of the General Conditions of the Contract, the most stringent and higher quality requirement shall govern.

E. If the Contract Documents are not complete as to any detail such as accessories or hardware, of a required construction system or with regard to manner of installing of parts, materials, or equipment, but there exists an accepted trade standard for good and workmanlike construction, such detail or accessories shall be deemed to have been implicitly required by the Contract Documents in accordance with such standard.
F. Equipment and material damaged during transportation, installation, or operation will be considered as totally damaged. Replace with new. Variance from this will be permitted only with written acceptance.

G. Provide an authorized representative to constantly supervise the Work of this Division and to check all materials prior to installation for conformance with the Contract Documents.

H. Do not use equipment exceeding dimensions indicated for equipment, or arrangements that reduce required clearances, or exceed specified maximum dimensions.

2.02 FLASH PROTECTION

A. Electrical equipment including switchboards, panelboards, disconnect switches, etc. which are likely to require examination, adjustment or servicing while energized shall be field marked to warn of potential electric arch flash hazards per CEC Article 110.16. Marking shall be a pre-printed label which references NFPA 70E.

PART 3 - EXECUTION

3.01 NORMAL CONTINGENCIES:

A. Protection: In performance of Work, protect existing facility and protect Work of other Sections as well as Work of this Section from damage.

1. Existing conduits which are required to be extended, altered, or reconnected shall be accomplished as shown or as directed. Existence of any wires, conduits, or other facilities are shown in a general way only. Determine existence, location, and condition on site.

2. Where existing conduits which are shown to be revised or which will be essential to functioning of particular system are cut or exposed due to construction changes, new connections shall be made in most

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City of Sacramento
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expeditious manner as directed or shown. Where wiring is involved, new wires shall be "pulled-in" between nearest available accessible reused outlets. In all cases where new wires are required, shown, or specified to be installed in existing conduits, if same cannot be installed, new conduits shall be provided therefore as directed.

3. Existing switchboards, motor control centers, and panelboards which are required to be extended, altered or modified under the Work of this Division shall be provided with new sections, bus extensions, and all necessary hardware for a complete and operating system.

4. Attention is called to the fact that all new conduit, wiring, and apparatus shown or specified shall be connected to existing systems so as to function as complete units.

5. All conduits, electrical apparatus, and similar items, in place and not shown or specified to be reused or which will not be essential to functioning of various systems when Work is completed, shall be removed. No existing material shall be reinstalled or reused, unless shown or specified. Concealed conduits which are not shown or specified to be reused and become exposed due to construction changes shall be removed to nearest available accessible reused outlets.

3.02 PERFORMANCE:

A. Sleeves, Chases, and Concrete Inserts:

1. This Division shall provide, to cause no delay, all required sleeves, chases, concrete inserts, anchor bolts, and similar items before concrete is placed, and be responsible for correct location and installation of same.

2. Sleeves and chases are prohibited in structural members, except where shown or as otherwise approved in writing.

B. Cutting and Patching:

1. Do all cutting and patching, including structural reinforcing, necessary for the Work of this Division.

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City of Sacramento

Garcia Bend Park Restroom Restoration Project

100% Submittal

Page 249 of 312
2. Do no cutting or patching without prior approval. Repair damage done by cutting and patching equal to original condition, in Architect's opinion.

C. Provide metal backing plates, anchor plates, and similar items that are required for anchorage for the Work of this Section; securely weld or bolt to metal framing. Wood blocking or backing will not be permitted in combination with metal framing.

3.03 TESTING AND ADJUSTING:

A. Furnish all labor and test equipment required for the Work of this Division. Testing work is defined as that work necessary to establish that equipment has been properly assembled, connected, and checked to verify that intent and purpose of the drawings, specifications, manufacturer's instruction manuals, and directions of Architect have been accomplished in satisfactory manner.

B. Provide field tests to verify component compliance with Specifications, including but not limited to adjusting, calibrating, and setting circuit breakers, relays, timers, etc.

C. After completion of testing and adjustment, operate the different systems and equipment under normal working conditions and show specified performance. If, in the opinion of the Architect, performance of equipment or systems is not in accordance with Contract Document or submitted data, alter or replace equipment at no increase in Contract Sum.

D. Do not allow or cause any Work installed hereunder to be covered up or enclosed before it has been inspected and accepted. Should any Work be enclosed or covered up before it has been approved, uncover such Work, and after it has been inspected and approved, make all repairs necessary to restore Work of Others to condition in which it was found at time of cutting, all at no increase in Contract Sum.

E. At completion of Work provide written certification that all Systems are functioning properly without defects.

3.04 CLEANING AND PAINTING:

16050-8

City of Sacramento

Garcia Bend Park Restroom Restoration Project

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A. Properly prepare Work of this Division to be finish painted as part of the Work of Painting Section.

B. Refinish Work supplied with final finish as part of the Work of this Division if damaged as part of the Work of this Division to satisfaction of Architect.

C. Thoroughly clean interiors of switchboards and motor control centers. After other Work is accomplished, clean exposed conduit, panels (interiors and exteriors), fixtures, and equipment, and leave in condition satisfactory to Architect.

D. Clean out and remove from site all surplus materials and debris resulting from this Work, including surplus excavated materials.

END OF SECTION
SECTION 16060  

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS  

PART 1 - GENERAL  

SUMMARY  

A. Section Includes:  

1. Wire.  

2. Mechanical connectors.  

REFERENCES  

B. International Electrical Testing Association:  


C. Part 3, Title 24, - California Electrical Code (CEC).  

SYSTEM DESCRIPTION  

D. Grounding systems use the following elements as grounding electrodes:  

1. Existing Metal underground water pipe.  

2. Concrete-encased electrode.
3. Existing Metal underground gas piping system.

QUALITY ASSURANCE

E. Provide grounding materials conforming to requirements of CEC, IEEE 142, and UL labeled.

PART 2 - PRODUCTS

2.01 WIRE

A. Material: Stranded copper.

B. Bonding Conductor: Copper conductor insulated.

2.02 MECHANICAL CONNECTORS

A. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

PART 3 - EXECUTION

3.01 PREPARATION

A. Remove paint, rust, mill oils and surface contaminants at connection points.

3.02 EXISTING WORK

A. Modify existing grounding system to maintain continuity to accommodate renovations.
B. Extend existing grounding system using materials and methods as specified.

3.03 INSTALLATION

A. Install grounding and bonding conductors concealed from view.

B. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

C. Permanently ground entire light and power system in accordance with CEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

D. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with CEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment.

E. Ground conduits as necessary by means of grounding bushings on terminations at panelboards and switchboards to grounding bus.

F. Permanently attach equipment and grounding conductors prior to energizing equipment.

***END OF SECTION***
SECTION 16075

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Nameplates.

2. Labels.

3. Wire markers.


5. Underground Warning Tape.

1.02 QUALITY ASSURANCE

A. Comply with OSHA, NFPA or local jurisdiction identification requirements for electrical systems.

PART 2 - PRODUCTS

2.01 NAMEPLATES
A. Product Description: Laminated three-layer plastic with engraved white letters on contrasting background color.

1. Provide minimum letter height as follows:

   a. For Panelboards, Distribution boards, Switchboards, Battery Panels and Motor Control Center: 1/2 inch letters to identify equipment designation. Use 1/4 inch letters to identify voltage, phase and wires.

   b. For Individual Circuit Breakers, Switches and Motor Starters in Distribution panelboards, Distribution boards, Switchboards, Switchgear and Motor Control Centers use 3/8 inch letters to identify equipment designation. Use 1/8 inch letters to identify all other.

   c. For Individual mounted Circuit Breakers, Disconnect Switches, Enclosed Switches and motor Starters use 3/8 inch letters to identify equipment designation. Use 1/8 inch letters to identify all others.

   d. For Transformers use 1/2 inch letters to identify equipment designation. Use 1/4 inch letters to identify primary and secondary voltages, primary disconnect location, and other specified data.

   e. For equipment cabinets, terminal cabinets, control panels and other cabinet enclosed apparatus use 3/8 inch letters to identify equipment designation.

B. Minimum nameplate thickness: 1/16 inch for signs up to 20 square inches, or 8 inches in length; 1/8 inch thick for larger sizes. Furnish with pre-punched holes for mechanical fasteners.

2.02 LABELS

A. Labels: Thermal transfer laminated adhesive tape, with 1/8-inch black letters on clear tape cartridge.
2.03 WIRE MARKERS

A. Description: Self-adhering, pre-printed, machine printable or write-on, self-laminating vinyl wrap around strips. Inscribe blank markers using the printer or pen recommended by the manufacturer for this purpose.

B. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number as indicated on Drawings.

2. Control Circuits: Control wire number as indicated on shop drawings.

2.04 CONDUCTOR PHASE MARKERS

A. Colored vinyl plastic electrical tape, 3/4 inch wide, for identification of phase conductors.

2.05 UNDERGROUND WARNING TAPE

A. Description: 6 inch wide plastic tape, detectable type, colored yellow or red with suitable warning legend describing buried electrical lines.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Nameplate Installation:

1. Install nameplate parallel to equipment lines.

2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners.

4. Secure nameplate to equipment front using rivets.

   a. Provide color coded nameplates as applicable, with the following information:

B. Nameplates for power system distribution equipment and devices are to be colored as follows: (Unless otherwise noted)

   1. 120/208 VAC Normal - Back with white letters

   2. 120/208 VAC Emergency/Battery - Red with white letters

C. Label Installation:

   1. Install label for identification of individual receptacles.

   2. Locate the top of label 1/2 inch below the top edge of coverplates.

   3. Install label for multi-outlet assembly receptacles.

   4. Install labels for permanent adhesion.

D. Wire Marker Installation:

   1. Install wire marker for each conductor at outlet and junction boxes each load connection.

   2. Provide colored plastic phase tape in half-lapped turns for a distance of 3 inches from terminal points and in boxes where splices or taps are made.

E. Junction box identification:

16075-4

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1. Color code and identify all junction boxes located above suspended ceilings and below ceilings in non-public areas.

2. Use finish paint suitable for use on metal surfaces.

3. Boxes shall be identified with permanent felt tip marker on cover indicating panel and circuit numbers. Paint junction box covers using the color coding listed below.

   a. 208/120 Volt System: Blue.


3.02 UNDERGROUND WARNING TAPE:

   A. Install underground warning tape along length of each underground conduit, raceway, or cable 6 to 8 inches below finished grade, directly above buried conduit, raceway, or cable.

***END OF SECTION***
SECTION 16120

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes building wire and cable, metal clad cable; and wiring connectors and connections.

B. Related Sections:


1.02 REFERENCES

A. International Electrical Testing Association:


B. NECA (National Electrical Contractors Association) - Standard of Installation.

C. Part 3, Title 24, - California Electrical Code (CEC).

D. Underwriters Laboratories, Inc. (UL).

1. UL-83, UL-44 – Thermoplastic-Insulated Wire and Cables.
2. UL-1569 – Metal Clad Cable.

1.03 SYSTEM DESCRIPTION

A. Product Requirements: Provide products as follows:

1. Conductor not smaller than 12 AWG for power and lighting circuits.

2. Conductor not smaller than 14 AWG for control circuits.

3. 10 AWG conductors for 20 ampere, 120 volt branch circuit home runs longer than 75 feet.

4. 10 AWG conductors for 20 ampere, 277 volt branch circuit home runs longer than 200 feet.

B. Wiring Methods: Provide the following wiring methods:

1. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN-2 insulation, in raceway or metal clad cable with ground wire.

2. Exposed Dry Interior Locations: Use only building wire in raceway.

3. Exterior Locations: Use only building wire in raceway.

4. Underground Locations: Use only building wire insulation, in raceway.

PART 2 - PRODUCTS

2.01 BUILDING WIRE

16120-2

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A. Product Description: Single conductor insulated wire.

B. Conductor: Copper.

2.02 METAL CLAD CABLE May not be used

2.03 Plastic Tape:

A. Black 7 mil thick general purpose electrical tape, Scotch 33 plus or equal.

2.04 WIRING CONNECTORS

A. Bolted pressure connectors: Cast bronze compression bolts designed for parallel taps, tees, crosses or end-to-end connections.

B. Insulated spring wire connectors: Multi-part construction incorporating a steel spring enclosed with a color coded outer thermoplastic shell.

C. Compression type termination lugs: Tin plated copper high-compression type lugs for installation with hand or hydraulically operated crimping tools and dies. Provide 2-hole lugs for size #4/0 AWG and larger wire where terminated to bus bars.

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Remove exposed abandoned wire and cable, including abandoned wire and cable above accessible ceiling finishes. Patch surfaces where removed cables pass through building finishes.
B. Disconnect abandoned circuits and remove circuit wire and cable. Remove abandoned boxes when wire and cable servicing boxes is abandoned and removed. Install blank cover for abandoned boxes not removed.

C. Provide access to existing wiring connections remaining active and requiring access. Modify installation or install access panel.

D. Extend existing circuits using materials and methods as specified.

E. Clean and repair existing wire and cable remaining or wire and cable to be reinstalled.

3.02 INSTALLATION

A. Route wire and cable to meet Project conditions.

B. Neatly train and lace wiring inside boxes, equipment, and panelboards.

C. Identify and color code wire and cable under provisions of Section 26 05 53. Identify each conductor with its circuit number or other designation indicated.

D. Special Techniques - Cable:

1. Protect exposed cable from damage.

2. Support cables above accessible ceiling, using spring metal clips or plastic cable ties to support cables from structure. Do not rest cable on ceiling panels.

3. Use suitable cable fittings and connectors.

4. Metal Clad Cable is not permitted for homerun use. Extend cable from junction/wireway box having branch circuits for the immediate area. Use conduit or electrical metallic tubing for routing branch circuit conductors from junction/wireway box to panelboard.
5. Metal Clad Cable is only permitted for branch circuit wiring rated 20 amps or less.

E. Special Techniques - Wiring Connections:

1. Clean conductor surfaces before installing lugs and connectors.

2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.

4. Install [solderless tool applied pressure] [split bolt] connectors and lugs for copper conductor splices and taps, 8 AWG and larger.

5. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

6. Encapsulate below grade splices at outlet, pull and junction boxes with specified insulating resin kits. Make all splices watertight.

7. Install waterproof wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller in outdoor or wet locations.

8. Where oversized cables are used to accommodate voltage drop, whether a single or parallel feeder, provide appropriate reducing adapter and conductors for termination.

9. Install suitable reducing connectors or mechanical connector adaptors for connecting aluminum conductors to copper conductors.

3.03 WIRE COLOR

A. General
1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
   a. Black and red for single phase circuits at 120/240 volts.
   b. Black, red, and blue for circuits at 120/208 volts single or three phase.

2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes. Colors are as follows:
   a. Black and red for single phase circuits at 120/240 volts.
   b. Black, red, and blue for circuits at 120/208 volts single or three phase.

B. Branch Circuits: Shared neutral conductors for multiple circuits are not permitted. Provide a separate neutral conductor for each phase conductor.

C. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.

D. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.

E. Feeder Circuit Conductors: Uniquely color code each phase.

F. Ground Conductors:
   1. For 6 AWG and smaller: Green.
   2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

3.04 FIELD QUALITY CONTROL
A. Provide visual and mechanical inspection in accordance with NETA ATS, 7.3.2.1.

B. Subject feeder cables sized #2 AWG and larger, rated 600 volts AC to insulation resistance test in accordance with NETA ATS, 7.3.2.2.

END OF SECTION
SECTION 16130

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes conduit, surface raceways, outlet boxes, pull and junction boxes, and handholes.

1.02 REFERENCES

A. American National Standards Institute:

1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.

2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.

B. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.

5. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
6. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

C. Part 3, Title 24, - California Electrical Code (CEC).

1.03 SYSTEM DESCRIPTION

A. Underground outside Foundation Wall: Use nonmetallic conduit. Terminate with rigid steel conduit out of concrete of soil. Use cast metal boxes or nonmetallic handhole.

B. Outdoor Locations, Above Grade: Provide rigid steel conduit, intermediate metal conduit and electrical metallic tubing with compression type fittings. Provide cast metal or nonmetallic outlet, pull, and junction boxes.

C. Below Slab on Grade: Use Schedule 40 nonmetallic conduit. Terminate with rigid steel elbows and short length of rigid steel conduit out of concrete.

D. Wet and Damp Locations: Provide rigid steel conduit, electrical metallic tubing with compression type fittings, Schedule 40 nonmetallic conduit. Provide cast metal or nonmetallic outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.

E. Concealed Dry Locations: Provide rigid steel conduit intermediate metal conduit or electrical metallic tubing. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas.

F. Exposed Interior Dry Locations: Use rigid steel conduit or intermediate metal conduit below eight feet or where subject to damage. Use rigid steel conduit, intermediate metal conduit, or electrical metallic tubing above eight feet or in electrical, mechanical, elevator or telecommunication rooms. Use sheet-metal or cast metal boxes. Use flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.04 DESIGN REQUIREMENTS

A. Minimum Raceway Size:

1. 1/2 inch.
2. 3/4 inch. for homeruns.

3. 1 inch outside foundation line.

PART 2 - PRODUCTS

2.01 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Intermediate Metal Conduit (IMC): Rigid steel.

C. Fittings and Conduit Bodies: NEMA FB 1. Fittings shall be steel or malleable iron with threaded fittings. Use insulated metallic bushings with lug where ground connections are required. Use plastic bushing for non-bonding applications.

2.02 FLEXIBLE METAL CONDUIT

A. Product Description: Interlocked steel construction.

B. Fittings: NEMA FB 1; steel or malleable iron squeeze type with insulated throat.

2.03 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (May not be used in Public Areas)

A. Product Description: Interlocked steel construction with PVC jacket.

B. Fittings: NEMA FB 1; steel or malleable iron fitting with insulated throat.

2.04 ELECTRICAL METALLIC TUBING (EMT)

A. Product Description: ANSI C80.3; galvanized tubing.

B. Fittings: NEMA FB 1; steel or malleable iron couplings and connectors. Box connectors shall have with insulated throat.
2.05 NONMETALLIC CONDUIT (MAY NOT BE USED)

2.06 SURFACE METAL RACEWAY (MAY NOT BE USED WHERE CALLED OUT ON PLANS)

2.07 OUTLET BOXES

A. Sheet Metal Outlet Boxes:

1. NEMA OS 1, galvanized steel.

2. Boxes for shall be 1-1/2 inch deep by 4 inch square minimum.

B. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

C. Wall Plates for Finished Areas: As specified in Section 26 27 26.

D. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.08 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Concrete composite Handholes: Die-molded, concrete composite hand holes:

1. Cable Entrance: Pre-cut cable entrance at center bottom of each side.

2. Extension: 12” reinforced concrete below box.

3. Cover: Concrete composite cover with nonskid finish. Covers shall be marked “ELECTRIC”, “SIGNAL”, “GROUND” or as indicated on drawings.

PART 3 - EXECUTION

16130-4

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3.01 EXISTING WORK

A. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces.

B. Remove concealed abandoned raceway to its source.

C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets when raceway is abandoned and removed. Install blank cover for abandoned outlets not removed.

D. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.

E. Extend existing raceway and box installations using materials and methods as specified.

F. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.02 INSTALLATION

A. Ground and bond raceway and boxes in accordance with Section 26 05 26.

B. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.

C. Identify raceway and boxes in accordance with Section 26 05 53.

3.03 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.
SECTION 16140

WIRING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes wall switches; wall dimmers; receptacles; and device plates and decorative box covers.

1.02 REFERENCES

A. National Electrical Manufacturers Association:

1. NEMA WD 1 - General Requirements for Wiring Devices.

2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

PART 2 - PRODUCTS

2.01 WALL SWITCHES

A. Manufacturers:

1. Pass & Seymour

2. Hubbell

3. Leviton

16140-1
4. Cooper

5. Approved equal

B. Product Description: Specification Grade, NEMA WD 1, Heavy-Duty, AC only general-use snap switch.

C. Body and Handle: White thermoplastic with rectangular rocker switch. Red color for devices connected to emergency power system.

D. Ratings:
   1. Voltage: 120-277 volts, AC.

2.02 RECEPTACLES

A. Manufacturers:
   1. Pass & Seymour
   2. Hubbell
   3. Leviton
   4. Cooper
   5. Approved equal

B. Product Description: Specification Grade, NEMA WD 1, Heavy-duty general use receptacle. Combination head brass grounding screw. Brass alloy triple wipe contacts shall grip both sides of plug prongs.

C. Device Body: White thermoplastic rectangular design with smooth face. Red for devices connected to Emergency circuits.

16140-2
D. Convenience Receptacle: Type 5-15.

E. Dedicated Receptacle: Duplex, type 5-20

F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

G. Special Purpose Receptacles: Type and rating and number of poles indicated or required for the anticipated purpose.

2.03 WALL PLATES

A. Decorative Cover Plate: Brushed Stainless Steel.

B. Mounting Screws: Stainless steel, painted head to match plate finish.

C. Surface cover plate in dry locations: Galvanized steel. Four inch square, raised 1/2" for surface mounted switches and receptacles.

D. Weatherproof Damp Location Cover Plate: Gasketed cast metal cover plate with hinged and gasketed device cover.

E. Weatherproof Wet Location Cover Plate: Extended metal hinged cover for use when attachment plug is inserted.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify outlet boxes are installed at proper height.

B. Verify wall openings are neatly cut and completely covered by wall plates.
C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.02 PREPARATION

A. Clean debris from outlet boxes.

3.03 EXISTING WORK

A. Disconnect and remove abandoned wiring devices.

B. Modify installation to maintain access to existing wiring devices to remain active.

C. Clean and repair existing wiring devices to remain or to be reinstalled.

3.04 INSTALLATION

A. Install devices plumb and level.

B. Mounting heights shown shall be measured from the center of the device. U.O.N.

C. Mounting heights of electrical switches, receptacles and telecommunication devices in accessible spaces as defined by the CBC shall comply with the mounting height requirements. Switches and receptacle outlets shall be located no more than 48 inches measured from the top of the outlet box nor less than 16 inches measured from the bottom of the box to the level of the finished floor or working platform.

D. Install switches with OFF position down.

E. Install wall dimmers to achieve full rating specified and indicated after de-rating for ganging as instructed by manufacturer.

F. Do not share neutral conductor on load side of dimmers.
G. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.

H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.05 LABELS AND INSCRIPTIONS:

A. Identify receptacle cover plate with panel and branch circuit number (for example L2A-3). Provide label as described in Section 26 05 53].

END OF SECTION
SECTION 16510

INTERIOR LIGHTING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes interior luminaires, lamps, ballasts, and accessories.

1.02 REFERENCES

A. American National Standards Institute:


2. ANSI C82.4 - American National Standard for Ballasts-for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).

PART 2 - PRODUCTS

2.01 INTERIOR LUMINAIRES

A. Product Description: Complete interior luminaire assemblies, with features, options, and accessories as scheduled.

PART 3 - EXECUTION

02100-1

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3.01 EXISTING WORK

A. Disconnect and remove abandoned luminaires, lamps, and accessories.

B. Clean and repair existing interior luminaires to remain or to be reinstalled.

END OF SECTION
SECTION 16270

LIGHTING CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Networked lighting control system and components.

1.02 REFERENCES

A. Federal Communications Commission:


B. Government Electronics and Information Technology Association:


C. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

D. California Title 24:

1. Part 3, California Electrical Code.

E. Title 24 Part 6:

F. Underwriters Laboratories Inc.:

1. UL 50 - Enclosures for Electrical Equipment.

2. UL 67 - Panelboards.

3. UL 508 - Industrial Control Equipment.

4. UL 916 - Energy Management Equipment.

1.03 SYSTEM DESCRIPTION

A. Provide lighting control system consisting of components manufactured by single source.

B. Provide lighting control system consisting of:

1. Relay panels and programmable switches connected together by networked wiring system extending from panel locations with single communications bus to allow switches to communicate with panels.

2. System connected to single time clock mounted in interior of relay panel.

C. Perform Work in accordance with the State of California Title 24 Part 6 2010 Energy Code.

D. Completion and issuance of all Title 24 mandatory testing forms for manual daylight switching, occupancy sensing devices and automatic shut-off controls

E. Completion and issuance of all Title 24 mandatory installation certificates for occupancy sensing devices and automatic shut-off controls.

F. Comply with NFPA 70 as applicable to electrical wiring work.

G. Comply with NEMA 250 for type of electrical equipment enclosures.
H. Provide panelboards with UL listing in accordance with UL 50, UL 67, and UL 916.

I. Provide equipment complying with FCC emissions' standards in part 15 subpart J for Class A application.

PART 2 - PRODUCTS

2.01 LIGHTING CONTROL SYSTEM

A. Lighting control system consisting of the following components: relay panels, programmable wired switches, programmable clock, software, and capability of integration into building automation system.

B. Each control panel shall provide a Warn-Off (flash the lights) to inform the occupants of and impending Off command. The Warn-Off command will allow 10 extra minutes for the occupants to override their lights.

C. Control panels shall permit lighting to be overridden On for after hours use or cleaning. These overrides shall be hard wired inputs or voice guided touch tone telephone control.

2.02 RELAY PANELS

A. UL listed, NEMA 250 Type 1 enclosure.

B. Cover: Hinged, locking configuration with wiring schedule directory card.

C. Furnish with individual on-off switches for both panel and network wiring power.

2.03 PROGRAMMABLE NETWORK WIRED SWITCHES

A. Function: Allow individual overrides. Switches terminated to network wiring of each panel.
2.04 PHOTOCELL CONTROL

A. The controller shall accept user adjustable ambient light sensors. Sensors shall provide for both indoor and outdoor applications. The sensor shall be powered from the controller.

2.05 TELEPHONE OVERRIDES

A. The control system shall provide intelligent software for a telephone interface module. The interface module shall allow modem communications and touch tone overrides from any touch tone phone.

2.06 PROGRAMMABLE CLOCK

A. From each plug-in point on network wiring, time clock can be used to:

1. Schedule each 8 channel groups in relay panel network.
2. Program network wired switches.

B. Includes user selectable functions to handle standard lighting control functions for each channel independently. Selectable functions include:

1. Scheduled on and scheduled off.
3. Astronomical on and astronomical off with optional offset.
4. Astronomical on and scheduled off with optional offset.

C. Each channel capable of being assigned the following:

1. Time delay from 1 to 256 minutes.
2. Automatic blinking of lights before turning off to allow occupants opportunity to enter override. Time interval configurable.

D. Features:

1. Furnish clock with display and user interface.

2. Capable of being adjusted for leap year, daylight savings dates, and holidays.

2.07 SOFTWARE

A. Furnish plug-in capability for use in system commissioning, programming, monitoring, and control. Software capable of functioning with EIA 709.1 compliant network tool.

B. After programming of system parameters is completed, system allows each user-definable feature such as schedules, relay groups, switch assignments to be field modified without need for configuration software or system integration expertise.

2.08 BAS INTEGRATION

A. In addition to hardwired channel inputs, furnish system with capability for integration into building automation and control system without use of dry contact, gateways or protocol converters. Integration accomplished via network connections of EIA 709.1 compliant devices.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Mount switches occupancy sensors and photocells as indicated on Drawings.

B. Label each low voltage wire clearly indicating connecting relay panel.
C. Use only properly color coded, stranded wire.

D. Identify power wiring with circuit breaker number controlling load. When multiple circuit breaker panels are feeding into relay panel, label wires to clearly indicate originating panel’s designation.

E. Terminate communication conductors and associated conduits external to factory supplied equipment.

F. Test relays and switches after installation to confirm proper operation.

G. Label each low voltage wire with relay number at each switch or sensor.

H. Install wiring schedule directory card affixed to rear of panel cover to identify circuits, relays, and loads controlled.

3.02 FIELD QUALITY CONTROL

A. Test relays and switches after installation to confirm proper operation and confirm correct loads are recorded on directory card in each panel.

B. Test light fixtures and control devices per the test procedures described in the California Energy Commissions Building Energy Efficiency Standards.

END OF SECTION
Special Inspection Short Form
2016 CBC Adopted Codes
Effective January 1st, 2017

Prior to issuance of a permit, the applicant shall complete Part I of this form. Part II and Part III shall be completed by the project registered design professional and the Community Development Department as a part of the plan review process. Before permit issuance, all parties must sign this agreement. Please note that failure to comply with special inspection requirements could be expensive in terms of retrofit design and construction as well as delays in the project.

Part I - Statement of Special Inspection

Project Address: 7654 Pocket Road, Sacramento CA
Permit Number: COM - 1813169

City Approved Testing/Inspection Firms (Form CDD-230)

Firm 1: Geocon Phone Number: (916) 852 - 9118
Email Address: Born@geoconinc.com

Firm 2: Construction Testing Services Phone Number: (916) 419 - 4747
Email Address: asolis@cts-1.com

Part II - Special Inspection and Testing Agreement

When special inspection is required by Section 1705, the registered design professional shall prepare an inspection program, which shall be submitted, to the Building Official for approval prior to issuance of the building permit. The special inspector shall be employed by the owner (other than owner-builder/developer), the registered design professional, or an agent of the owner, BUT NOT the contractor, or any other person responsible for the work (such as an owner-builder/developer).

The special inspection firm(s) named above have been authorized to perform the special inspection and testing services designated in this agreement, and in accordance with the California Building Code (CBC) requirements, and to report all activities to the Building Official, and other parties as listed. It is understood that special inspections are required in addition to the normal inspections performed by the Building Inspector.

The undersigned hereby affirm, under penalty of law that the special inspection program is in accordance with the requirements of the CBC and the City of Sacramento. The undersigned has used all reasonable diligence in completing this form and to the best of his/her knowledge the information contained herein is true and complete. The undersigned hereby certifies under the penalty of perjury under the laws of the State of California that the foregoing is true and correct.

CDD-0197 Revised 1-01-2017
This plan has been developed with the understanding that the Building Official will:
- Review and approve the qualifications of the Special Inspectors who will perform the inspections.
- Monitor special inspection activities on the job site to assure that the Special Inspectors are qualified and are performing their duties as called for in this Statement of Special Inspection.
- Review submitted inspection reports.
- Perform inspections as required by the local building code.

Registered Design Professional in Responsible Charge:
Name: Anthony J. Lopes  License Number: S4550
Phone Number: 509-943-2021 x119  Email Address: ajlopes@siegfriedeng.com
Signature:  Date: 10/02/2018

Owner’s Authorization: To be completed by the Owner or the Owners Representative (see part II, paragraph 1)
Name: Jeff McIlhanka  Telephone Number: (916) 808-5996
Signature:  Date: 7/27/18
Email Address: jmcilhanka@cityofsacramento.org

Building Official’s Acceptance:
Plan Reviewer:  
Signature:  Date: 

Seismic Requirements (Section 1705.12-13)

Description of seismic-force-resisting system and designated seismic systems subject to special inspections as per Section 1705.12-13. Describe the Seismic resisting system in the longitudinal and transverse directions.

The extent of the seismic-force-resisting system is defined in more detail in the construction documents.
### Part III - Schedule of Special Inspection

Please refer to Chapter 17 of the 2016 California Building Code for detailed tasks for each inspection heading below. Inspection tasks correspond to item #’s and table references listed below.

<table>
<thead>
<tr>
<th></th>
<th>2010 CBC Table 1704.3 – Steel Construction</th>
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<tbody>
<tr>
<td>Items 1-2</td>
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<td>Item 3</td>
<td>Structural Steel(^a) (Material Verification)</td>
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<td>Items 4-5</td>
<td>Welding:</td>
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<tr>
<td></td>
<td>• Shop</td>
<td>□</td>
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<tr>
<td></td>
<td>• Field</td>
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<td>Item 6</td>
<td>Steel Frame (Member Locations &amp; Connection Details)</td>
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<td><strong>Composite Construction AISC 360-10 Table N6.1</strong></td>
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<tr>
<td>Item 1</td>
<td>Cold-formed Steel Deck(^a)</td>
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</tr>
<tr>
<td>Item 2</td>
<td>Open web steel joists and joist girders</td>
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<tr>
<td>Item 3</td>
<td>Cold-formed steel trusses spanning over 60’ or greater.</td>
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<tr>
<td><strong>2016 CBC Table 1705.3 – Concrete Construction</strong></td>
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<tr>
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<td>Concrete Anchorage:</td>
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<td>• Post installed steel anchors</td>
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<td></td>
<td>• Level C</td>
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<td><strong>CBC Table 1705.6-9 – Geotechnical &amp; Foundation Construction</strong></td>
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<td>Items 1-7</td>
<td>• Report Verification and Inspection of Soil Preparation(^b)</td>
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<td>Items 1-3</td>
<td>• Pile Foundation</td>
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<td></td>
<td>• Pier Foundation</td>
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<td>Structural wood and wood construction</td>
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<td><strong>Other items or Special Instructions</strong></td>
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<td>□</td>
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</tbody>
</table>

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\(^a\) Mill certification or identification markings are acceptable for material verification.

\(^b\) Shall be in compliance with the Geotechnical Report when it is provided.

\(c\) Due to the elimination of the steel construction table in the 2016 CBC, the 2010 CBC Steel Construction Inspection shall be used.
Instruction to the Special Inspector:

1. Provide daily field reports to the building inspector on site as construction progress.
2. A copy of all special inspection test laboratory reports shall be sent to the plan check engineer identified above and the architect or engineer of record.
3. Upon completion of special inspections and testing work, provide the city's plan check engineer a final special inspection test report wet stamped and signed by the responsible professional engineer.
CERTIFICATE OF LIABILITY INSURANCE

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFER NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
DJM Insurance Services
1651 E. Main Street Suite 104
El Cajon CA 92021

INSURED
The Design Build Inc
2021 Fulton Avenue
Sacramento CA 95835

INsureR(S) AFFORDING COVERAGE

<table>
<thead>
<tr>
<th>NAIC #</th>
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<tr>
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COVERAGES CERTIFICATE NUMBER: MASTER 4/20/2018 REVISION NUMBER:

This is to certify that the policies of insurance listed below have been issued to the insured named above for the policy period indicated. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies. Limits shown may have been reduced by paid claims.

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<td>E.L. EACH OCCIDENT</td>
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<td>E.L. DISEASE - EA EMPLOYEE</td>
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DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101). Additional Remarks Schedule, may be attached if more space is required.

As per written contract, City of Sacramento, its employees, officers, and agents are included as additional insured with respect to the General Liability coverage, per form #ID 01 37 04 13. Primary and non-contributory wording endorsement applies with respect to the General Liability insurance coverage, per form #ID 01 37 04 13. Waiver of Subrogation applies with respect to the General Liability insurance coverage, per form #ID 01 37 04 13.

CERTIFICATE HOLDER
City of Sacramento; Department of Youth, Parks, & Community Enrichment
915 I Street, 3rd Floor
Sacramento CA 95814

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

© 1988-2015 ACORD CORPORATION. All rights reserved.
THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

BLANKET ADDITIONAL INSURED

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

A. **Section II – Who Is An Insured** is amended to include as an additional insured any person or organization for whom you are performing operations when you and such person or organization have agreed in writing in a contract or agreement that such person or organization be added as an additional insured on your policy. Such person or organization is an additional insured, but only to the extent that such person or organization is held liable for your acts or omissions arising out and in the course of your ongoing operations performed for such additional insured. A person’s or organization’s status as an additional insured under this endorsement ends when your operations for that additional insured are completed.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

1. "Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or the failure to render, any professional architectural, engineering or surveying services, including:
   
   a. The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
   
   b. Supervisory, inspection, architectural or engineering activities.

2. "Bodily injury" or "property damage" occurring after:

   a. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
   
   b. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

3. "Bodily injury", "property damage" or "personal and advertising injury" involving or related to or in connection with any additional insured or any location covered by a scheduled or blanket additional insured endorsement that is a part of the policy.

C. **Primary and Non-contributory Insurance** - We will consider this insurance to be primary and non-contributory to other insurance issued directly to additional insured person(s) or organization(s) to which this endorsement applies if each such additional insured is a named insured in such other insurance and a written contract between you and such person(s) or organization(s) specifically requires that we consider this insurance to be primary and non-contributory.

D. **Waiver of Subrogation** – We waive any right of recovery we may have against the additional insured person(s) or organization(s) to which this endorsement applies if each such additional insured is a named insured in such other insurance and a written contract between you and such person(s) or organization(s) specifically requires that we waive subrogation because of payments we make for injury or damage arising out of "your work" done under a contract with such person(s) or organization(s) to which this endorsement applies.
# Certificate of Liability Insurance

**Producer:** Sherman Chan - State Farm Insurance  
1510 X Street  
Sacramento CA 95818  
916-422-1550

**Insured:** QAYYUM, MANZAR & MANZAR, HORIA  
DBA: The Design Build, Inc  
1711 EDEMORE AVE  
SACRAMENTO CA 95835-1226

**Date:** 01/16/2019  
**Insurer A:** State Farm Mutual Automobile Insurance Company 25178  
**NAIC #** 25178

## Coverages

The policies of insurance listed below have been issued to the insured named above for the policy period indicated. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies. Aggregate limits shown may have been reduced by paid claims.

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<th>LTR/INSRD</th>
<th>TYPE OF INSURANCE</th>
<th>POLICY NUMBER</th>
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<th>POLICY EXPIRATION DATE (MM/DD/YYYY)</th>
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<td>EACH OCCURRENCE $</td>
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<td>WORKERS COMPENSATION AND EMPLOYER'S LIABILITY</td>
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<td>WC STATUTORY LIMITS OTH</td>
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<td>ANY PROPRIETOR/OWNER/EXECUTIVE OFFICER/OWNER EXCLUDED?</td>
<td>(Mandatory in NH)</td>
<td>If yes, describe under SPECIAL PROVISIONS below</td>
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<td>E.L. EACH ACCIDENT $</td>
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<td>E.L. DISEASE - EA EMPLOYEES $</td>
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<td></td>
<td>E.L. DISEASE - POLICY LIMIT $</td>
</tr>
</tbody>
</table>

**Description of Operations / Locations / Vehicles / Exclusions Added by Endorsement / Special Provisions**

The city, its officials, employees, and volunteers shall be covered by policy terms or endorsement as additional insureds as respects auto liability. Garcia Bend Park Restroom (rebid) L19120500 & L19706038 Bid #B1819112126  
ADDITIONAL INSURED: CITY OF SACRAMENTO C/O EXIGIS LLC  
PO BOX 4668 ECM-#35050  
NEW YORK, NY. 10168-4668

**Certificate Holder**

CITY OF SACRAMENTO C/O EXIGIS LLC  
PO BOX 4668 ECM-#35050  
NEW YORK, NY. 10168-4668

**Cancellation**

Should any of the above described policies be cancelled before the expiration date thereof, the issuing insurer will endeavor to mail 30 days written notice to the certificate holder named to the left, but failure to do so shall impose no obligation or liability of any kind upon the insurer, its agents or representatives.

**Authorized Representative**

JASON D. ARMSTRONG  
Page 306 of 312

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The ACORD name and logo are registered marks of ACORD  
1001486 132849.3 04-06-2009
IMPORTANT

If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

DISCLAIMER

This Certificate of Insurance does not constitute a contract between the issuing insurer(s), authorized representative or producer, and the certificate holder, nor does it affirmatively or negatively amend, extend or alter the coverage afforded by the policies listed thereon.
CERTIFICATE OF LIABILITY INSURANCE

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFLICTS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

**PRODUCER**
Cal-Valley Insurance Services, Inc.
5070 N. Sixth St. #155
Fresno, CA 93710

**CONTACT NAME:** Irene Torres
**PHONE:** (559) 225-1300
**FAX:** (559) 225-8968
**E-MAIL ADDRESS:** irenet@calvalleyinsurance.com

**INSURED**
The Technologist Design Build, Inc.
2021 Fulton Ave
Sacramento, CA 95821

**INSCRIBER(S) AFFORDING COVERAGE**
NAIC #
INSURER A: State Compensation Ins Fund
35076

**COVERAGES**

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**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY**
[Automatic in RY]
[If any, describe under DESCRIPTION OF OPERATIONS below]

| Y/N | 5048106-1B | 03/09/2018 | 03/09/2019 |

**DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES** (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Certificate issued as evidence of coverage maintained by named insured.

Regarding:
Garcia Bend Park Restroom (rebid) L19120500 & L19706038 Bid #818191112126

**CERTIFICATE HOLDER**
City of Sacramento Department of Youth, Parks & Community Enrichment
915 I Street, 3rd Floor
Sacramento, CA 95814

**CANCELLATION**

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

[Signature]

© 1988-2015 ACORD CORPORATION. All rights reserved.
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OFADTLCV

Copyright 2001, AMS Services, Inc.
ENDORSEMENT AGREEMENT

WAIVER OF SUBROGATION
BLANKET BASIS

EFFECTIVE MARCH 9, 2018 AT 12:01 A.M.
AND EXPIRING MARCH 9, 2019 AT 12:01 A.M.

THE TECHNOLOGIST DESIGN BUILD, INC
2921 FULTON AVE
SACRAMENTO, CA  95821

WE HAVE THE RIGHT TO RECOVER OUR PAYMENTS FROM ANYONE LIABLE FOR AN INJURY COVERED BY THIS POLICY. WE WILL NOT ENFORCE OUR RIGHT AGAINST THE PERSON OR ORGANIZATION NAMED IN THE SCHEDULE.

THIS AGREEMENT APPLIES ONLY TO THE EXTENT THAT YOU PERFORM WORK UNDER A WRITTEN CONTRACT THAT REQUIRES YOU TO OBTAIN THIS AGREEMENT FROM US.

THE ADDITIONAL PREMIUM FOR THIS ENDORSEMENT SHALL BE 2.00% OF THE TOTAL POLICY PREMIUM.

SCHEDULE

PERSON OR ORGANIZATION
ANY PERSON OR ORGANIZATION FOR WHOM THE NAMED INSURED HAS AGREED BY WRITTEN CONTRACT TO FURNISH THIS

JOB DESCRIPTION
BLANKET WAIVER OF SUBROGATION

NOTHING IN THIS ENDORSEMENT CONTAINED SHALL BE HELD TO VARY, ALTER, WAIVE OR EXTEND ANY OF THE TERMS, CONDITIONS, AGREEMENTS, OR LIMITATIONS OF THIS POLICY OTHER THAN AS STATED. NOTHING ELSEWHERE IN THIS POLICY SHALL BE HELD TO VARY, ALTER, WAIVE OR LIMIT THE TERMS, CONDITIONS, AGREEMENTS OR LIMITATIONS OF THIS ENDORSEMENT.

COUNTERSIGNED AND ISSUED AT SAN FRANCISCO:

MARCH 7, 2018

AUTHORIZED REPRESENTATIVE

PRESIDENT AND CEO
W-9
Request for Taxpayer Identification Number and Certification

Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

Business name/disregarded entity name, if different from above.

Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes.

- Individualsole proprietor or single-member LLC
- Corporation
- Corporation
- Partnership
- Trust/estate
- Limited liability company. Enter the tax classification (S corporation, P=partnership)

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is not disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

Other (see instructions)

Address (number, street, and apt. or suite no.) See instructions.

City, state, and ZIP code

Print or type. See Specific Instructions on page 3.

Requester’s name and address (optional)

Part I Taxpayer Identification Number (TIN)
Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see How to get a TIN, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see What Name and Number To Give the Requester for guidelines on whose number to enter.

Social security number

or

Employer identification number

Part II Certification
Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and

2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and

3. I am a U.S. citizen or other U.S. person (defined below); and

4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but if you must provide your correct TIN. See the instructions for Part II, later.

Signature of U.S. person

Date

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form
An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amounts reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1088-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.
2019 Withholding Exemption Certificate 590

The payee completes this form and submits it to the withholding agent. The withholding agent keeps this form with their records.

Withholding Agent Information
Name
City of Sacramento

Payee Information
Name
THE DESIGN BUILD INC

Address (apt./ste., room, PO box, or PMB no.)
2921 FULTON AVENUE

City (If you have a foreign address, see instructions.)
SACRAMENTO

State
CA

ZIP code
95825

Exemption Reason
Check only one box.

☐ Individuals — Certification of Residency:
I am a resident of California and I reside at the address shown above. If I become a nonresident at any time, I will promptly notify the withholding agent. See instructions for General Information D, Definitions.

☒ Corporations:
The corporation has a permanent place of business in California at the address shown above or is qualified through the California Secretary of State (SOS) to do business in California. The corporation will file a California tax return. If this corporation ceases to have a permanent place of business in California or ceases to do any of the above, I will promptly notify the withholding agent. See instructions for General Information D, Definitions.

☐ Partnerships or Limited Liability Companies (LLCs):
The partnership or LLC has a permanent place of business in California at the address shown above or is registered with the California SOS, and is subject to the laws of California. The partnership or LLC will file a California tax return. If the partnership or LLC ceases to do any of the above, I will promptly inform the withholding agent. For withholding purposes, a limited liability partnership (LLP) is treated like any other partnership.

☐ Tax-Exempt Entities:
The entity is exempt from tax under California Revenue and Taxation Code (R&TC) Section 23701 ______ (insert letter) or Internal Revenue Code Section 501(c) ______ (insert number). If this entity ceases to be exempt from tax, I will promptly notify the withholding agent. Individuals cannot be tax-exempt entities.

☐ Insurance Companies, Individual Retirement Arrangements (IRAs), or Qualified Pension/Profit-Sharing Plans:
The entity is an insurance company, IRA, or a federally qualified pension or profit-sharing plan.

☐ California Trusts:
At least one trustee and one noncontingent beneficiary of the above-named trust is a California resident. The trust will file a California fiduciary tax return. If the trustee or noncontingent beneficiary becomes a nonresident at any time, I will promptly notify the withholding agent.

☐ Estates — Certification of Residency of Deceased Person:
I am the executor of the above-named person’s estate or trust. The decedent was a California resident at the time of death. The estate will file a California fiduciary tax return.

☐ Nonmilitary Spouse of a Military Servicemember:
I am a nonmilitary spouse of a military servicemember and I meet the Military Spouse Residency Relief Act (MSRRA) requirements. See instructions for General Information E, MSRRA.

CERTIFICATE OF PAYEE: Payee must complete and sign below.

To learn about your privacy rights, how we may use your information, and the consequences for not providing the requested information, go to ftb.ca.gov/forms and search for 1131. To request this notice by mail, call 800.852.5711.

Under penalties of perjury, I declare that I have examined the information on this form, including accompanying schedules and statements, and to the best of my knowledge and belief, it is true, correct, and complete. I further declare under penalties of perjury that if the facts upon which this form are based change, I will promptly notify the withholding agent.

Type or print payee’s name and title
MANUEL QUINTERO CFO

Telephone (916) 712-1314

Payee’s signature ▶

Date 1-14-2019

Page 312 of 312