Bus Wash Facility
Request for Proposals #G090

Issued by:
Golden Empire Transit District
1830 Golden State Ave
Bakersfield, CA 93301

Bids must be submitted
No later than 1:00 PM (PST)
July 3, 2019

LATE BIDS WILL BE REJECTED
There will not be a public opening for this RFP

For further information regarding this Request for Proposals contact Victor Honorato
Via Email: vhonorato@getbus.org

Issued: June 3, 2019
GOLDEN EMPIRE TRANSIT DISTRICT

Bus Wash Facility
Request for Proposals #G090

NOTICE IS HEREBY GIVEN that Golden Empire Transit District, a public transit district, is soliciting bids to replace the existing bus wash facility and construct a new bus wash facility and pre-fabricated metal building. All in strict conformance with Contract Documents and Specifications therefor, entitled “Bus Wash Facility RFP#G090” being on file in the offices of the Golden Empire Transit District at 1830 Golden State Avenue, Bakersfield, California.

Each proposal must be contained in a sealed envelope stating “Bus Wash Facility RFP#G090”, Attention: Victor Honorato – “Purchasing Agent” and filed at the offices of the Golden Empire Transit District, 1830 Golden State Avenue, Bakersfield, California, 93301-1012 at or before 4:00 PM, July 5, 2019

Copies of the Contract Documents and Specifications may be obtained on the Golden Empire Transit District website www.getbus.org or by contacting Victor Honorato, Purchasing Agent, at vhonorato@getbus.org. Bids may not be withdrawn for a period of ninety (90) days after opening. The District will not reimburse the bidders for cost incurred in the preparation of their bids. Bidders are required to submit an original written bid and one (1) copy in response to this Invitation for Bids. The bid must be sufficiently detailed to enable the District staff to adequately evaluate the project cost.

Any interpretation, correction or change of the bid documents will be made by addendum only. Interpretations, corrections or changes made in any other manner will not be binding, and bidders shall not rely upon such interpretations corrections or changes.

It is the bidder’s responsibility to continue checking the website for any updates or addenda. If you accessed this bid package from our website, we may not have you in our database. In order to ensure that you receive all updates and addenda, please contact Victor Honorato by phone at 661-869-6326 or email at vhonorato@getbus.org to verify you have been added to our database.

All bidders are required to read and completely familiarize themselves with the terms and conditions of the project’s Contract Documents, Specifications, and to submit all necessary documentation required of the bidder as specified in “Part I Commercial Terms and Conditions” and “Part II General Terms and Conditions.”

DBE Participation: It is the policy of the Department of Transportation that DBE’s, as defined in 49 CFR, Parts 23 and 26, shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with federal funds under this Agreement. A DBE goal has not been established for this project but the Golden Empire Transit District welcomes and encourages DBE participation.

The District reserves the right to postpone the proposal opening, accept or reject any and all bids and to waive any informality in any proposal as the District deems being in its own best interests.
Confidentiality Of Proposals

Access to government records is governed by the State of California. Except as otherwise required by the State of California, the Procuring Agency will exempt from disclosure proprietary information, trade secrets and confidential commercial and financial information submitted in the proposal. Any such proprietary information, trade secrets or confidential commercial and financial information, which an Offeror believes should be exempted from disclosure, shall be specifically identified and marked as such. Blanket-type identification by designating whole pages or sections as containing proprietary information, trade secrets or confidential commercial and financial information will not assure confidentiality. The specific proprietary information, trade secrets or confidential commercial and financial information must be clearly identified as such.

The Offeror may (or shall) submit proprietary information, trade secrets or confidential commercial and financial information, which an Offeror believes should be exempted from disclosure, in a separate volume specifically identified and marked as such as an appendix to the proposal.

The Procuring Agency shall employ sound business practices no less diligent than those used for the Procuring Agency's own confidential information to protect the confidence of all licensed technology, software, documentation, drawings, schematics, manuals, data and other information and material provided by Offerors and the Contractor pursuant to the Contract which contain confidential commercial or financial information, trade secrets or proprietary information as defined in or pursuant to the laws of the State of California against disclosure of such information and material to third parties except as permitted by the Contract. The Contractor shall be responsible for ensuring that confidential commercial or financial information, trade secrets or proprietary information, with such determinations to be made by the Procuring Agency in its sole discretion, bears appropriate notices relating to its confidential character.
GOLDEN EMPIRE TRANSIT DISTRICT

Bus Wash Facility
Request for Proposals #G090

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INTRODUCTION:
Golden Empire Transit District (GETD) is issuing a Request for Proposals to replace the existing bus wash and construct a new bus wash and pre-fabricated metal building. The project location is 1830 Golden State Ave, Bakersfield, CA. 93301. Receipt of any bid shall under no circumstance, obligate the District to accept the best price offering.

DESCRIPTION OF THE PROJECT:
The Work consists of demolishing the existing bus wash, constructing a new wash pad and foundation for the new bus wash, installing a pre-fabricated metal building as well as all the related materials needed to furnish a turnkey Bus Wash System. All in accordance with the Plans and the Specifications of this RFP and all local and state regulations.

PROJECT SCHEDULE:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 3, 2019</td>
<td>Solicit Bids</td>
</tr>
<tr>
<td>June 14, 2019</td>
<td>Last Day to Submit Questions</td>
</tr>
<tr>
<td>June 19, 2019</td>
<td>GETD’s Response to Questions</td>
</tr>
<tr>
<td>July 3, 2019</td>
<td>Bid Due Date</td>
</tr>
<tr>
<td>July 17, 2019</td>
<td>Contract Award</td>
</tr>
<tr>
<td>January 1, 2020</td>
<td>Project Completion Date</td>
</tr>
</tbody>
</table>

CONTRACTOR QUALIFICATIONS:
Contractor’s License Classification: In accordance with the provisions of California Public Contract Code, Section 3300, Golden Empire Transit has determined that bidder shall possess a valid **Class A Contractor's License** issued by the State of California at the time of Bid opening and for the duration of the contract. The General Contractor or the General Contractor’s Subcontractors performing the associated work are required to possess a Class B or Class C-10 and Class C-21 Contractor’s License. Failure to possess the specified licenses shall render the Bid as non-responsive and shall act as a bar to award of the contract to any bidder not possessing said license at the time of Bid opening. The Contractors’ State License Board may be contacted at 9821 Business Park, Sacramento, CA 95827; PO Box 26000, Sacramento, CA 95826; (800) 321-2752.
PREVAILING WAGE RATES:
Pursuant to Section 1770, California Labor Code, the successful Bidder shall pay not less than the prevailing rate of per diem wages as determined by the Director of California Department of Industrial Relations. A copy of such prevailing rate is on file at the offices of the Golden Empire Transit, which copy will be made available for examination during business hours to any party on request: Prevailing wage rate information is also available on the internet at the following website address: http://www.dir.ca.gov/dlsr/PWD.

EVALUATIONS OF BIDS:
Proposals will be evaluated on the criteria set forth below. The maximum score for a proposal will be 100 points, which will be allocated as follows:

1. Transit Bus Wash System Design, Functionality, and Reliability (25 Points)
2. Transit Bus Wash System proposed and described in this RFP’s requirements (10 Points)
3. Proposed Total System Price and Install Schedule (40 Points)
4. References for similar Transit Bus Wash Systems and Warranty Provided for proposed Bus Wash System (20 Points)
5. Compliance with all Schedule Requirements, Certifications, Forms & DBE Participation (5 Points)

Opening of Proposals
Proposals will not be publicly opened. All proposals and evaluations will be kept strictly confidential throughout the evaluation, negotiation and selection process. Only the members of the Selection Committee and Evaluation Team and other Procuring Agency officials, employees and agents having a legitimate interest will be provided access to the proposals and evaluation results during this period.

Evaluation Committee
An Evaluation Committee will be established. The Committee will make all decisions regarding the evaluations, determination of responsible Offerors and the competitive range, negotiations and the selection of the Offeror, if any, that may be awarded the Contract. The Evaluation Committee will include employees of the Procuring Agency. The Evaluation Committee will carry out the evaluations and report all of its findings for final approval.

Proposal Selection Process
An award, if made, will be to a responsible Offeror for a proposal, which is found to be in the Procuring Agency’s best interest, price, and other evaluation criteria considered.

Evaluation of Competitive Proposals
The approach and procedures are those, which are applicable to a competitive negotiated procurement whereby proposals are evaluated to determine which proposals are within a competitive range. Discussions and negotiations may then be carried out with Offerors within the competitive range, after which Best and Final Offers (BAFO) may be requested. However, the Procuring Agency may select a proposal for award without any discussions or negotiations or request for any BAFO(s). Subject to the Procuring Agency’s right to reject any or all proposals, the Offeror will be selected whose proposal is found to be most advantageous to the Procuring Agency.
Evaluation Procedures

All aspects of the evaluations of the proposals and any discussions/negotiations, including documentation, correspondence and meetings, will be kept confidential during the evaluation and negotiation process. Proposals will be analyzed for conformance with the requirements of the RFP and Contract documents. Proposals that do not comply with these requirements and do not include the required forms may be rejected as insufficient or not be considered for the competitive range.

SPECIFICATIONS:

1.1 GENERAL

A. The Contractor shall keep on the job a copy of the Plans and Specifications and shall at all times give the Owner and Engineer access thereto.

B. Anything mentioned in the Specifications and not shown on the Plans or shown on the Plans and not mentioned in the Specifications shall be of like effect as if shown or mentioned in both.

C. The Contractor shall not take advantage of any errors, discrepancies or omissions which may exist in the Plans and Specifications but shall immediately call them to the attention of the Engineer whose interpretation or correction thereof shall be conclusive.

D. In case of conflict between portions of the Contract Documents, the order of precedence of Contract Documents shall be:

   First: Permits from other agencies as may be required by law
   Second: Addenda
   Third: Bid Documents, Division 0
   Fourth: Technical Specifications, Division 2 through Division 48
   Fifth: Plans
   Sixth: General Requirements, Division 1
   Seventh: State Standard Specifications
   Eighth: Reference Documents

E. Change Orders, supplemental agreements and approved revisions to Plans and Specifications will take precedence over documents listed above. Detailed Plans shall have precedence over general Plans.

F. Whenever any conflict appears in any portions of the Contract Documents, it shall be resolved by application of the order of precedence.
1.2 GENERAL REQUIREMENTS AND TECHNICAL SPECIFICATIONS

A. For definitions of the Specifications categorized as General Requirements (Division 1) and Technical Specifications (Division 2 through Division 48) refer to Section 01 42 13 – Definitions and Abbreviations.

1.3 REFERENCE DOCUMENTS

A. For a definition of Reference Documents and State Standard Specifications refer to Section on Definitions and Abbreviations.

B. Throughout the following Specification sections, references are made to various widely published, standard and commercial specifications, manuals, or codes of technical societies, organizations, or associations. These specifications are intended to amplify the descriptions of materials, equipment, and construction systems. The Contractor shall caution each of his Subcontractors to become familiar with the contents of the pertinent portions of these Reference Documents. The following Reference Documents are the most widely used, and are cited or referred to in each of the following sections of these Specifications:

1. American Society of Testing Materials (ASTM)
2. American National Standards Institute (ANSI)
3. American Standards Associations (ASA)
4. American Concrete Institute (ACI)
5. Federal Specifications, as applicable.
6. California Building Code
7. California Plumbing Code

C. Each citation of a Reference Document shall be construed to refer to the latest published revision of such specification as of the date of the invitation for bids and to such portions of it that relate and apply directly to the material or installation called for on this job. The Engineer will give no consideration to any claimed ignorance as to what a cited Reference
Document contains, since such Subcontractor on a project of this scope is deemed to be experienced and familiar with his own trade to be experienced and familiar with his own trade's generally accepted, published standards of quality.

D. Whenever references are made to any of the above-mentioned Reference Documents or testing methods in the governing Building Codes, the requirements of those Reference Documents shall govern, insofar as they are not in contravention with maxima or minima prescribed by documents designated in the Building Code.

1.4 LIST OF DRAWINGS

A. The Work shall conform to the following Drawings: Located in Appendix A

<table>
<thead>
<tr>
<th>Cover Sheet</th>
<th>C1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demo Sheet</td>
<td>C2</td>
</tr>
<tr>
<td>Horizontal Control Plan</td>
<td>C3</td>
</tr>
<tr>
<td>Site Grading</td>
<td>C4</td>
</tr>
<tr>
<td>Details</td>
<td>D1</td>
</tr>
<tr>
<td>Building Layout</td>
<td>S1</td>
</tr>
<tr>
<td>Building Elevations</td>
<td>S2</td>
</tr>
<tr>
<td>Building Details</td>
<td>S3</td>
</tr>
<tr>
<td>General Notes &amp; Symbols</td>
<td>E0</td>
</tr>
<tr>
<td>Details</td>
<td>E0.1</td>
</tr>
<tr>
<td>Electrical Site Plan</td>
<td>E1</td>
</tr>
</tbody>
</table>

1.5 STATE STANDARD SPECIFICATIONS

A. For the purpose of this contract, the following terms or pronouns in place of them, used throughout the State Standard Specifications and defined in Section 1, Definition of Terms, of the State Standard Specifications, shall be as follows:

<table>
<thead>
<tr>
<th>TERMS</th>
<th>INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>State of California</td>
</tr>
<tr>
<td>Department</td>
<td>Golden Empire Transit District</td>
</tr>
<tr>
<td>Director</td>
<td>Karen King</td>
</tr>
<tr>
<td>Engineer</td>
<td>Provost &amp; Pritchard Engineering Group, Inc.</td>
</tr>
</tbody>
</table>
Contractor

The person or persons, co-partnership or corporation, private or municipal, who have entered into a contract with the Golden Empire Transit District as party or parties of the second part, or his or her legal representative.

1.6 OCCUPATIONAL SAFETY AND HEALTH ACT

A. The applicable standards of the American National Standards Institute and the National Fire Protection Association that have been adopted are hereby made a part of these Specifications as a whole and as mentioned in the various sections.

B. Any errors, ambiguities, or inconsistencies of these standards with either the local codes, the Specifications, or the Drawings shall be brought to the attention of the Engineer.

1.7 COMPLIANCE WITH ALL LAWS AND CODES

A. Contractor shall conform to and abide by all local city, county, state and federal laws, rules, regulations, including industrial safety laws. Such laws shall be considered as essential parts of these Specifications and, in the absence of definite requirements herein, the provisions of such rules and regulations shall be observed by the Contractor. If the Drawings and/or Specifications are at variance therewith, Contractor shall so notify Engineer promptly. Should the Contractor perform any work contrary to such laws, ordinances, rules and regulations he shall bear all costs arising therefrom.

B. Where these Specifications, however, call for or describe materials workmanship or construction of a better quality, higher standard, or larger size than is required by said rules and regulations, the provisions of these Specifications shall take precedence over said rules and regulations. Contractor shall furnish, without any extra charge, all additional labor or materials, or both, when required for compliance with these rules and regulations.

DESCRIPTION OF THE WORK AND SCHEDULE CONSTRAINTS:

1.1 WORK INCLUDED

A. The Work consists of furnishing all labor, materials and equipment necessary to demolish the existing bus wash facility and construct a new
bus wash facility and pre-fabricated metal building, as well as all necessary components and appurtenances necessary for full and complete operation by the District, in the City of Bakersfield, in accordance with the Plans and the Specifications.

B. The construction site is located in Kern County within the City of Bakersfield, California.

C. The primary components are generally described as follows:
   1. Bus Wash Equipment  
   2. Pre-fabricated Metal Building  
   3. Concrete Wash Pad  
   4. Water Reclaim System

1.2 BEGINNING OF WORK

D. The Contractor shall begin work within fourteen (14) calendar days after receipt of official Notice to Proceed from the Owner.

1.3 TIME OF COMPLETION

E. The Contractor shall substantially complete all work within one-hundred and twenty (120) calendar days unless the period for completion is extended otherwise by the Contract Documents. The work shall be finally complete within an additional thirty (30) calendar days. The Contractor shall diligently prosecute the work to completion on or before the completion date indicated on the Notice to Proceed.

1.4 TIME CONSTRAINTS

F. Contractor shall supervise, inspect, and direct the Work competently and apply such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the specific means, methods, techniques, sequence, or procedure of construction required to complete the project as specified by the Contract Documents. Contractor shall be responsible to see that the completed Work complies accurately with the Contract Documents.

1.5 ORDER OF WORK

G. Demolish Existing Facilities  
H. Install Pre-Cast Overflow Tanks  
I. Construct foundations and flat work  
J. Construct concrete wash pad  
K. Install Bus Wash Equipment and water reclaim equipment  
L. Install pre-fabricated metal building
ENGINEER’S STATUS DURING CONSTRUCTION

1.1  DISTRICT’S REPRESENTATIVE

A. Engineer will be District’s representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as District’s representative during construction are set forth in these Specifications and will not be changed without written consent of District and Engineer.

1.2  VISITS TO SITE

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor’s executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of District, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer’s efforts will be directed toward providing for the District a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep the District informed of the progress of the Work and will endeavor to guard the District against defective Work.

B. Engineer’s visits and observations are subject to all the limitations on Engineer’s authority and responsibility set forth in Section 1.5, below. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

C. Review of the Work by the Engineer shall not relieve the Contractor of the obligation to fulfill all conditions of the Contract.

D. No oral or telephonic agreement or conversation with any officer, agent or employee of the District or the Engineer, or with the Engineer, either before or after execution of the Contract, shall affect or modify any of the terms or obligations contained in any of the Contract Documents.
E. The Contractor shall pay the District for all overtime review in accordance with existing resolutions or fee schedules of the District, unless the charges for such inspection have been specifically waived in the Contract Documents. Overtime charges will be made for all reviews on Saturdays, Sundays and State holidays, and hours worked by the reviewer other than those of the normal working day.

1.3 AUTHORIZED VARIATIONS IN WORK

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on the District and also on Contractor, who shall perform the Work involved promptly. If the District or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefore as provided within the Contract Documents.

1.4 REJECTING DEFECTIVE WORK

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed. Neither this authority nor the Engineer’s good faith judgment to reject or not reject any work shall subject the Engineer to any liability or cause of action by the Contractor, subcontractors, or any other suppliers or persons performing work on the Contract.

1.5 LIMITATIONS ON ENGINEER’S AUTHORITY AND RESPONSIBILITIES

A. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor’s failure to perform the Work in accordance with the Contract Documents.
B. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

C. Engineer’s review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

D. The limitations upon authority and responsibility shall also apply to, the Engineer’s field representative, known as the Resident Project Representative, if any, and assistants, if any.

1.6 RESIDENT PROJECT REPRESENTATIVE

1.6.1 Responsibilities of the Resident Project Representative shall be as set forth in the Contract Terms & Conditions.

COORDINATION OF WORK:

1.1 RESPONSIBILITY OF CONTRACTOR

A. If any part of the Work depends for proper execution or results upon the work of others, the Contractor shall inspect and promptly report to the Engineer any apparent discrepancies or defects in such work of others that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the work of others as fit and proper except as to defects which may develop in the work of others after execution of the Work by the Contractor.

1.2 WORK INVOLVED WITH EXISTING SYSTEM

B. Existing materials and equipment removed not designated to be salvaged for the District in the execution of the Work shall become the property of the Contractor and shall be removed from, and disposed of, off the site by the Contractor in an acceptable and lawful manner.
1.3 COORDINATION OF WORK

C. The Contractor shall maintain overall coordination for the execution of the Work. Based on the Construction Schedule prepared in accordance with these Specifications, he shall obtain from each of his subcontractors a similar schedule and shall be responsible for all parties maintaining these schedules or for coordinating required modifications.

MEASUREMENT AND PAYMENT:

1.1 MEASUREMENT

A. Unless otherwise specified in the Contract Documents, quantities of work shall be determined from measurements or dimensions in a horizontal plane. All measurements shall be made in accordance with United States Standard Measures and shall be measured on the basis of “in-place” quantities.

B. After the work has been completed, the Engineer will make field measurements of unit price items in order to determine the quantities of the various items as a basis for payment. On all unit price items, the contractor will be paid for the actual amount of the work performed in accordance with the contract documents, as computed from field measurements.

C. Work or quantities not listed in the description of bid items are considered incidental to other construction and will not be measured. Compensation for such incidental work is considered to be included in the various items of work bid.

1.2 INCREASED OR DECREASED QUANTITIES

A. Increases or decreases in quantities shall be governed by the General Conditions.

B. All written requests for adjustment shall be made no later than five working days after notification by the Engineer that the item of work is complete.

1.3 FINAL PAY QUANTITIES

A. Final pay quantities shall be in accordance with the General Conditions except as modified below.

B. Final pay quantities will be designated only in the Bid Schedule and in Section on Explanation of Bid Items and are not shown on the Plans.
C. When an item of work is designated as a Final Pay Quantity on the Bid Schedule and/or in the Explanation of Bid Items, the estimated quantity for that item of work shall be the final pay quantity, unless the dimensions of any portion of that item are revised by the Engineer, or the item or any portion of the item is eliminated.

If the dimensions of any portion of the item are revised, and the revisions result in an increase or decrease in the estimated quantity of that item of work, the final pay quantity for the item will be revised in the amount represented by the changes in the dimensions.

If a final pay item is eliminated, the estimated quantity for the item will be eliminated.

If a portion of a final pay item is eliminated, the final pay quantity will be revised in proportion to the bid quantity represented by the eliminated portion of the item of work.

D. The estimated quantity for each item of work designated as a Final Pay Quantity on the Bid Schedule and/or in the Explanation of Bid Items shall be considered as approximate only, and no guarantee is made that the quantity which can be determined by computations, based on the details and dimensions shown on the plans, will equal the estimated quantity. No allowance will be made in the event that the quantity based on computations does not equal the estimated quantity.

E. In case of discrepancy between the quantity shown on the Bid Schedule for a final pay item and the quantity or summation of quantities for the same item shown on the plans, payment will be based on the quantity shown on the Bid Schedule.

1.4 PARTIAL PAYMENT

A. Attention is directed to Section 9-1.06 of the State Standard Specifications which, except as modified herein, shall apply in its entirety.

1. The local agency shall withhold not less than 5 percent of the contract price until final completion and acceptance of the project.

2. Partial payments for materials on hand shall not exceed one hundred percent (100%) of the value of material delivered on site, properly stored in a secured fenced area subject to, or under the
control of, the owner and local agency, and unused. Contractor shall submit copies of invoices of materials to support values. Materials stored shall be installed within 60 days of delivery for payment eligibility.

B. Payment shall not relieve the Contractor from its obligations under the Contract; nor shall such payment be construed as acceptance of any of the Work. Payment shall not be construed as transfer of ownership of any equipment or materials to the Owner. Responsibility of ownership shall remain with the Contractor who shall obligated to protect any fully or partially completed work or structure for which payment has been made; or replace any materials or equipment to be provided under the Contract which may be damaged, lost, stolen or otherwise degraded in any way prior to acceptance of the Work, except as provided in Section 7-1.15 of the State Standard Specifications.

1.5 PARTIAL PAYMENT

A. Attention is directed to Section 9-1.16 of the State Standard Specifications which, except as modified herein, shall apply in its entirety.

1. The local agency shall withhold not less than 5 percent of the contract price until final completion and acceptance of the project.

2. Partial payments for materials on hand shall not exceed one hundred percent (100%) of the value of material delivered on site, properly stored in a secured fenced area subject to, or under the control of, the owner and local agency, and unused. Contractor shall submit copies of invoices of materials to support values. Materials stored shall be installed within 60 days of delivery for payment eligibility.

B. Payment shall not relieve the Contractor from its obligations under the Contract; nor shall such payment be construed as acceptance of any of the Work. Payment shall not be construed as transfer of ownership of any equipment or materials to the Owner. Responsibility of ownership shall remain with the Contractor who shall obligated to protect any fully or partially completed work or structure for which payment has been made; or replace any materials or equipment to be provided under the Contract which may be damaged, lost, stolen or otherwise degraded in any way prior to acceptance of the Work.
1.6 **PARTIAL PAYMENT**

A. Attention is directed to Article 14.02 of Section 00 72 00, Standard Specifications, which, except as modified herein, shall apply in its entirety.

1. The local agency shall withhold not less than 5 percent of the contract price until final completion and acceptance of the project.

2. Partial payments for materials on hand shall not exceed one hundred percent (100%) of the value of material delivered on site, properly stored in a secured fenced area subject to, or under the control of, the owner and local agency, and unused. Contractor shall submit copies of invoices of materials to support values. Materials stored shall be installed within 60 days of delivery for payment eligibility.

B. Payment shall not relieve the Contractor from its obligations under the Contract; nor shall such payment be construed as acceptance of any of the Work. Payment shall not be construed as transfer of ownership of any equipment or materials to the Owner. Responsibility of ownership shall remain with the Contractor who shall obligated to protect any fully or partially completed work or structure for which payment has been made; or replace any materials or equipment to be provided under the Contract which may be damaged, lost, stolen or otherwise degraded in any way prior to acceptance of the Work, except as provided in Article 14 of Section 00 72 00, Standard Specifications.

1.7 **FINAL PAYMENT**

A. Notice of Completion will be filed in the normal course of business following the first regular meeting of Golden Empire Trans District Board which occurs far enough after Final Completion to allow for agendizing Golden Empire Transit District Board approval of the Notice.

B. Final payment will be due thirty (30) days after the recording of the Notice of Completion and acceptance by the Owner.

C. Upon completion of the project the final contract prices shall be revised by change order, if necessary, to reflect the true quantities used at the stated unit price thereof as contained in the Bidder’s Proposal hereto attached. Payments on account thereof will be made as set forth in these Specifications.

D. The Contractor shall comply with all Golden Empire Transit District’s General Terms and Conditions.
A. At the request and expense of Contractor, securities equivalent to the amount withheld shall be deposited with Owner, or with a state or federally chartered bank in California as the escrow agent, who shall then pay those withheld moneys to Contractor. Upon satisfactory completion of the contract and acceptance by the Owner, the securities shall be returned to Contractor.

B. Alternatively, Contractor may request and the Owner shall make payment of retentions earned directly to the escrow agent at the expense of Contractor. At the expense of Contractor, Contractor may direct the investment of the payments into securities and Contractor shall receive the interest earned on the investments upon the same terms provided for in this section for securities deposited by Contractor. Upon satisfactory completion of the contract, Contractor shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from Owner, pursuant to the terms of this section. Contractor shall pay to each subcontractor, not later than 20 days of receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of Contractor.

C. Securities eligible for investment under this section shall include those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Contractor and Owner.

D. Contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon.
ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between

____________________________________________________________ whose address is
____________________________________________________________
hereinafter called "Owner,"

____________________________________________________________ whose address is
____________________________________________________________
hereinafter called "Contractor" and

____________________________________________________________ whose address is
____________________________________________________________
hereinafter called "Escrow Agent."

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

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

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

(3) When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until the time that the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

(4) Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

(5) The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.
(6) Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

(7) The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven days written notice to the Escrow Agent from the owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

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

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

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

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

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

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EXPLANATION OF BID ITEMS:

1.1 GENERAL

The Contract payment for the specified items of work as set forth in the Bid Schedule shall be full compensation for furnishing all labor, materials, methods or processes, implements, tools, equipment and incidentals and for doing all work involved as required by the provisions of the Contract Documents for a complete in place and operational system.

1.2 BID ITEMS

**Bid Item 1 – Mobilization, Bonds, Insurance, and Permits:** Payment for this item shall include full compensation for all labor, materials, tools, equipment and incidentals making up the cost of mobilization, move-in, move-out, all necessary bonds, insurance, permits, dust control, erosion and sediment control, licenses, and fees required during the performance of the work as specified. This item also includes demobilization, including the removal of all equipment, supplies, personnel and incidentals from the project at the end of construction. Payment shall not exceed 20% of the contract amount. Payment for mobilization shall be made with the first progress payment and shall not exceed 80 percent of the bid item amount. Payment for demobilization shall be made with the last progress payment and shall not be less than 20 percent of the bid item amount.

**Bid Item 2 – Worker Protection:** Payment for this item shall be considered full compensation for all labor, materials, tools, equipment and incidentals for providing for worker protection from caving ground in excavations and other hazards that may occur during construction, in accordance with the Plans and specifications. This bid item will be paid for by Lump Sum, prorated, based on percentage of contract work completed.

**Bid Item 3 – Demolition:** Payment for this item shall include full compensation for all labor, materials, tools, equipment and incidentals making up the cost of all work involved in clearing and grubbing within project site, including sawcutting of concrete and asphalt improvements and structure and equipment removal as described in the Specifications and shown on the Plans. This bid item will be paid for by Lump Sum, prorated, based on percentage of work completed.

**Bid Item 4 – 10,000 Gallon Pre-Cast Concrete Overflow Tanks:** Payment for this item shall include full compensation for all labor, permitting, materials, tools, equipment and incidentals making up the cost of all work involved in supplying and installing (2) traffic rated 10,000 Gallon Pre-Cast Concrete Overflow Tanks including all appurtenances, piping and connections in accordance with the manufacturer’s instructions as described in the Specifications and shown on the Plans. This bid item will paid for Per Each.

**Bid Item 5 – Concrete Foundations, Floors and Flatwork:** Payment for this item shall include full compensation for all labor, permitting, materials, tools, equipment and incidentals required to construct concrete foundations, floors and flatwork to the lines and grades shown and specified. This bid item includes excavation, preparation and compaction of subgrade,
furnishing, grading and compacting the granular base material and drain piping and inlet, forming, furnishing the Portland cement concrete, reinforcing steel, anchors, bolts, water stops and accessories, placement, finishing and all other work required to result in complete foundations, floors and flatwork in accordance with the Plans and Specifications. This bid item will be paid for by Lump Sum, prorated, based on percentage of work completed.

**Bid Item 6 – Bus Wash System and Appurtenances:** Payment for this item shall include full compensation for all labor, permitting, materials, tools, equipment and incidentals required to furnish and install the bus wash system and equipment as shown and specified (or Engineer approved equivalent) and furnishing all other materials and work necessary to result in a complete and fully operating bus wash facility in accordance with the Plans and Specifications. This item will be paid for by Lump Sum, prorated, based on percentage of work completed.

**Bid Item 7 – Pre-Fabricated Metal Building:** Payment for this item shall include full compensation for all labor, permitting, materials, tools, equipment and incidentals required to furnish and install the pre-fabricated metal building, doorways and all other necessary screws, nuts, bolts, fasteners and components for said building as shown and specified. This bid item includes furnishing all other materials and work necessary to result in a complete and fully functioning pre-fabricated metal building in accordance with the Plans and Specifications. This item will be paid for by Lump Sum, prorated, based on percentage of work completed.

**Bid Item 8 – Electrical System Upgrades:** Payment for this item shall include full compensation for all labor, permitting, materials, tools, equipment and incidentals required to furnish and install the 500kVA Transformer and 600 Ampere Distribution Panel as shown and specified. This bid item includes, permitting, excavation, trenching and trench repair, furnishing and installing: adequate supports for transformer and panel, switches, breakers, conduits, conductors, junction boxes, and making all connections necessary and furnishing and installing any other component necessary for to result in full installation and complete operation of the Electrical System Upgrades in accordance with the Plans and Specifications. This item will be paid for by Lump Sum, prorated, based on percentage of work completed.

**PROJECT MEETINGS:**

1.1 **PRECONSTRUCTION CONFERENCE**

A. Upon receipt of the Notice to Proceed, or at an earlier time if mutually agreeable, the District will arrange a preconstruction conference to be attended by the Contractor, Contractor’s superintendent, the Owner, the Engineer or his representative, and representatives of utilities, major subcontractors, and others involved in the execution of the Work.

B. The purpose of this conference shall be to establish a working understanding between the parties and to discuss the Construction
Schedule, Critical Path Method format required, shop drawing submittals and processing, applications for payment and their processing, and such other subjects as may be pertinent for the execution of the Work.

1.2 PROGRESS MEETINGS

A. The Engineer shall arrange and conduct progress meetings. These meetings shall be conducted weekly, unless designated otherwise and shall be attended by the Engineer or his representative, Contractor, Contractor's superintendent and representatives of all subcontractors, utilities, and others, that are active in the execution of the Work. The purpose of these meetings shall be to expedite the work of any subcontractor or other organization that is not up to schedule, resolve conflicts, and in general, coordinate and expedite the execution of the Work.

B. The agenda of progress meetings shall include review of progress and schedule, of payment request, of the latest Construction Schedule update, and of the record documents.

1.3 PROGRESS AND SCHEDULE REVIEW

A. The progress of the Work and the Construction Schedule shall be reviewed to verify:

1. Actual start and finish dates of completed activities since the last progress meeting.
2. Durations and progress of all activities not completed.
3. Reason, time, and cost data for Change Order work that is to be incorporated into the Construction Schedule or payment request form.
4. Payment due to the Contractor based on percentage complete of items in the submitted payment request.
5. Reasons for, and duration of, required revisions in the Construction Schedule.
6. After each monthly update, the Contractor shall submit to the Engineer three (3) prints of the last accepted Construction Schedule, revised in accordance with the monthly review.
1.4 REVIEW OF PAYMENT REQUEST

A. The Contractor shall have his copy of the payment request and all other data required by the Contract Documents completed prior to the progress meeting. The Engineer will process Contractor's payment request after satisfactory review of the schedule update.

SUBMITTAL PROCEDURES:

1.1 WORK INCLUDED

A. The work described in this section includes general requirements and procedures related to the preparation and transmission of submittals to include Shop Drawings, Samples, Manuals, and Record Drawings

1.2 RELATED WORK

A. General Conditions

B. Individual equipment specifications

1.3 GENERAL

A. Before submitting a Shop Drawing or Sample, Contractor shall have:

1. Reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

2. Determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

3. Determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

4. Determined and verified all information relative to Contractor’s responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
B. Submit each submittal document under separate cover or transmittal. Transmittal shall include the following identification data, as applicable:

1. Contract number
2. Project name and location
3. Submittal number and revision
4. Product identification
5. Applicable contract drawing number, specification section, and paragraph number
6. Stamp Space: Blank space of approximately 2-1/2 inches high by 4 inches wide adjacent to the identification data to receive Engineer's status stamp.
7. Contractor’s certification statement as described below

C. To each submittal affix the following signed Certification Statement.

1. "Certification Statement: By this submittal, we hereby represent that we have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and pertinent data and we have checked and coordinated each item with other applicable approved drawings and all Contract requirements."

D. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

E. Furnish neat, legible, and sufficiently explicit detail to enable proper review for Contract compliance.

F. Contractor assumes all risks of error and omission.

G. Work performed before approval, or not conforming to approved submittals, shall be at Contractor's risk.

H. Submittal requirements contained in this specification are in addition to
specific submittal requirements contained in individual equipment specification sections.

1.4 APPROVAL PROCESS

A. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer’s review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

B. Engineer’s review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

C. Engineer’s review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

D. Engineer’s review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has given Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the Contract Documents and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

E. Engineer’s review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

F. Submittals will be returned, marked with one of the following classifications:

1. NO EXCEPTION TAKEN: Requires no corrections, no marks.

2. APPROVED AS NOTED: Requires minor corrections. Items may be fabricated as marked without further resubmission. Resubmit 2 corrected copies to the Engineer.

3. RESUBMIT: Requires corrections. Resubmit entire submittal following original submission with corrections noted. Allow time
for checking and Engineer’s appropriate action.

4. REJECTED: Requires major corrections or is otherwise not following Contract Documents. No items shall be fabricated. Resubmit entire submittal following original submission with corrections noted.

5. INFORMATION ONLY: Items specified by Contract Documents.

2.1 SHOP DRAWINGS

A. Unless otherwise noted in the individual specification sections, submit five (5) sets of shop drawings.

B. All catalog and specification sheets shall be clearly marked to indicate the specific model number and configuration to be used. Items not applicable to the project shall be crossed out.

C. Show complete and detailed fabrication; assembly and installation details; wiring and control diagrams; catalog data; pamphlets; descriptive literature; and performance and test data.

D. Include calculations or other information sufficient to show comprehensive description of structure, equipment, or system provided and its intended manner of use.

E. Include Manufacturer’s installation recommendations.

2.2 SAMPLES

A. Unless otherwise noted in the individual specification sections, submit three (3) samples of each item.

B. Samples shall be representative of the actual material proposed for use in the project and of sufficient size to demonstrate design, color, texture, and finish.

C. Permanently attach to each sample
   1. The contract number
   2. Project name and location
   3. Product identification
   4. Applicable contract drawing and specification section number
5. Subcontractor’s, vendor’s and/or manufacturer’s name, address, and telephone number.

D. Certain samples may be tested for specific requirements by the Owner and/or Engineer prior to approval. Failure of sample to pass tests will be sufficient cause for refusal to consider further samples of the same brand and make.

E. Rejected samples will be returned upon request, and resubmittals shall consist of new samples.

2.2 RECORD DRAWING

A. Maintain 1 record copy of Contract Documents at site in good order and annotated to show revisions made during construction. Keep annotations current for possible inspection.

1. Make record drawings available to Engineer at all times during life of Contract.

2. Drawings: Made part of record drawings and to include:

   a. Contract Drawings: Annotate or redraft, as required, to show revisions, substitutions, variations, omissions, and discrepancies made or discovered during construction concerning location and depth of utilities, piping, ductbanks, conduits, manholes, pumps, valves, vaults, and other equipment. Make revisions and show on all drawing views with actual dimensions established to permanent points.

   b. Working/Layout Drawings: When required as submittals, record actual layouts of conduit runs between various items of electrical equipment for power, control, and instrumentation; wire sizes, numbers, and functions; configuration of conduits; piping layouts; and duct layouts. Add sections

3. Before preliminary inspection, furnish reproducible of record drawings. At completion of Contract and before final payment is made, furnish Engineer 1 set of reproducibles of finally approved record drawings reflecting revisions herein described.

2.2 OPERATION AND MAINTENANCE MANUALS

A. Furnish Operation and Maintenance Manuals for various types of equipment and systems, as required by Contract Documents. Operation
and Maintenance Manuals shall be provided for all mechanical and electrical equipment. Unless otherwise indicated, furnish separate manual for each piece of equipment and system. If manual contains other items or equipment, indicate where specified items are located in manual. Include in manual complete information necessary to operate, maintain, and repair specific equipment and system furnished under this Contract, and include the following specific requirements:

1. Contents.
   a. Table of Contents and Index.
   b. Brief description of equipment/system and principal components.
   c. Starting and stopping procedures, both normal and emergency.
   d. Installation, maintenance, and overhaul instructions including detailed assembly drawings with parts list and numbers, and recommended spare parts list with recommended quantity, manufacturer's price, supplier's address, and telephone number.
   e. Recommended schedule for servicing, including technical data sheets that indicate weights and types of oil, grease, or other lubricants recommended for use and their application procedures.
   f. One copy of each component wiring diagram and system wiring diagram showing wire size and identification.
   g. One approved copy of each submittal with changes made during construction properly noted, including test certificates, characteristic curves, factory and field test results.
   h. For electrical systems, include dimensioned installation drawings, single line diagrams, control diagrams, wiring and connection diagrams, list of material for contactors, relays and controls, outline drawings showing relays, meters, controls and indication equipment mounted on equipment or inside cubicles, control and protective schematics, and recommended relay settings.
2. Material:
   a. Covers: Oil, moisture, and wear resistant 9 inches by 11-1/2 inches size.
   b. Pages: 60 pound paper 8-1/2 inches by 11 inches size with minimum of 2 punched holes 8-1/2 inches apart reinforced with plastic, cloth, or metal.
   c. Fasteners: Metal screw post or Acco metal strap type.
   d. Diagrams and Illustrations: Attach foldouts, as required.

B. Copies:

1. Submit five (5) preliminary copies of manuals for review and approval no later than date of shipment of equipment. Installation shall not begin until manuals are accepted by Engineer. Include in preliminary copies all items required under “Contents” above. Three copies will be marked and returned to Contractor.

2. Deliver seven (7) copies of finally approved manuals to Engineer before startup.

MASTER LIST OF SUBMITTALS:

A. The following submittals are required for the Work. Other submittals may be required as requested by the District or District’s Representative.

1. Post-Bid Pre-Award Construction Schedule
2. Post-Award Construction Schedule
3. Contractor’s Plan of Activities (submitted weekly)
4. Copies of all agency permits, including, but not limited to:
5. Concrete mix designs, material certificates, admixtures, form release and curing compounds as specified in Section on Cast-In-Place Concrete.
6. Shop drawings, installation manuals, product literature, catalog cut sheets for all bus wash equipment as specified in Section on General Equipment Stipulations.
7. Shop drawings, installation manuals, product literature, catalog cut sheets for all prefabricated metal building components as specified in Section on Metal Doors & Frames; Section on Overhead Coiling Doors; and Section on Metal Building.

8. Shop drawings, installation manuals, product literature, catalog cut sheets for all electrical equipment, conduit and wiring, as specified in Division 26 – Electrical.

9. All other administrative and conditional submittals as explained in this Section on Submittal Procedures.

MATERIAL SUBSTITUTION PROCEDURES:

1.1 GENERAL

A. The materials furnished and used shall be new, except as may be provided elsewhere in these Specifications, or on the Plans.

B. All materials required to complete the work under this contract shall be furnished by the Contractor, unless otherwise stated.

C. It shall be the duty of the Contractor to call the Engineer's attention to apparent errors or omissions and request instruction before proceeding with the Work. The Engineer may, by appropriate instructions, correct said apparent errors and omissions, which instructions shall be as binding upon the Contractor as though contained in the original Contract Documents.

1.2 DEFINITIONS

A. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor.

B. Revisions: Changes to Contract Documents requested by the District or Engineer.

C. Options: Specified options of products and construction methods included in Contract Documents.

1.3 TRADE NAMES AND ALTERNATIVES

A. Wherever an article, or any class of materials, is specified by the trade name or by the name of any particular patentee, manufacturer or dealer,
or by reference to the catalog of any such manufacturer or dealer, it shall be taken as intending to mean and specify the article or material described or any other equal thereto in quality, finish and durability, and equally as serviceable for the purpose for which it is or they are intended. The intent of the Plans and Specifications is to specify highest grade standard equipment, and it is not the intent of these Plans and Specifications to exclude or omit the products of any responsible manufacturer, if such products are equal in every practical respect to those mentioned herein, as determined by the Engineer.

1.4 SAMPLES

A. At the option of the Engineer, the source of supply of materials for the Work shall be subject to tests and inspection before the delivery is started and before such materials are used in the Work. Samples representative of the character and quality of materials shall be submitted by the Contractor. Samples shall be of sufficient quantities or amounts for testing or examination.

B. All tests of materials furnished by the Contractor shall be made in accordance with the commonly recognized standards of national technical organizations, and such special methods and tests as are prescribed in the Contract Documents.

C. The Contractor shall furnish such samples of materials as are requested by the Engineer, without charge. No material shall be used until the Engineer has had the opportunity to test or examine such materials. Samples will be secured and tested whenever necessary to determine the quality of the material. Samples and test specimens prepared at the jobsite, such as concrete test cylinders, shall be taken or prepared by the Engineer, or his designated representative, in the presence and with the assistance of the Contractor.

1.5 SUBMITTALS

A. Material Submittals shall be made in accordance with Section on Submittals.

1.6 INSPECTION OF MATERIALS BY THE CONTRACTOR

A. Contractor shall make a close inspection of all materials as delivered, and shall promptly return all defective materials without waiting for their rejection by the Engineer.

1.7 CERTIFICATES OF COMPLIANCE

A. A Certificate of Compliance may be required for certain materials and equipment that become final products of the completed Work.
Certificates of Compliance shall be furnished prior to the use of any materials for which these Specifications require that such a certificate be furnished. In addition, when so authorized in these Specifications, the Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance.

B. The Certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the Specifications.

C. A Certificate of Compliance shall be furnished with each lot of material delivered to the Work and the lot so certified shall be clearly identified in the certificate.

D. All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Plans and Specifications and any such material not conforming to such requirements will be subject to rejection whether in place or not.

E. The District reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

1. The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.

1.8 MANUFACTURER TESTING

A. At the option of the Engineer, materials and equipment to be supplied under this Contract will be tested and inspected either at their place of origin or at the site of the Work. The Contractor shall give the Engineer written notification well in advance of actual readiness of materials and equipment to be tested and inspected at point of origin.

1. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the materials and equipment nor shall such tests and inspections preclude retesting or re-inspection at the site of the Work.

2. Materials and equipment which will require testing and inspection at the place of origin shall not be shipped prior to such testing and inspection.
1.9 MANUFACTURERS' RECOMMENDATIONS

A. All equipment specified and used in the project shall be installed in accordance with the approved manufacturer's current written recommendations.

B. All such equipment, material, etc., shall be of the manufacturer's latest system or line.

1.10 SUBSTITUTIONS

A. Conditions: Contractor's substitutions shall be considered when one or more conditions are satisfied, as determined by the Engineer. (The Contractor's submittal and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.)

1. Extensive revisions to Contract Documents are not required.

2. Proposed changes are in keeping with the general intent of the Contract Documents.

3. Request is timely, fully documented and properly submitted.

4. Request is directly related to an "or equal" clause or similar language in the Contract Documents.

5. The specified product or method of construction cannot be provided within the Contract Time. The request shall not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.

6. The specified product or method of construction cannot receive necessary approval by governing authority, and the requested substitution can.

7. Substantial advantage is offered the District, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the District may be required to bear.

   a. Additional responsibilities for the District may include additional compensation to the Engineer for redesign and
evaluation services, increased cost of other construction by the District or separate Contractors, and similar considerations.

b. Contractor shall provide all data in support of any proposed substitute or “or-equal” at Contractor’s expense.

8. Specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.

9. Specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.

10. Specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

1.11 SUBSTITUTION REQUEST FORM

A. Use Substitution Request Form (see below).

B. Submit one form (1 copy) for each request.
SUBSTITUTION REQUEST FORM

TO: _____________________________________________________________

PROJECT: _______________________________________________________

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

SECTION: PARAGRAPH: SPECIFIED ITEM:

_________________________________________ _______________________

Proposed Substitution:

______________________________________________________________

Attach: 1) Complete technical data, including laboratory tests, if applicable.

1) Complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

A. Does the substitution affect dimensions on Drawings?

______________________________________________________________

B. Will the undersigned pay for changes to the project design, including engineering and detailing costs caused by the requested substitution?

______________________________________________________________
C. What affect does substitution have on other trades?

D. Differences between proposed substitution and specified item?

E. Manufacturer's guarantees of the proposed and specified items are:

   ____ Same    _____ Different (explain on attached sheet)
The undersigned states that the function, appearance and quality are equivalent or superior to the specified item.

Submitted By:

Signature_________________________

Firm_____________________________

Address__________________________

Date _______________________________ Telephone ____________

For Use by Design Consultant

Accepted
Accepted as
Noted Not
Accepted
Received Late
By__________

Remarks__________

Date__________
DEFINITIONS AND ABBREVIATIONS:

1.1 DEFINITIONS AND TERMS

A. Whenever in these Specifications, or in other Contract Documents, the following terms are used, the intent and meaning shall be interpreted as follows:

1. **Board**: Golden Empire Transit Board

2. **Calendar Day**: Every day shown on the calendar.

3. **Contractor**: The word “Contractor” means the person, firm or corporation to whom the award is made. Subcontractors as such will not be recognized.

4. **Contract Unit Price**: The Contractor’s original bid for a single unit of an item of work in the Proposal.

5. **Contract Time**: The number of calendar days for completion of the Work, including authorized time extensions. In the event a calendar date is specified for Project completion in lieu of a number of calendar days, the Work shall be completed by that calendar date. The Contract Time shall be computed by excluding the first and including the last day; and if the last day be Sunday or a legal holiday, that shall be excluded.


7. **Equipment**: (Construction) - All machinery and equipment, together with the necessary supplies for upkeep and maintenance, and also tools and apparatus necessary for the proper construction and acceptable completion of work. (Installed) - All material or articles used in equipping a facility as furnishings or apparatus to fulfill a functional design.

8. **General Conditions**: As specified in GET General Conditions.

9. **GET**: Golden Empire Transit

10. **General Requirements**: All specifications contained in Division 1.
11. **Notice**: Any notice allowed or required to be given by the Owner may be given by the Engineer.

12. **Owner**: GET

13. **Person**: Any individual, association, partnership, corporation, trust, joint venture or other legal entity.

14. **Plans**: The drawings, profiles, cross-sections, working drawings and supplemental drawings, or reproduction thereof, approved by the Engineer, which show the location, character, dimensions or details of the work.

15. **Proposal**: The offer of a Bidder when submitted on the Proposal form; properly signed and guaranteed.

16. **Reference Documents**: Bulletins, Rules, Methods of Analysis or Test, Codes, Standards, and Specifications of public or private agencies, Engineer Societies, or Industrial Associations. Reference shall be to the latest edition thereof, including Amendments, which are in effect and published at the time the Request for Bids is issued, unless a specific edition is identified, in which case reference shall be to such specific edition. Reference Documents are intended to amplify the descriptions of materials, equipment, and construction systems and are to be considered a part of the Contract Documents insofar as the various sections thereof are referred to hereinafter. Examples of Reference Documents are Federal Specifications, State Standard Specifications, and those of American Society of Testing Materials (ASTM), American National Standards Institute (ANSI), American Standards Associations (ASA), and American Concrete Institute (ACI).

17. **Salvage**: The protection storage, and/or removal of specified existing equipment, parts or materials during the work for retention and later use by the Owner.

18. **Sanitary Sewer**: Any conduit and appurtenances intended for the reception and transfer of sewage.

19. **State**: The State of California.

21. **State Standard Specifications**: Standard Specifications for the project are those entitled "Standard Specifications, State of California, Business and Transportation Agency, Department of Transportation", current version, hereinafter referred to as the State Standard Specifications. These Specifications are to be considered a part of the Contract Documents insofar as they are not superseded by other provisions contained in Divisions 0 through 48 of these Specifications.

22. **Storm Sewer**: Any conduit and appurtenances intended for the reception and transfer of storm water.

23. **Street**: Any public road, highway, parkway, freeway, alley, walk or right-of-way.

24. **Surety**: Any individual, firm or corporation bound with and for the Contractor for the acceptable performance, execution and completion of the Work, and for the satisfaction of all obligations incurred.

25. **Utility**: Tracks, overhead of underground wires, pipelines, conduits, ducts or structures, sewers of storm drains owned, operated or maintained in or across a public right-of-way or private easement.

26. **Water Main**: Any conduit and appurtenances intended for the distribution of water.

27. **Working Day**: Any weekday (Monday through Friday), not a designated national holiday, during which weather allows the Contractor to work four or more hours consecutively, starting no later than 10:00 AM.

1.2 **REFERENCED STANDARDS**

A. The standards referred to, except as modified, shall have full force and effect as though printed in this Specification, and shall be the latest edition or revision thereof in effect on the bid opening date, unless a particular edition or issue is indicated. Copies of these standards are not available from the Owner. The Engineer will furnish, upon request, information as to how copies may be obtained.
1.3 LIST OF ABBREVIATIONS

A. Abbreviations and terms, or pronouns in place of them, shall be interpreted as follows:

AA    Aluminum Association
AABC  Associated Air Balance Council
AAMA  Architectural Aluminum Manufacturers Association
AASHTO American Association of State Highway and Transportation Officials
ABMA  American Boiler Manufacturers Association
ACI   American Concrete Institute
ACPA  American Concrete Pipe Association
ADC   Air Diffusion Council
AEIC  Association of Edison Illuminating Companies
AFBMA Antifriction Bearing Manufacturers Association
AGA   American Gas Association
AGMA  American Gear Manufacturers Association
AHA   American Hardboard Association
AI    Asphalt Institute
AIA   American Institute of Architects
AISC  American Institute of Steel Construction
AISI  American Iron and Steel Institute
AITC  American Institute of Timber Construction
AMCA  Air Moving and Conditioning Association
ANSI  American National Standards Institute
APA American Plywood Association
API American Petroleum Institute
APWA American Public Works Association
ARI American Refrigeration Institute
ASA (now U.S.A.S.I., USA Standards Institute) Association & its Standard Specifications
ASAHC American Society of Architectural Hardware Consultants
ASCE American Society of Civil Engineers
ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME American Society of Mechanical Engineers
ASSE American Society of Sanitary Engineers
ASTM American Society for Testing and Materials
AWG American Wire Gage
AWI Architectural Woodwork Institute
AWPA American Wood-Preservers' Association
AWS American Welding Society
AWWA American Water Works Association

BHMA Builders Hardware Manufacturers Association
BIA Brick Institute of America (formerly SCPI)

CAL/OSHA California Occupational Safety and Health Administration
CALTRANS California Department of Transportation
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CBC</td>
<td>California Building Code</td>
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<tr>
<td>CCR</td>
<td>California Codes of Regulations</td>
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<tr>
<td>CDA</td>
<td>Copper Development Association</td>
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<tr>
<td>CEC</td>
<td>California Electrical Code</td>
</tr>
<tr>
<td>CEQA</td>
<td>California Environmental Quality Act</td>
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<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
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<tr>
<td>CISPI</td>
<td>Cast Iron Soil Pipe Institute</td>
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<tr>
<td>CMAA</td>
<td>Crane Manufacturers Association of America</td>
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<tr>
<td>CMC</td>
<td>California Mechanical Code</td>
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<tr>
<td>CPC</td>
<td>California Plumbing Code</td>
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<tr>
<td>CRA</td>
<td>California Redwood Association</td>
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<tr>
<td>CRSI</td>
<td>Concrete Reinforcing Steel Institute</td>
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<tr>
<td>CS</td>
<td>Commercial Standard (U.S. Department of Commerce)</td>
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<tr>
<td>DHI</td>
<td>Door and Hardware Institute</td>
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<tr>
<td>DIPRA</td>
<td>Ductile Iron Pipe Research Association</td>
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<tr>
<td>EEI</td>
<td>Edison Electric Institute</td>
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<tr>
<td>EJCDC</td>
<td>Engineers' Joint Contract Documents Committee</td>
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<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>FED SPEC</td>
<td>Federal Specification</td>
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<tr>
<td>FCI</td>
<td>Fluid Controls Institute</td>
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<tr>
<td>FGMA</td>
<td>Flat Glass Marketing Association</td>
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<td>FIA</td>
<td>Factory Insurance Association</td>
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<td>FM</td>
<td>Factory Mutual</td>
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<tr>
<td>FSA</td>
<td>Fluid Sealing Association</td>
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<tr>
<td>FTI</td>
<td>Facing Tile Institute</td>
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<tr>
<td>HEI</td>
<td>Heat Exchange Institute</td>
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<tr>
<td>HMI</td>
<td>Hoist Manufacturers Institute</td>
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<tr>
<td>HPMA</td>
<td>Hardwood Plywood Manufacturers Association</td>
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<tr>
<td>HTI</td>
<td>Hand Tools Institute</td>
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<tr>
<td>ICBO</td>
<td>International Conference of Building Officials</td>
</tr>
<tr>
<td>I-B-R</td>
<td>Institute of Boiler and Radiator Manufacturers</td>
</tr>
<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
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<tr>
<td>IES</td>
<td>Illuminating Engineering Society</td>
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<tr>
<td>IFI</td>
<td>Industrial Fasteners Institute</td>
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<tr>
<td>IPCEA</td>
<td>Insulated Power Cable Engineers Association</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>ISA</td>
<td>Instrument Society of America</td>
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<tr>
<td>JIC</td>
<td>Joint International Conference (Hydraulic Institute)</td>
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<tr>
<td>MHI</td>
<td>Materials Handling Institute</td>
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<tr>
<td>MIL</td>
<td>Military Specification</td>
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<tr>
<td>MMA</td>
<td>Monorail Manufacturers Association</td>
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<tr>
<td>MSS</td>
<td>Manufacturers' Standardization Society</td>
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<tr>
<td>NAAMM</td>
<td>National Association of Architectural Metals Manufacturers</td>
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<tr>
<td>NACE</td>
<td>National Association of Corrosion Engineers.</td>
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<tr>
<td>MBBPVI</td>
<td>National Board of Boiler and Pressure Vessel Inspectors</td>
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<tr>
<td>NBHA</td>
<td>National Builders Hardware Association</td>
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<tr>
<td>NCSPA</td>
<td>National Corrugated Steel Pipe Association</td>
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<tr>
<td>NEC</td>
<td>National Electrical Code</td>
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<tr>
<td>NECA</td>
<td>National Electrical Contractors Association</td>
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<tr>
<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
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<tr>
<td>NEMI</td>
<td>National Elevator Manufacturing Industry</td>
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<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
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<tr>
<td>NIST</td>
<td>National Institute of Standards and Technology</td>
</tr>
<tr>
<td>NLA</td>
<td>National Lime Association</td>
</tr>
<tr>
<td>NPC</td>
<td>National Plumbing Code</td>
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</tbody>
</table>
NPT National Pipe Thread
NRCA National Roofing Contractors' Association
NRMCA National Ready Mixed Concrete Association
NSC National Safety Council
NSF National Sanitation Foundation
NTMA National Terrazzo and Mosaic Association
NWMA National Woodwork Manufacturers Association
OSHA Occupational Safety and Health Administration
PCA Portland Cement Association
PCI Prestressed Concrete Institute
PDI Plumbing and Drainage Institute
PFI Pipe Fabrication Institute
PS Product Standard
RTI Resilient Tile Institute
(formerly AVATI)
SAE Society of Automotive Engineers
SCPRF Structural Clay Products Research Foundation
SI International Systems of Units (Metric)
SIGMA Sealed Insulating Glass Manufacturers Association
SFPA Southern Forest Products Association
SJI Steel Joist Institute
SMA Screen Manufacturers Association
SMACNA Sheet Metal and Air Conditioning Contractors National Association
SPFA Steel Plate Fabricators Association
SPI Society of the Plastics Industry
SPTA Southern Pressure Treaters Association
SSI Scaffolding and Shoring Institute
SSPC Steel Structures Painting Council
SSPWC Standard Specifications for Public Works Construction (Greenbook)
UL Underwriters' Laboratories
UPC Uniform Plumbing Code
USBR U.S. Bureau of Reclamation
USGS United States Geological Survey
WCLA West Coast Lumbermen's Association (Std. Grading and Dressing Rule)
WCLIB West Coast Lumber Inspection Bureau
WIC Woodwork Institute of California
WRI Wire Reinforcement Institute, Inc.
WWPA Western Wood Products Association
QUALITY CONTROL AND TESTING:

1.1 NOTICE OF DEFECTS

A. Prompt notice of all defective Work of which the District or Engineer has actual knowledge will be given to Contractor.

B. All defective Work may be rejected, corrected, or accepted, at the discretion of the District and Engineer.

1.2 ACCESS TO WORK

A. The District, Engineer, their consultants and other representatives and personnel of the District, independent testing laboratories, and governmental agencies with jurisdictional interests shall have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor’s Site safety procedures and programs so that they may comply therewith.

1.3 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be subject to the requirements of Section on Materials and Substitutions.

1.4 PROJECT SITE TESTING

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Except for specified material suitability tests, all initial routine tests of materials shall be at the expense of the District and shall be performed by an independent certified laboratory designated by the District. Whenever a specified percent relative compaction test is required and the material or portion thereof so tested fails to meet or exceed the relative compaction specified, all subsequent retesting shall be performed the District’s lab at the expense of the Contractor.

C. All material suitability tests shall be at the expense of the Contractor. Testing shall be by an independent certified laboratory approved by the Engineer.
1.5 **TEST STANDARDS**

A. All sampling, specimen preparation, and testing of materials shall be in accordance with the standards of nationally recognized technical organizations.

B. The physical characteristics of all materials not particularly specified shall conform to the latest standards published by the ASTM, where applicable.

1.6 **UNCOVERING WORK**

A. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without concurrence of Engineer, it must, if requested by Engineer, be uncovered for Engineer’s observation and recovered at Contractor’s expense.

B. If Engineer considers it necessary or advisable that covered Work be re-observed by Engineer or inspected or tested by others, Contractor, at Engineer’s request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall promptly correct said defects, including all work involved in uncovering and recovering the work, at no cost to the Owner.

2. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction.

1.7 **CORRECTION OR REMOVAL OF DEFECTIVE OR REJECTED WORK**

A. Upon receipt of notice, Contractor shall correct all defective or rejected Work and replace it with Work that is not defective, at no cost to the Owner.

1.8 **ACCEPTANCE OF DEFECTIVE WORK**

A. If, instead of requiring correction or removal and replacement of defective Work, the District prefers to accept it, the District may do so.

1. If any such acceptance occurs, a Change Order will be issued incorporating the necessary revisions in the Contract Documents
with respect to the Work, and the District shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted.

2. Engineer shall determine the reasonableness of the diminished value of Work so accepted and Contractor shall pay all costs involved in making such determination.

TEMPORARY FACILITIES:

1.1 GENERAL

A. The Contractor shall provide all temporary facilities and utilities required for completion of the Work as well as safety precautions and programs. No attempt is made to set out in detail the Contractor's means or methods necessary to accomplish the tasks involved.

1.2 TEMPORARY UTILITIES

A. Water

1. The Contractor may make arrangements with the Owner to use municipal water where appropriate during construction. See Watering Section of these specifications for details.

2. Water used for human consumption shall be kept free from contamination and shall conform to the requirements of the State and local authorities for potable water.

B. Sanitary Facilities

1. The Contractor shall provide suitable and adequate sanitary conveniences for the use of his staff at the site of the Work. Such conveniences shall include chemical toilets or water closets and shall be located at appropriate locations at the site of the Work. All sanitary conveniences shall conform to the regulations of the public authority having jurisdiction over such matters. At the completion of the Work, all such sanitary conveniences shall be removed and the site left in a sanitary condition.

2. With respect to sanitation facilities, the Contractor shall cooperate with and follow directions of representatives of the Public Health Service and the State. State and County Public Health Service
representatives shall have access to the Work, whether it is in preparation or progress, and the Contractor shall provide facilities for such access and inspection.

1.3 TEMPORARY CONSTRUCTION FACILITIES

A. Construction hoists, shoring, and similar temporary facilities shall be of ample size and capacity to adequately support and move the loads to which they will be subjected. Railings, enclosures, safety devices, and controls required by law or for adequate protection of life and property shall be provided.

B. Temporary supports shall be designed with an adequate safety factor to assure adequate load bearing capability. The Contractor shall submit design calculations prepared by a professional registered engineer for staging and shoring prior to application of loads.

C. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations from one hour before sunset each day to one hour after sunrise of the next day until such excavation is entirely refilled, compacted, and paved. All excavations shall be barricaded in such a manner as to prevent person from falling, walking, or otherwise entering any excavation in any street, roadway, parking lot, treatment plant, or any other area, public or private.

D. The Contractor shall adequately identify and guard all hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. Such devices shall, as a minimum, conform to the requirements of Cal/OSHA.

E. At such time or times any temporary construction facilities and utilities are no longer required for the work, the Contractor shall notify the Engineer of his intent and schedule for removal of the temporary facilities and utilities, and obtain the Engineer's approval before removing the same. As approved, the Contractor shall remove the temporary facilities and utilities from the site as his property and leave the site in such condition as specified, as directed by the Engineer, and/or as indicated on the Plans.

1.4 ACCESS ROADS AND STAGING AREA

A. Adequately access shall be maintained to all storage areas and other areas to which frequent access is required. The Contractor shall limit the location of his storage of equipment and materials outside of the project
The Contractor shall make his own arrangements for space that may be required and bear all associated costs. The Contractor shall provide any temporary storage required for the protection of equipment and materials as recommended by manufacturers of such materials.

B. Storage and protection:

1. Materials and equipment shall be stored in accordance with supplier's written instructions, with seals and labels intact and legible. Exposed metal surfaces of valves, fittings and similar materials shall be coated with accordance with manufacturer’s recommendations to prevent corrosion.

2. Storage shall be arranged to provide access for inspection. The Contractor shall periodically inspect to assure materials and equipment are undamaged and are maintained under required conditions.

WATERING:

1.1 WORK INCLUDED

A. The work of this section consists of furnishing, hauling, and applying water required for compaction of embankments, backfills, subgrade, and base course, and for landscaping, and other construction operation.

1.2 RELATED WORK

A. Section on Temporary Facilities

B. Section on Dust Control

1.3 REFERENCES

A. State Standard Specifications Watering Section

PART 2 PRODUCTS

2.1 WATER

A. Free of debris, organic matter, and other objectionable substances.
PART 3 EXECUTION

3.1 WATER TRUCK

A. At least 1,000-gallon capacity.

B. Keep at least one water truck on site at all times, unless Engineer approves removal of the truck from the site before final completion.

3.2 APPLICATION

A. Use pressure type distributors or a pipeline equipped with sprinkler system. Provide approved meter devices near points of discharge.

B. Ensure a uniform application of water for optimum moisture content. Avoid excessive runoff and minimize water waste.

C. The Contractor may water excavation areas before excavating. Drill full depth of excavation to make moisture determinations.

D. If over watering occurs, de-water at no additional expense to the Owner.

3.3 SPECIAL CONTROLS

The Contractor shall take all reasonable means to minimize inconvenience and injury to the public by dust, noise, diversion of storm water, or other agencies under his control.

A. Dust Control

1. As specified in Dust Control Section

B. Water

1. The Contractor shall pay for and shall construct all facilities necessary to furnish water for his use during construction. The Contractor shall pay for all water used for the Contractor’s operations prior to final acceptance. The Contractor may make arrangements with the Owner to use non-potable well water or treated effluent where appropriate during construction.

2. Water used for human consumption shall be kept free from contamination and shall conform to the requirements of the State and local authorities for potable water.
3. Full compensation for furnishing all labor, materials, tools and equipment and for doing all work involved in furnishing and applying water as required by the Contract Documents and Specifications, State Standard Specifications, shall be considered as included in the contract unit prices paid for other items of work and no additional allowance will be made therefore.

CULTURAL AND ARCHEOLOGICAL COMPLIANCE:

1.1 CULTURAL RESOURCES

A. The California Public Resources Code Chapter 1.7, Section 5097.5 makes it a misdemeanor for anyone to knowingly disturb an archaeological historical feature. California Public Resources Code Sections 5097.98 and 5097.99 require protection of Native American remains which may be found and outlines procedures for handling any burials found.

B. The California Administrative Code, Title 14, Section 4308, requires that no person disfigure any object of historical interest or value. The California Penal Code, Title 14, Part 1, Section 622-1/2 makes it a misdemeanor to destroy anything of historical value within any public place.

C. Should human skeletal material or archaeological remains be found during construction activities, all work must be halted within thirty (30) meters of the find. The Contractor shall notify the Engineer immediately. Construction activities within thirty (30) meters of the find shall remain halted until the Contractor has been notified that construction in the vicinity of the find may resume. If, in the opinion of the Engineer, the Contractor's operations are delayed or interfered with due to investigations made of the archaeological find, GET will compensate the Contractor for such delays to the extent provided in Delays section of the State Standard Specifications.

1.2 ARCHEOLOGICAL MONITORING

A. The Contractor's attention is directed to the designated Environmentally Sensitive Areas (ESA) shown on the plans.

1. Within the boundaries of an ESA, as indicated on the project plans, or where designated by the Engineer, no construction or related activities, which may involve ground disturbance, are
permitted without the presence of the designated Department archaeological monitor and Native American observer.

2. Ground disturbance includes, but is not limited to, excavation, scarification of ground surface, clearing and grubbing, grading, and auger borings.

B. The Contractor shall notify the Engineer at least ten (10) days in advance of commencing any work within the ESA. The notification shall include a schedule of the hours and days to be worked, including Saturdays, Sundays and holidays.

C. The Contractor shall notify the Engineer of a meeting that the Contractor or other officer of his organization will be required to establish and participate in.

The meeting will be assembled prior to the start of work on this contract, to delineate the location of the ESA on the ground and to introduce the Department monitor and Native American observer. The Contractor shall be responsible for scheduling said meeting adequately in advance of commencing construction operations, in order to comply with other requirements specified herein. The meeting shall be between 8:00 AM and 3:00 PM, Monday through Friday, except legal holidays. The Contractor shall submit a written request for said meeting to the Engineer not less than five (5) days in advance of the day and time of the meeting. Additional items of discussion at the meeting shall include:

1. To have the Engineer inform the Contractor in the field of the archaeological resources located within or adjacent to the project work area.

2. To define cultural resources and to discuss action to take if cultural resources are found during construction activities.

3. To discuss laws regulating protection of cultural resources

4. To discuss communication protocol between the engineer, contractor, archaeological monitor, and Native American observer.

D. The monitors, including the Native American observer, have the authority to halt construction operations in the vicinity of an archaeological find, if significant or potentially significant cultural resources are exposed or adversely affected by construction operations. Work cannot resume without the express written
authorization from the Engineer.

E. Should human skeletal material or other archaeological finds be uncovered, the Contractor's construction activities, within thirty (30) meters of the find, shall be halted immediately and shall not be resumed until permitted, in writing, by the Engineer.

F. In the event that any skeletal remain or artifact is found, and if in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of the skeletal remain or artifact being found, the State will compensate the Contractor for such delays to the extent provided for in Sections 8-1.07, "Delays," of the State Standard Specifications, and not otherwise.

G. GET reserves the right to use other forces for exploratory work to identify the extent of areas requiring archaeological evaluation or recovery.

H. Contractor labor, equipment and materials required to assist the archaeologist shall be paid as extra work as provided in Section 4-1.06 of the State Standard Specifications.

EROSION CONTROL:

1.1 WORK INCLUDED

A. The work of this section consists of protecting from erosion all areas disturbed by new construction and construction operations, including areas disturbed by demolition, earthwork, and fence, piping, and equipment installation.

1.2 RELATED WORK

Dust Control Section

1.3 SUBMITTALS

A. As specified in Submittal Procedures Section

B. One-bale of proposed straw.

2.1 RICE STRAW

A. Sterile rice straw.
3.1 PREPARATION
A. Loosen areas to be protected by raking or other approved method before application. Maintain grading and drainage patterns.

3.2 PLACING STRAW
A. Exercise particular care to ensure application is made uniformly.
B. The Contractor shall install and maintain protected areas as required by the Storm Water Pollution Prevention Plan.

3.3 ACCEPTANCE
A. Application will be considered complete when all soil disturbing activities are completed and all unpaved disturbed areas have an even application of straw. No gaps (larger than 6 inches x 6 inches) will be permitted.

STORM WATER POLLUTION PREVENTION PLAN:

1.1 WORK INCLUDES
A. The Project disturbed area is understood to be less than 1-acre, therefore CalGreen Building Code Requirements apply. The Contractor shall implement storm water pollution prevention measures as prescribed in the Legally Responsible Person’s approved Good Housekeeping Plan (GHP) to prevent sediment and/or pollutants from entering storm drains, streams, or water bodies throughout the duration of the Work in compliance with the permit requirements. Work shall be performed in accordance with all Federal, State, and local regulations.

B. The Contractor shall during construction install temporary measures, maintain the measures, remove of all temporary measures, and install permanent erosion and sediment control measures, in accordance with the requirements of the Contract Documents.

1. The Legally Responsible Party (LRP) is Golden Empire Transit District
2. The Approved Signatory for the LRP is Mr. Chris James.

C. Penalties: Failure to comply with this Section may result in significant fines and possible imprisonment. The Regional Water Quality Control Board (RWQCB) or other prosecuting authority may assess fines for each violation. Should the District be fined or penalized as a result of the Contractor failing to comply with this Section and applicable permit requirements, the Contractor shall reimburse the District for any and all
fines, penalties and related costs.

D. All costs for work required for compliance with this Section shall be included in the price bid for the various items of work.

1.2 SUBMITTALS

A. As specified in Submittal Procedures.

A. Submittals under this section shall be completed and submitted at least three weeks prior to beginning work and within 10 days of issuance of the Notice to Proceed.

1. The Contractor shall provide a notice of concurrence with the Good Housekeeping Plan, demonstrating pollution prevention measures and steps to be taken to ensure no pollutant discharges from the project site, located in the Appendix C. All documents shall be kept onsite in either a job trailer or accessible lockbox.

1.3 QUALITY ASSURANCE

At minimum, the following measures shall be taken to help ensure control of storm water and non-storm water pollution. These measures shall not be construed to limit or override the measures set forth and called for in the GHP.

A. Control the rate and effect of dewatering in such a manner as to avoid all objectionable settlement and subsidence and to assure the integrity of the finished work.

B. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, establish reference points and observe at frequent intervals to detect any settlement that may develop. Conduct the dewatering operation in a manner that protects adjacent natural resources and facilities. Cost of repairing all damage to adjacent resources and facilities shall be the sole responsibility of the Contractor.

C. Before commencing grading, excavation or filling in any part of the site, Contractor shall construct swales, diversion channels, inlet protection barriers, sedimentation traps, and other measures to guide runoff away from the work area and to capture eroded material before it reaches natural water courses. The measures shall be in accordance with the approved storm water pollution prevention plans.

D. Arrange demolition activities to minimize erosion to the maximum practical extent. Clearing, excavation, and grading shall be limited to
those areas of the Project site necessary for demolition. Minimize the area exposed and unprotected.

E. Clearly mark and delineate the work limits activities. Equipment shall not be allowed to operate outside the limits of work or to disturb existing vegetation. Excavation and grading shall be completed during the dry season to the maximum extent possible.

1.4 GENERAL REQUIREMENTS

A. The Contractor shall exercise care in preserving vegetation and protecting property, to avoid disturbing areas beyond the limits of the Work and promptly repair any damage caused by Contractor operations.

B. The Contractor shall provide all necessary water pollution control devices to prevent, control, and abate water pollution, and implement good housekeeping pollution control measures to reduce the discharge of pollutants from the Site to the maximum extent practicable. These water pollution control devices include structural BMPs, drains, gutters, slope protection blankets and retention basins and shall be constructed concurrently with other Work at the earliest practicable time.

C. Stockpiles of earth and other construction-related materials shall be protected from being transported from the Site by wind or water using covers or equivalent.

D. The Contractor shall properly store and handle fuels, oils, solvents, and other toxic materials in a manner not to contaminate the soil or surface waters, enter the groundwater, or be placed where they may enter a live stream, channel, drain, or other water conveyance facilities. All approved toxic storage containers shall be protected from weather. Spills shall be cleaned immediately, and soiled materials shall be properly disposed of. Spills shall not be washed into live streams, channels, drains, storm drains, or other water conveyance facilities.

E. Excess or waste concrete shall not be washed into the public way or any drainage systems. The concrete wastes shall be retained on-site until they can be appropriately disposed of or recycled. Concrete wastes shall not be washed into live streams, channels, drains, storm drains, other water conveyance facilities, bare ground or unapproved concrete washout containment areas.

F. Non-stormwater runoff from equipment washing, vehicle washing, and any other activities shall be contained at the work site and properly disposed of. Non-stormwater runoff shall not be allowed to enter live
streams, channels, drains, storm drains, or other water conveyance facilities.

G. The Contractor shall prevent sediments and other materials to be tracked from the Site by vehicle traffic. Construction entrance roadways shall be stabilized to inhibit sediments from being deposited onto public ways. The Contractor shall immediately sweep up accidental depositions and not allow depositions to be washed away by rain or by any other means.

1.5 REGULATORY REQUIREMENTS

A. The Contractor shall comply with the requirements of the State Water Resources Control Board (SWRCB), RWQCB, California Administrative Code, California Building Code, Owner and any other agencies having jurisdiction in storm water and non-storm water discharges and waste management.

1.6 GOOD HOUSEKEEPING PLAN IMPLEMENTATION

A. General Requirements:

1. Implementation of all BMPs shall be overseen by trained personnel employed or retained by the Contractor.

2. Any required site monitoring and water testing, as necessary, shall be overseen by trained personnel employed or retained by the Contractor.

3. All erosion and sediment control measures shall be implemented as specified in the Good Housekeeping Plan.

4. A copy of the Good Housekeeping Plan, including working details (fact sheets) for construction site BMPs and applicable amendments, shall be kept and maintained by the Contractor on the construction site and continuously updated to reflect current site conditions throughout the duration of the project.

B. The Contractor shall implement all activities required by the GHP. The GHP shall identify applicable best management practices (BMPs). All stormwater or non-stormwater pollution prevention activities specified in the SWPPP shall comply with the guidance provided in the “Stormwater Best Management Practice Handbook, Construction,” November 2009 or more current edition, published by the California Stormwater Quality Association (CASQA).
2.1 GENERAL

A. Materials furnished for BMPs shall meet the requirements of the California Stormwater Quality Association, Stormwater Best Management Practice Handbook, Construction – November 2009 edition (or most current version) unless otherwise indicated.

B. Before the work begins, sufficient equipment shall be available on the site to assure that the operation and adequacy of the erosion control plans can be continuously maintained.

3.1 GENERAL DESCRIPTION

A. The Contractor shall install and maintain all pollution, erosion, and sediment control measures in accordance the approved Good Housekeeping Plan.

B. Sediment transport and erosion from working stockpiles shall be controlled and restricted from moving beyond the immediately stockpile area by implementing applicable BMPs, including but not limited to construction of temporary toeof-slope ditches and accompanying silt fences as necessary. If the BMPs proposed in the GHP prove inadequate to control sediment transport and erosion on the Site, the Contractor shall without delay implement additional provisions to obtain effective control. The GHP shall be updated to reflect the necessary changes as discussed in paragraph 1.6 above.

C. The Contractor shall be responsible for taking the proper actions to prevent contaminants and sediments from leaving the project Site. The Contractor shall take immediate action if directed by the Construction Manager/LRP, or if the Contractor observes contaminants and/or sediments entering the storm drainage system, to prevent further stormwater from entering the system.

3.2 NOTIFICATION AND REPORTING

A. If non-stormwater pollution occurs in the work area for any reason or when the Contractor becomes aware of any violation of this Section, the Contractor shall correct the problem and shall follow the requirements of the GHP for monitoring, control and reporting of non-stormwater discharges.
3.3 FIELD QUALITY CONTROL

A. The Contractor shall maintain the BMPs and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures.

3.4 RECORDS

A. The Contractor shall retain records/copies of notifications of non-compliance; training, incidents such as spills or other releases, including photographs as available; sampling and analysis of discharges discovered through visual monitoring, maintenance and repair activities that have been implemented.

3.5 MAINTENANCE OF TEMPORARY FACILITIES

A. Inspect erosion and sediment control structures daily, including site exit locations.

B. Sediment shall be removed from behind run off control structures after each storm, or as directed by the Engineer or LRP.

C. If areas are seeded, Contractor shall examine those areas during and after major storms to check that grass is becoming established.

3.6 DISPOSAL OF SEDIMENT FROM STORM WATER POLLUTION CONTROL STRUCTURES

A. Sediment excavated from temporary sediment control structures shall be disposed on the site with general fill or with topsoil. Sediment shall be allowed to dry out as required before reuse. All trash shall be removed before reuse.

B. Contractor shall place the sediment removed from traps and other structures where it will not enter a storm drain or water course and where it will not immediately reenter the basin.

3.7 REMOVAL OF TEMPORARY STORM WATER POLLUTION CONTROL MEASURES

A. Temporary control measures shall be removed once all drainage area ground disturbance is completed, permanent drainage works have been constructed and full stabilization is achieved. Contractor shall not breach any temporary control structures until the associated catchment area is complete unless approved by the Engineer.
DUCT CONTROL:

1.1 WORK INCLUDED

A. The work of this section consists of implementing measures to prevent air pollution during construction activities, in accordance with Federal, State, and local regulations. A formal Dust Control Plan (DCP) is not necessary however dust control must be enforced. A DCP can be required by the Owner and/or Engineer, should it be determined necessary during construction activities.

1.2 RELATED WORK

A. Section on Temporary Facilities
B. Section on Watering
C. Division 02 – Existing Conditions
D. Division 31 – Earthwork

1.3 REFERENCES

A. San Joaquin Air Pollution Control District (SJVAPCD) Regulation VIII.
   A. Construction Notification Form, District Rule 8021.

1.4 SUBMITTALS

A. As specified in Section on Submittal Procedures.
B. Submit, prior to beginning work and within 10 days of issuance of the Notice to Proceed the completed Construction Notification Form. The Notification Form shall show proposed timelines to be checked by the Engineer prior to submittal to the SJVAPCD for review and approval.

1.5 QUALITY ASSURANCE

A. Control the rate and effect of watering in such a manner as to avoid all objectionable settlement and subsidence as approved by the Engineer and to assure the integrity of the finished work.
B. Arrange demolition activities to minimize dust to the maximum practical extent. Clearing, excavation, and grading shall be limited to those areas of the Project site necessary for construction. Minimize the area exposed and unprotected.
C. Clearly mark and delineate the work limits activities. Equipment shall not be allowed to operate outside the limits of work or to disturb existing vegetation.

1.6 REGULATORY REQUIREMENTS

A. Contractor shall comply with all provisions of the SJVAPCD regulations, as well as Federal and State regulations.

2.1 EQUIPMENT

A. Before the work begins, sufficient equipment and resources shall be available on the site to assure that the operation and adequacy of the dust control measures can be continuously maintained.

2.2 DUST CONTROL MEASURES

A. Water shall be available to the contractor for dust control as specified in section on Temporary Facilities.

B. Dust Suppressants shall be polymer emulsions or hygroscopic suppressants. Petroleum emulsions and bituminous materials will not be allowed.

1. If dust suppressants other than water are utilized, Contractor shall submit MSDS, Manufacturer’s Usage Instructions, and certification by the manufacturer that the product is safe for ground application.

2. If dust suppressants other than water are utilized, contractor shall notify owner 15 days prior to use for notification to the SJVAPCD.

C. Gravel used for Gravel Pads shall be washed gravel, a minimum of one inch in diameter, and shall be placed a minimum of six inches deep.

3.1 GENERAL DESCRIPTION

A. Dust control measures shall include, but may not be limited to: Water application, dust suppressant application, physical barriers limiting site access, reduction of vehicle speed on site, utilization of gravel pads, utilization of grizzlies, and wheel washers. If physical barriers are utilized, the Engineer shall approve the location, size, and type. Physical barriers shall be removed upon project completion.
B. Furnish, install, maintain, and operate necessary control measures and other equipment necessary to prevent dust. Temporary measures shall be to Contractor's own design and Contractor shall be solely responsible for risks related to the management of dust control during construction.

3.2 MAINTENANCE OF TEMPORARY FACILITIES

A. Inspect dust control facilities daily.

3.3 DISPOSAL OF SOIL FROM PAVED SURFACES AND DUST CONTROL DEVICES

A. Soil excavated from temporary dust control structures shall be disposed on the site with general fill or with topsoil. Soil shall be allowed to dry out as required before reuse. Any trash shall be removed before reuse.

B. Contractor shall place the sediment removed from traps and other structures where it will not enter immediately reenter the device or paved area.

3.4 REMOVAL OF TEMPORARY DUST CONTROL MEASURES

A. Temporary control measures shall be removed once grading is completed and soils have stabilized.

3.5 RECORD KEEPING

A. Contractor shall keep a copy of the Construction Notification Form, any approved revisions, and all dust control records at the site.

B. Contractor shall furnish upon request by the Owner, Engineer, or SJVAPCD Inspector the Construction Notification Form, approved revisions, and dust control records.

C. Contractor shall maintain dust control records for one year after project completion.

3.6 DUST CONTROL

1. The Contractor shall take whatever steps, procedures, or means as are required to limit dust generated by his operations during the Work, including Saturdays, Sundays, and Holidays. Dust shall be controlled to the standards of the local governing agency or, in the absence of local standards, to the satisfaction of the Engineer. Dust control shall extend to any unpaved road which the Contractor or any of his subcontractors are using, to excavation or fill areas, to
demolition operations, and to other activities. Control shall be by sprinkling, use of dust palliatives, modification of operations, or any other means acceptable to the local governing agency or, in the absence of same, the Engineer.

2. If the dust control is not adequate in the opinion of the Engineer, this work may be done by others, and the respective cost shall be deducted from the total payment due the Contractor.

CONSTRUCTION STAKES, LINES, AND GRADES:

1.1 LINES AND GRADE

A. The Work shall be executed in accordance with the lines and grades indicated in the Contract Documents. Distances and measurements, except elevations and structural dimensions, shall be made on horizontal planes.

1.2 CONSTRUCTION STAKING

A. Engineer or Engineer’s representative will provide project control monuments as shown on the Plans (vertical and horizontal) at the Owner’s expense.

B. All other construction staking necessary for the work shall be done by Contractor.

C. Compensation for Construction Staking shall be included in the price paid for the various items of work listed on the Bidders Proposal.

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL:

1.1 WORK INCLUDED

A. The provisions of this Section apply to newly constructed buildings, building additions of 1,000 square feet or greater, and/or building alterations with a permit valuation of $200,000 or above (for occupancies within the authority of California Building Standards Commission)

B. This section includes administrative and procedural requirements for the following:
1. Recycling nonhazardous demolition and construction waste.

2. Disposing of nonhazardous demolition and construction waste.

C. Related Requirements

1. Comply with local regulations for disposal of waste resulting from site clearing and removal of above- and below-grade improvements.

2. Comply with the local codes and requirements governing construction waste management for municipal construction waste management requirements.

1.2 RELATED WORK

A. Section on Demolition

1.3 REFERENCES

A. California Green Building Standards Code, latest revision.

1.4 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations, including packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition or construction waste and subsequent recycling, salvage, reuse, or disposal, as acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility, or delivery to the Owner as specified in Section on Demolition.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
1.5 PERFORMANCE REQUIREMENTS

A. Recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste, in accordance with the ‘Guide to the 2016 California Green Building Standards Code, Nonresidential”, Section 5.408.1.1, 5.408.1.2, or 5.408.1.3; or meet the local construction and demolition waste management ordinance, whichever is more stringent.

1.6 SUBMITTALS

A. Waste Management Plan

1. Submit Waste Management Plan within 7 days of date established for the Notice to Proceed.

2. The Waste Management Plan shall be prepared in accordance with the California Green Building Standards Code, latest revision, and shall include the following:

   a. Identify the construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project, or salvage for future use or sale.

   b. Indicate if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).

   c. Identify diversion facilities where construction and demolition waste material collected will be taken.

   d. Specify that the amount of construction waste and demolition materials diverted shall be calculated by weight or volume, but not by both.

   e. Construction Waste Management Acknowledgement Form. The Acknowledgement Form shall be signed by all subcontractors, to acknowledge that they have read the Waste Management Plan for the project, they understand the goals of the plan, and agree to follow the procedures described in the plan.

B. Waste Reduction Progress Reports
1. Documentation shall be provided to the Owner, which demonstrates compliance with Sections 5.408.1.1 through 5.408.1.3 of the ‘Guide to the 2016 California Green Building Standards Code, Nonresidential”. The Waste Management Plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.

2. Concurrent with each Application for Payment, submit report. Include the following information, as applicable:
   a. Material type.
   b. Total quantity of waste in tons.
   c. Quantity of waste salvaged, both estimated and actual in tons.
   d. Quantity of waste recycled, both estimated and actual in tons.
   e. Total quantity of waste recovered (salvaged plus recycled) in tons.
   f. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

C. Construction Waste Management Final Report

1. A construction waste management final report containing information and supporting documentation that demonstrates compliance with the Waste Management Plan, shall be provided to the enforcing agency before the final inspection. The required documentation shall include, but is not necessarily limited to, the following:
   a. Documentation of the quantity by weight of each material type diverted or disposed, consistent with the requirements of the approved Waste Management Plan, and receipts or written certification from all facilities and waste management companies utilized to divert or dispose waste generated by the project to substantiate the amounts specified on the construction waste management final report.
   b. For projects that satisfy the waste stream reduction alternative specified in Section 5.408.1.3, documentation of the quantity by weight of each material type disposed and the total combined weight of construction and demolition waste
disposed in landfills as a result of the project, the corresponding pounds disposed per square foot of the building area, and receipts or written certification form all facilities and waste management companies utilized to dispose waste generated by the project that substantiate the amounts specified on the construction waste management final report.

1.7 QUALITY ASSURANCE

A. Waste Management Conference: Contractor will conduct regular meetings at Project site to review methods and procedures related to waste management. Meetings shall be conducted as needed, but not less than one time per month, and shall include, but not be limited to, the following:

1. Review and discuss Waste Management Plan including responsibilities of Contractor and subcontractors.

2. Review requirements for documenting quantities of each type of waste and its disposition.

3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.

4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.

5. Review waste management requirements for each trade.

3.1 PLAN IMPLEMENTATION

A. General: Implement approved Waste Management Plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract, or contract with an acceptable Waste Management firm to pick up and sort construction waste materials for recycling and disposal.

B. Contractor shall be responsible for implementing, monitoring, and reporting status of Waste Management Plan.

1. At the Contractor’s option, they may contract with a qualified Waste Management firm to manage and process the construction waste.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
1. Distribute waste management plan to all subcontractors.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.2 RECYCLING DEMOLITION AND CONSTRUCTION WASTE

A. General: Recycle paper and beverage containers used by on-site workers.

B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

C. Procedures for On-Site Separation: Unless Waste Management firm is coordinating all construction waste recycling and disposal, comply with requirements for separating recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

   a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3. Stockpile materials away from construction area.

4. Store components off the ground and protect from the weather.

5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.3 RECYCLING CONSTRUCTION WASTE

A. Packaging:
1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:
   2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
      a. Comply with requirements in Landscaping Specification Sections for use of clean sawdust as organic mulch.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn wastematerials.

C. Disposal: Remove waste materials from project property and dispose in a legal manner.

3.5 PAYMENT

A. The work under this section will be paid under the various items of work included in the Bid Schedule. Not additional payment shall be made thereto.
CONTRACT CLOSEOUT:

1.1 GENERAL

A. It is the intent of these Contract Documents that the Contractor shall deliver a complete and operable facility capable of performing its intended functions and ready for use.

1.2 CLEANING

A. Throughout the period of construction the Contractor shall keep the Work site free and clean of all rubbish and debris, and shall promptly remove from the site, or from property adjacent to the site of the Work, all unused and rejected materials, surplus earth, concrete, plaster, and debris, excepting select material which may be required for refilling or grading.

1.3 FINAL SITE CLEAN-UP

A. Upon completion of the Work, and prior to final acceptance, the Contractor shall remove from the vicinity of the Work all paint, surplus material, and equipment belonging to him or used under his direction during construction.

B. The Contractor shall restore to original condition not all property designated for alteration by these Contract Documents.

1.4 FINAL BUILDING CLEAN-UP

A. On all building projects and wherever else applicable, besides general broom cleaning, the following special cleaning shall be performed at completion of the Work:

1. Putty stains and paint shall be removed from glass; glass shall be washed and polished, inside and outside. Care shall be exercised so as not to scratch glass.

2. Marks, stains, fingerprints, and other soil and dirt shall be removed from painted, decorated, or stained work.

3. Waxed woodwork shall be cleaned and polished.

4. Hardware shall be cleaned and polished of all traces; this shall include removal of stains, dust, dirt, paints, and blemishes.
5. Spots, soil, paint, plaster, and concrete shall be removed from tile; tile work shall be washed afterwards.

6. Fixtures and equipment shall be cleaned and stains, paint, dirt, and dust shall be removed.

7. Temporary floor protection shall be removed; floors shall be cleaned, waxed, and buffed.

8. Dust, cobwebs, and traces of insects and dirt shall be removed.

1.5 WASTE DISPOSAL

A. The Contractor shall dispose of surplus materials, waste products, demolition materials, and debris. The Contractor shall transport and dispose of waste materials in accordance with applicable laws and regulations.

1.6 PROJECT RECORD DOCUMENTS

A. The Contractor shall maintain at the site, available to the Owner and Engineer, one copy of the Contract Documents, Drawings, Shop Drawings, Change Orders, and other modifications in good order and annotated to show all changes made during construction. These Documents shall be delivered to the Engineer for the Owner upon completion of the Work.

B. Record documents shall be reviewed during progress meetings to ascertain that all changes have been recorded.

C. Store Record Documents separate from documents used for construction.

1.7 TOUCH-UP AND REPAIR

A. The Contractor shall touch-up or repair finished surfaces on structures, equipment, fixtures, or installations that have been damaged prior to final acceptance. Surfaces on which such touch-up or repair cannot be successfully accomplished shall be completely refinished or in the case of hardware and similar small items, the item shall be replaced. Such items shall include, but not be limited to, the following:

1. Road surfaces

2. Exposed structure surfaces
3. Exposed equipment surfaces

4. Exposed piping surfaces

1.8 EQUIPMENT START-UP

A. After all acceptance tests have been completed by the Contractor and Owner but prior to final acceptance, the Contractor shall recheck all equipment for proper alignment and adjustment, check oil levels, re-lubricate all bearings and wearing points, and in general assure that all equipment is in proper condition for continuous operation.

1.9 OPERATION AND MAINTENANCE (O&M) MANUALS

A. See Section 01 33 00 Master List of Submittals.

1.10 FINAL EQUIPMENT CHECK

A. After testing and before acceptance, all equipment shall be test run by the Owner for a minimum of 7 days to ensure proper operation. At the end of the test run each piece of machinery shall be lubricated and all components and couplings checked for proper alignment and adjustment.

B. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.

C. Provide submittals to the Owner required by other governing authorities.

1.11 MANUFACTURER'S CERTIFICATES OF PROPER INSTALLATION

1. The Contractor shall submit manufacturers' certificates of proper installation for all items of equipment.
PROTECTION OF UNDERGROUND FACILITIES AND SURVEY MONUMENTS

1.1 UNDERGROUND FACILITIES

A. **Shown or Indicated**: The information and data shown or indicated in the Contract Documents with respect to existing underground facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such underground facilities, including Owner, or by others.

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. The cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
   
   a. Reviewing and checking all such information and data,
   
   b. Locating all Underground Facilities shown or indicated in the Contract Documents,
   
   c. Coordination of the Work with the owners of such underground facilities, including Owner, during construction, and
   
   d. The safety and protection of all such underground facilities and repairing any damage thereto resulting from the Work.

B. **Not Shown or Indicated**: If an underground facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated with reasonable accuracy in the Contract Documents, the following shall apply.

1. Contractor shall develop and execute a work-plan, subject to Engineer’s approval to protect underground facilities.

2. The Contractor shall expose, prior to staking and trenching, all existing utilities and existing facilities which may control proposed facility grades, and alignment. Two working days notice shall be given to the Engineer prior to commencing this work.

3. Full compensation for all costs involved in locating, verifying, protecting, exposing, and otherwise providing for utilities shall be included in the amounts bid for the various items of work, and no separate payment shall be made therefore.
1.2  PROTECTION

A. The Contractor shall not interrupt the service function or disturb the supporting base of any Utility by disrupting any facility identified in the Plans and Specifications without authority from the Owner or order from the Engineer. Where protection of such facilities is required to ensure support of utilities, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at the Contractor's expense.

B. The Contractor shall be prepared at all times with labor, equipment and materials to make repair on damaged mains or Utility facilities. The Contractor shall immediately notify the Engineer and the Utility owner if he disturbs, disconnects or damages any Utility. The Contractor shall bear the costs of repair or replacement of any Utility facility described with reasonable accuracy in the Plans and Specifications that is damaged by the Contractor. No extra compensation will be made for the repair of any services or mains damaged by the Contractor, nor for any damage incurred if the neglect or failure of providing protective barriers, lights and other devices or means required to protect such existing utilities or facilities described with reasonable accuracy in the Plans and Specifications.

1.3  SURVEY MARKERS AND PERMANENT REFERENCE POINTS

A. Surveying and Permanent Survey Markers

The Engineer will take measurements to assure the preservation of survey markers (monuments and bench marks). The Contractor shall not disturb permanent survey markers without the consent of Engineer and shall bear the expense of replacing any that may be disturbed without permission.

1. Replacement of survey markers shall be done only by the Engineer.
2. If disturbing of markers cannot be avoided, the Owner shall pay the cost of replacing said markers.

B. Lot Corner Monuments

The Contractor shall preserve property line and corner survey markers except where their destruction is unavoidable and the Contractor is proceeding in accordance with accepted practice. Markers that are lost or disturbed by his operations shall be replaced at the Contractor's expense by the Engineer.
DEMOLITION:

1.1 DESCRIPTION

A. The work of this section consists of demolition and removal of pavements, buildings, walls, conduits, mechanical equipment, and light fixtures among other features in the existing bus wash facility vicinity.

B. This work may also include trenching and removal of existing utilities in the area.

C. Definitions:

   1. Portland Cement Concrete: A mixture of Portland cement, fine aggregate, coarse aggregate, admixtures (if used) and water, proportioned and mixed. Also, included is rebar.

   2. Asphalt Concrete: A mixture of liquid asphalt and graded aggregate used as paving material for roadways and parking lots.

1.2 WORK INCLUDED

A. Repair and restoration of areas damaged due to demolition work.

B. Salvaging of equipment for Owner.

C. Removal of demolished materials from site.

D. Remove existing piping and other existing structures as shown on the Plans to be removed.

E. Properly dispose of all removed materials.

F. Dewatering as needed in order to complete the proposed demolition.

G. Removal of trees and landscaping as required for construction.

1.3 RELATED WORK

A. Section on Cast in Place Concrete

B. Section on Structure Excavation and Backfilling.

C. Section on Disposal of Materials
1.4 **SEQUENCING**

A. Sequence work to minimize interference with Compressed Natural Gas (CNG) Operations adjacent to the project. The fuel islands shall remain in operation throughout the duration of the project.

1.5 **REGULATORY REQUIREMENTS**

A. Obtain required permits from City of Bakersfield as well as any other applicable jurisdictional authorities.

B. Dispose of removed materials in an approved disposal or salvage facility.

1.6 **REFERENCES**

A. Section on Clearing and Grubbing, State Standard Specifications

B. Section on Earthwork, State Standard Specifications

1.7 **SUBMITTALS**

A. As specified in Section on Submittal Procedures

B. Demolition plan including sequence of operations. The plan shall specifically address methods of demolition, schedule, sequence of demolition, and procedures for archeological monitoring. Demolition shall not proceed until the plan has been approved.

1.8 **QUALITY ASSURANCE**

A. General: Take all necessary precautions with regard to safety in carrying out the demolition and site work. Erect suitable barriers around open excavations and fulfill all appropriate requirements of CAL/OSHA. Comply with safety requirements for demolition, ANSI A10.6-90.

1.9 **PROJECT CONDITIONS**

A. Underground utilities exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.

B. Keep dust to a minimum at removal site and on haul roads. Use sprinklers or water trucks as necessary or as directed by the Engineer.

C. Ensure safety of persons in demolition area. Provide temporary barricades as required.
D. Excavations may encounter groundwater and require dewatering depending on the time of year and amount of seasonal run-off. Loose sands exposed in excavation sidewalls may be unstable and require shoring or lying back in accordance with OSHA requirements. Flowing sands may also be encountered in excavations below groundwater levels.

1.10 CLOSEOUT SUBMITTALS

A. As specified in Section on Contract Closeout.

B. Show all capped and abandoned utility terminations and location of remaining facilities on project Record Drawings.

2.1 REPAIR AND RESTORATION MATERIALS

A. Concrete shall be as specified in Section on Cast in Place Concrete.

B. Backfill materials shall be as required by Section on Earthwork, State Standard Specifications.

C. Asphalt and concrete shall be replaced in conformance with governing authority standards

3.1 INSPECTION

A. Prior to demolition, inspect the site conditions, verifying all governing dimensions, notes and specification. Notify the Engineer of any errors or omissions in the contract documents.

B. Make such explorations and probes as are necessary to ascertain any required protection measures before proceeding with the demolition and removal work.

3.2 PREPARATION

A. Protect existing, appurtenances, structures, and facilities which are not to be demolished.

B. Prior to demolition work, all erosion control measures specified in Section 01 57 13 – Erosion Control Plan and inlet protection barriers shall be in place. Contractor shall provide appropriate measures to prohibit demolition debris and/or soil from entering any watercourse.

1. Protect all buildings, structures, utilities, and vegetation to remain.
3.3 DEMOLITION REQUIREMENTS

A. Conduct demolition to protect and minimize damage to structures and existing improvements.

B. Execute the work in a careful, orderly and safe manner, with the least possible disturbance to the public. Cease operations immediately if adjacent work appears to be endangered. Do not resume operations until corrective measures have been taken.

C. Pavement and Slabs:

1. Remove completely all Portland cement concrete slabs-on-grade including, but not limited to, equipment pads, sidewalks, etc. If approved by the Engineer, the Contractor may crush Portland concrete for use as aggregate base.

2. Saw cut existing asphalt concrete pavements cleanly in straight continuous lines. Remove asphalt concrete pavement as shown on the drawings.

   a. Asphalt Concrete Milling Equipment: Milling machines shall be power operated, self-propelled machines capable of removing the desired thickness. They shall have sufficient power, traction and stability to accurately maintain depth of cut and slope.

3. In areas that are demolished, but where no future roads or structures are shown, the exposed subgrade shall be scarified an additional 18 inches before placing backfill.

D. Concrete and Masonry Structures: Remove structure to a minimum of 3 feet below grade. Break remaining portions to permit drainage. Remove completely if under proposed structures or roadways.

E. Items to be Salvaged: Remove as directed by the Engineer. Remove carefully. All salvaged material remains the property of the Owner. Store where directed by the Engineer.

F. Abandoned Utilities: Remove above ground utilities and terminate as approved by the utility company and the Engineer. Remove necessary portions of underground utilities to within 24 inches of excavation or final grade. Plug abandoned pipes and conduits with concrete plugs. Plugs shall be 6 inches or 2 times the pipe diameter in length, whichever is greater.

   1. Water lines shall be capped as close as possible to active mains.
3.4 **ORDER OF WORK**

A. Existing facilities shall remain in operation as much as possible until the new bus wash facility is in operation. Coordination will be required with the Owner for temporary shut-off of existing water, compressed air, and electrical utility systems for connection of new pipelines to existing pipelines and/or machinery. Contractor shall submit plans to Owner for approval for shut-off duration at least 10 days prior to shut-off.

1. Hours and duration of shut-off shall be discussed with Owner and decided at Owner’s discretion

3.5 **PRESERVATION**

A. If indicated or required, preserve trees, plants, rock outcroppings, or other features designated to remain. Protect trees and plants from damage; fell trees in a manner which shall not injure standing trees, plants and improvements which are to be preserved.

3.6 **RESTORATION**

A. All demolition areas, staging/stockpiling, and open excavations shall be filled in accordance with the Paving and Concrete Sections. Fill all open excavations deeper than one foot to an elevation to match the surrounding topography.

1. New Construction Areas: As shown on drawings.

**CONCRETE FORMWORK:**

1.1 **WORK INCLUDED**

A. Work required under this section consists of furnishing all materials, supplies, equipment, tools, transportation, and facilities, and performing all labor and services incidental to furnishing and installing concrete formwork as described in this section of the Specifications, shown on the accompanying Plans, or reasonably implied therefrom. The work shall include, but is not necessarily limited to:

B. Scope:

1. Design of formwork, shoring and reshoring.
2. Furnishing, erection, and removal of forms.
3. Shoring and bracing of formwork.
1.2 RELATED SECTIONS

A. Section on Concrete Accessories
B. Section on Concrete Reinforcing
C. Section on Cast-In-Place Concrete
D. Section on Concrete Curing

1.3 REFERENCES

A. Industry Codes and Standards
   1. American Concrete Institute (ACI) Manual of Concrete Practice
      ACI 117 Standard Tolerances for Concrete Construction and Materials and Commentary
      ACI 301 Specifications for Structural Concrete for Buildings
      ACI 347 Guide to Formwork for Concrete
   2. Western Wood Products Association (WWPA)

B. Government Regulations
   1. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) Regulations
      a. OSHA 29 CFR Part 1926.701 Safety and Health Regulations for Construction
   2. Cal/OSHA Standards, Division of Industrial Safety, Construction Safety Orders, Article 29 Erection and Construction
      a. Section 1717 Falsework and Vertical Shoring

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

1.4 SUBMITTALS

A. As specified in Section on Submittal Procedures.
B. Provide concrete construction joints and expansion joints of the types and locations indicated. Submit for approval shop drawings showing proposed location and type of required construction for any joints not shown on the Drawings, and sequence of forming and concrete placing operations.

C. Provide formwork, shoring and reshoring calculations for information only.

1.5 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies. The requirements of California Division of Occupational Safety and Health, Construction Safety Orders Section 1717 and OSHA Part 1926, Section 1926.701 apply to the Work of this Section, and the Contractor shall prepare and maintain at least one (1) copy of the required drawings at the site. Design of the structures shown on the Drawings does not include any allowance or consideration for imposed construction loads. Provide forms, shoring and falsework adequate for imposed live and dead loads, including equipment, height of concrete drop, concrete and foundation pressures, stresses, lateral stability, and other safety factors during construction.

B. Standards and Tolerances. Employ formwork complying with ACI 347 Guide to Formwork for Concrete, except as exceeded by the requirements of regulatory agencies or as otherwise indicated or specified. Design and construct formwork to produce finished concrete conforming to tolerances given in ACI 117

   1. Form offset shall meet the requirements of Class C.

2.1 FORM COATING

A. Form coating compounds shall be biodegradable with a VOC level less than 50 grams/liter. Non-grain raising and non-staining resin or polymer type that will not leave residual matter on surface of concrete or adversely affect bonding to concrete of paint, plaster, mortar, protective coatings, waterproofing or other applied materials. Coatings containing mineral oils, paraffin, waxes, or other non-drying ingredients are not permitted. For concrete surfaces contacting potable stored water, use only coatings and form-release agents that are completely non-toxic.

2.2 LUMBER

A. WWPA Structural Light Framing No. 1 or Structural Joists and Planks No. 1, or equal. Board forms, if used, shall be No. 2 Common or better, T&G or shiplap, S1S2E, or better.
2.3 **METAL FORM TIES**

A. Provide commercially manufactured, prefabricated rod, snap-off, or threaded internal disconnecting type of tensile strength to resist all imposed loads. Use only ties that leave no metal within 1½-inch of concrete surfaces after removal. Employ snap-off type ties having integral washer spreaders of diameter to fully close tie holes in forms.

3.1 **FORM TYPES**

A. Smooth Surface Concrete. Use specified plywood or metal forms, as approved, for interior and exterior exposed above-grade concrete and all formed concrete in contact with liquids, waterproofing and protective coatings.

B. General Concrete. Use either plywood or board forms for concealed surfaces, or form as specified for smooth surface concrete.

3.2 **SHORING AND FALSE WORK**

A. Distribute loads properly over base area on which shoring is erected, either concrete slabs or ground; if on ground, protect against undermining or settlement, particularly against wetting of soils.

B. Alignment. Construct forms to produce in finished structure all lines, grades, and camber, as required.

3.3 **FORM CONSTRUCTION**

A. Build forms to exact shapes, sizes, lines, and dimensions as required to obtain accurate alignment, location and grades, and level and plumb work in finished structures. Provide for openings, offsets, keyways, recesses, moldings, chamfers, blocking, joint screeds, bulkheads, anchorages, and other required features. Make forms easily removable without hammering or prying against concrete. Use approved metal spreaders to provide accurate spreading of forms. Construct forms so that no sagging, leakage, or displacement occurs during and after pouring of concrete. Coat forms with specified coating material only prior to placement of reinforcing steel; do not allow coating to contact reinforcing bars.

B. Form Joints and Tie Holes. Seal joints between form panels with specified calking compound. Unless form tie spreaders fully seal tie holes in forms, seal around ties with specified materials and prevent leakage of concrete mortar.

C. Reuse. Clean and recondition form material before each reuse. Fill all
holes, cracks and defects. Unsatisfactory material (in the opinion of the Construction Manager) shall be rejected and removed from the site.

D. Provide ¾” inch chamfers at all exposed outside corners. Use mill run chamfer strips surfaced all sides. Provide rounded top edges of sidewalks, walkways, and where directed.

3.4 ALLOWABLE VARIATIONS FOR FORMED SURFACES

A. Tolerances: Per ACI 301 requirements.

3.5 EMBEDDED PIPING AND ROUGH HARDWARE

A. Install electrical conduits per the direction of the electrical contractor as not to reduce the strength of the construction. Support embedded pipes and conduits independently from reinforcing steel in a manner to prevent metallic contact and thereby prevent electrolytic deterioration. Place embedded pipes and conduits as nearly as possible to the centerline of the concrete section. Submit all conduit, piping and other wall penetrations, reinforcements and anchor bolt sizing and locations to Owner’s review and approval.

3.6 FIELD QUALITY

A. Inspection of Forms: Check forms prior to placement of any concrete for grade and alignment.

B. Control during Concrete Placement: Check forms during concrete placement and to promptly seal all mortar leaks and to correct all form movement or misalignment.

3.7 REMOVAL OF FORMS AND SHORING

A. Do not remove forms or shoring until concrete has attained sufficient strength to support its own weight and all imposed construction and permanent loads.

B. Form Removal. Minimum times for removal after concrete placement are as follows:

- Beam sides but not shoring: 3 days
- Column forms and wall forms: 2 days
- Forms for supported slabs but not shoring: 14 days
C. Shoring and Falsework Removal. Do not remove shoring and falsework until 21 days after concrete placement, or until concrete has attained at least 90 percent of the 28 day design compressive strength as demonstrated by control test cylinders, but in no event, not sooner than 14 days.

D. All form materials, during stripping of forms below finish grade, shall be removed and deposed of unless otherwise approved by the Engineer.

E. Restriction. Do not impose construction, equipment, or permanent loads on columns, supported slabs, or supported beams until concrete has attained the 28- day design compressive strength.

F. Concrete Curing During Removals. Refer to Section 03 39 00 of these Specifications.

CONCRETE ACCESSORIES:

1.1 WORK INCLUDED

A. Furnish all materials, supplies, and performing all labor to furnish and install concrete accessories as described in this section of the Specifications, shown on the Plans. The work shall include, but is not necessarily limited to

1. Polyvinyl chloride waterstop.
2. Hydrophilic waterstop
3. Bentonite strip waterstop
4. Preformed synthetic sponge rubber expansion joint material.
5. Preformed bituminous fiber expansion joint material.

1.2 REFERENCES

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

3. D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers


5. D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact


7. D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

8. D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)


B. U. S. Army Corps of Engineers (USACE):

1. CRD-C-572, Specification for Polyvinyl Chloride Waterstop.

1.3 RELATED WORK

A. Section on Cast in Place Concrete

B. Section on Concrete Curing

C. Section on Caulking and Sealants

1.4 SUBMITTALS

A. As specified in Section on Submittal Procedures.

B. Product Data:

1. Waterstops and Preformed Expansion Joint Material: Sufficient information on each type of material for review to determine conformance of material to requirements specified.

C. Provide material certificates, shop fabrication and placement drawings, and schedule.

D. Samples: Provide samples of each product to be supplied under this section.
E. Manufacturer's Installation Instructions: For all materials specified under this section

F. Quality Control Submittals:

1. Certificates of Compliance:
   a. Written certificates that waterstops and Preformed Expansion Joint Material supplied meet or exceed physical property requirements of this section.

1.5 QUALITY ASSURANCE

A. Mock-Ups:

1. 1. Welding Demonstration:
   a. Demonstrate ability to weld acceptable joints in polyvinyl chloride waterstop before installation of waterstop begins.

B. Field Joints:

1. Polyvinyl Chloride Waterstop Field Joints: Shall be free of misalignment, bubbles, inadequate bond, porosity, cracks, offsets and other defects which would reduce the potential resistance of the material to water pressure at any point. Replace defective joints, remove faulty material from the site.

C. Inspections:

1. Quality of welded joints will be subject to acceptance of the Engineer.

2. Polyvinyl Chloride Waterstop: The following defects that represent a partial list that will be grounds for rejection.
   a. Any combination of offset or crack which will result in a net reduction in the cross section of the waterstop in excess of 1/16-inch or 15 percent of the material thickness, at any point, whichever is less.
   b. Misalignment of the joint, which will result in misalignment of the waterstop in excess of 1/2-inch in 10 feet.
   c. Porosity in the welded joint as evidenced by visual inspection.
   d. Bubbles or inadequate bonding.
2.1 MANUFACTURED UNITS

A. Waterstops:

1. Polyvinyl Chloride Waterstops:
   
a. One of the following or Engineer approved equivalent:
   
   1) Vinylex Corporation, Kwik-Tie.
   
   2) Greenstreak Plastic Products Company, Inc.
   
   b. Type: Ribbed Waterstop. Unless otherwise specified, joints shall be constructed as follows:
       
       1) Construction Joints: ribbed type, width to be 6 inches unless otherwise specified or shown on the plans, without center bulb.

   c. Provide polyvinyl chloride waterstops complying with following requirements:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Required Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water absorption</td>
<td>ASTM D 570</td>
<td>0.15% max</td>
</tr>
<tr>
<td>Tear Resistance</td>
<td>ASTM D 624</td>
<td>200 lb/in (35 kN/m) min.</td>
</tr>
<tr>
<td>Ultimate Elongation</td>
<td>ASTM D 638</td>
<td>350% min.</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D 638</td>
<td>2000 psi (13.78 Mpa) min.</td>
</tr>
<tr>
<td>Low Temperature Britteness</td>
<td>ASTM D 746</td>
<td>No Failure @ -35° F (-37° C)</td>
</tr>
<tr>
<td>Stiffness in Flexure</td>
<td>ASTM D 747</td>
<td>600 psi (4.13 Mpa) min.</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>ASTM D 792</td>
<td>1.45 max.</td>
</tr>
<tr>
<td>Hardness, Shore A</td>
<td>ASTM D 2240</td>
<td>79 ±3</td>
</tr>
<tr>
<td>Tensile Strength after accelerated extraction</td>
<td>CRD-C 572</td>
<td>1850 psi (11.03 Mpa) min.</td>
</tr>
<tr>
<td>Elongation after accelerated extraction</td>
<td>CRD-C 572</td>
<td>300% min.</td>
</tr>
<tr>
<td>Effect of Alkalies after 7 days:</td>
<td>CRD-C 572</td>
<td>between -0.10% / +0.25% +/- 5 points</td>
</tr>
<tr>
<td>Weight Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardness Change</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Hydrophilic waterstop

   a. One of the following or Engineer approved equivalent:

   1) W. R. Grace and Company, Adcor ES
Greenstreak Plastic Products Company, Inc., Hydrotite

b. Performance Requirements as follows:

### Chloroprene Rubber

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Required Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>ASTM D 412</td>
<td>1300 PSI min.</td>
</tr>
<tr>
<td>Ultimate Elongation</td>
<td>ASTM D 412</td>
<td>400% min.</td>
</tr>
<tr>
<td>Hardness (Shore A)</td>
<td>ASTM D 2240</td>
<td>50 +/- 5</td>
</tr>
<tr>
<td>Tear Resistance</td>
<td>ASTM D 624</td>
<td>100 lb/inch min.</td>
</tr>
</tbody>
</table>

### Modified Chloroprene (Hydrophilic) Rubber

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Required Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>ASTM D 412</td>
<td>350 PSI min.</td>
</tr>
<tr>
<td>Ultimate Elongation</td>
<td>ASTM D 412</td>
<td>600% min.</td>
</tr>
<tr>
<td>Hardness (Shore A)</td>
<td>ASTM D 2240</td>
<td>52 +/- 5</td>
</tr>
<tr>
<td>Tear Resistance</td>
<td>ASTM D 624</td>
<td>50 lb/inch</td>
</tr>
<tr>
<td>Expansion Ratio</td>
<td>Volumetric Change - Distilled Water @ 70º F</td>
<td>3 to 1 min.</td>
</tr>
</tbody>
</table>

3. Bentonite Strip Waterstop

   a. One of the following or Engineer approved equivalent:

      1) Cetco, Waterstop, RX.
      2) Green Streak, Swell Stop

B. Preformed Expansion Joint Materials:

1. Preformed Synthetic Sponge Rubber Expansion Joint Material:

   a. Manufacturers: One of the following or Engineer approved equivalent:

      1) JD Russell Co, Reflex
      2) W.R. Meadows, Sponge Rubber Expansion Joint

2. Preformed Bituminous Fiber Expansion Joint Material:

   a. Conform to ASTM D994, preformed bituminous type, 1/2-inch thick
b. Manufacturers: One of the following or Engineer approved equivalent:

1) JD Russell Co., Fiberflex
2) W.R. Meadows, Fiber Expansion Joint

2.2 ACCESSORIES

A. Adhesives and sealants:

1. Provide as recommended by product supplier.

3.1 INSTALLATION

A. Waterstops - General:

1. Waterstops shall be stored so as to permit free circulation of air around the waterstop material and to prevent direct exposure to sunlight.

2. Install waterstops in concrete joints where indicated on the Drawings.

3. Carry waterstops in walls into lower slabs and join to waterstops in slabs with appropriate types of fittings.

4. In Water bearing Structures: Provide all joints with waterstops, whether indicated on the Drawings or not.

5. Provide waterstops that are continuous.

6. Set waterstops accurately to position and line as indicated on the Drawings.

7. Hold and securely fix edges in position at intervals of not more than 24-inches so that they do not move during placing of concrete.

8. Position the waterstop so that the center axis of the waterstop shall be coincident with the centerline of the joint, unless detailed otherwise.

9. Do not drive nails, screws, or other fasteners through waterstops in vicinity of construction joints.

10. Secure waterstop against movement at not more than 24-inches on centers.
11. Terminate waterstops 3-inches from top of finish surfaces of walls and slabs unless otherwise specified or indicated on the Drawings.

12. When any waterstop is installed in the concrete on one side of a joint, while the other half or portion of the waterstop remains exposed to the atmosphere for more than two days, suitable precautions shall be taken to shade and protect the exposed waterstop from direct rays of sunlight during the entire exposure and until the exposed portion is embedded in concrete.

13. Use specific type in applications as indicated on the Drawings.

14. No scrap or recycled material shall be used.

B. Polyvinyl Chloride Waterstops:

1. Install waterstops so that joints are watertight.

2. Weld joints such as unions, crosses, ells, and tees, with thermostatically controlled equipment recommended by waterstop manufacturer.
   a. The material shall not be damaged by heat sealing.
   b. Make joints by overlapping then simultaneously cut the ends of the sections to be spliced so they will form a smooth even joint.
   c. The continuity of the waterstop ribs and tubular center axis shall be maintained.
   d. The splices shall have a tensile strength of not less than 60 percent of the unspliced materials tensile strength.

3. Butt joints of the ends of two identical waterstop sections may be made while the material is in the forms.

4. All joints with waterstops involving more than two ends to be joined together, and all joints that involve an angle cut, alignment change, or the joining of two dissimilar waterstop sections shall be prefabricated prior to placement in the forms, providing not less than 24-inch long strips of waterstop material beyond the joint.
5. Vertical crosses and tees shall be prefabricated by the manufacturer. Horizontal crosses or tees may be field or factory welded.

6. Split type waterstop will not be permitted except where specifically indicated on the Plans.

C. Hydrophilic Waterstops

1. Apply adhesive recommended by the manufacturer for the given application.

2. Cut coil ends square or at proper angle for mitered corners with a sharp blade to fit splices together without overlaps.

3. Splices and exposed cells shall be sealed using adhesives recommended by the manufacturer.

4. Provide minimum concrete cover per manufacturer’s recommendations and in no instance less than 2 inches.

5. Surfaces shall be even, smooth, clean and dry.

6. Do not use when the head exceeds 150’

D. Bentonite Waterstops

1. Apply adhesive recommended by the manufacturer for the given application.

2. Maintain the minimum clear cover recommended by the manufacturer but in no instance less than 2 inches.

3. Butt splice by pressing ends together to ensure no separation or air pockets. Do not overlap the ends of the waterstops.

4. Remove release paper immediately prior to the second concrete pour.

5. Replace waterstop showing signs of premature swelling, discontinuity or debris contamination.

E. Preformed Expansion Joint Material:

1. Fasten expansion joint strips to concrete, masonry, or forms with adhesive. No nailing will be permitted, nor shall expansion joint strips be placed without fastening.
2. Install expansion joint filler in accordance with manufacturer’s instructions.

3. Install joint filler ½ inch (13 mm) below the concrete surface.

4. Prior to sealing, slide expansion joint cap over the expansion joint.

5. Place concrete and screed to finish grade, allow adequate during time before removing top of expansion joint cap. Pull cap free and discard.

6. Seal with joint sealant.

F. Joints:

1. Install construction and expansion joints as indicated on the Plans.

ANCHOR BOLTS AND POST-INSTALLED ANCHORS:

1.1 WORK INCLUDED

A. The work of this section consists of furnishing and installing all materials and equipment and providing all labor necessary to complete the work shown on the drawings and/or listed below and all other work and miscellaneous items not specifically mentioned but reasonably inferred for a complete installation, including all accessories and appurtenances required for a completed system.

B. Cast-in-Place anchor bolts, anchor bolts and threaded rod anchors for epoxy grouting.

C. Expansion anchors to be installed in hardened concrete.

1.2 RELATED WORK

A. Section on Cast-in-Place Concrete

1.3 SUBMITTALS

A. As specified in Section on Submittal Procedures.

1.4 GENERAL
A. All anchor bolts shall be cast-in-place bolts, shall be as shown on the plans, as required by the manufacturer’s instructions, and per all applicable building permits.

B. Expansion anchors and threaded rod anchors indicated or accepted in lieu of cast-in-place anchor bolts for equipment or structural framing shall be as shown on the plans, as required by the manufacturer’s instructions, and per all applicable building permits and shall be ICBO Evaluation Report listed.

1. Unless otherwise specified or indicated on the drawings, or approved by the Engineer, all other expansion anchors shall have a diameter per manufacturer’s drawings.

2.1 MATERIALS

A. Nuts and washers for anchor bolts and expansion anchors shall be the same material as the bolts or anchors they are used with.

<table>
<thead>
<tr>
<th>Application</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Anchor Bolts and Nuts</td>
<td></td>
</tr>
<tr>
<td>1. Carbon Steel</td>
<td>ASTM A307</td>
</tr>
<tr>
<td>2. Stainless Steel</td>
<td>IFI-104, Grade 304 or 316</td>
</tr>
<tr>
<td>B. Threaded Rod Anchors and Nuts</td>
<td></td>
</tr>
<tr>
<td>1. Carbon Steel</td>
<td>ASTM A307 or A36</td>
</tr>
<tr>
<td>2. Stainless Steel</td>
<td>IFI-104, Grade 304 or 316</td>
</tr>
<tr>
<td>C. Flat Washers</td>
<td>ANSI B18.22.1; of the same material as anchor bolts and nuts.</td>
</tr>
<tr>
<td>D. Expansion Anchors</td>
<td></td>
</tr>
<tr>
<td>1. For Concrete</td>
<td>Fed Spec FF-S-325; wedge type, Group II, Type 4, Class 1 or 2; self-drilling type, Group III, Type 1; or nondrilling type, Group VIII, Type 1 or 2; Hilti ICBO #3987 or 4627, ITW Ramset/Red Head ICBO #2391, Rawl Bolt ICBO #4514, or ICBO approved equivalent.</td>
</tr>
<tr>
<td>E. Adhesive Anchors</td>
<td>Hilti HIT RE-500 V3</td>
</tr>
</tbody>
</table>

B. Anchor bolts and threaded rod anchors for buried service and in splash zones shall be stainless steel. Anchor bolts, threaded rod anchors, and expansion anchors for immersion service shall be stainless steel. Expansion anchors for buried service and in splash zones shall be stainless.
steel. All other anchor bolts, threaded rod anchors, and expansion anchors shall be galvanized steel unless otherwise specified or indicated on the Plans.

3.1 ANCHOR BOLTS

A. Anchor bolts shall be delivered in time to permit setting before the structural concrete is placed. Anchor bolts which are cast in place in concrete shall be provided with sufficient threads to permit a nut to be installed on the concrete side of the concrete form or supporting template.

B. Anchor bolts and threaded rod anchors which are to be epoxy grouted shall be clean and free of coatings that would weaken the bond with epoxy.

C. Two nuts, a jam nut, and a washer shall be furnished for anchor bolts and threaded rod anchors indicated on the drawings to have locknuts; two nuts and a washer shall be furnished for all other anchor bolts.

D. Anti-seize thread lubricant shall be liberally applied to projecting, threaded portions of stainless steel anchor bolts and threaded rod anchors immediately before final installation and tightening of the nuts.

3.2 EXPANSION ANCHORS

A. Expansion anchors shall be installed in conformity with the manufacturer's instructions and ICBO Evaluation Report recommendations for maximum holding power, but in no case shall the depth of hold be less than four (4) bolt-hole diameters. The minimum distance between the center of any expansion anchor and an edge or exterior corner of concrete shall be at least four and one half (4-1/2) times the diameter of the hole in which the anchor is installed. Unless otherwise indicated on the Plans, the minimum distance between the centers of the expansion anchors shall be at least eight (8) times the diameter of the hole in which the anchors are installed.

B. Anti-seize thread lubricant shall be liberally applied to threaded stainless steel components immediately before assembly.

CONCRETE REINFORCING:

1.1 WORK INCLUDED

A. Work required under this section consists of furnishing all materials, supplies, equipment, tools, transportation, and facilities, and performing all labor and services incidental to furnishing and installing concrete
reinforcing work as described in this section of the Specifications, shown on the accompanying Plans, or reasonably implied therefrom, except as hereinafter specifically excluded. The work shall include, but is not necessarily limited to:

1. Provide reinforcing work, complete as indicated, specified and required.
2. Furnishing and placing bar and mesh reinforcing for cast-in-place concrete.

1.2 RELATED WORK
A. Section on Concrete Formwork
B. Section on Cast-In-Place Concrete
C. Section on Concrete Curing

1.3 REFERENCES
A. Industry Codes and Standards
   1. American Society for Testing and Materials (ASTM)
      a. A1064/A1064M Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
      b. A615/A615M Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
   2. California Building Code (CBC)
   3. Concrete Reinforcing Steel Institute (CRSI)
   4. American Concrete Institute (ACI)
      a. ACI 301 Specification for Structural Concrete
      b. Publication SP-66 ACI Detailing Manual
1.4 SUBMITTALS

A. Provide material certificates, shop fabrication and placement drawings, and schedule for all reinforcing steel, imbedded items, form release and curing compounds.

1. Shop Drawings. Submit shop drawings for reinforcing steel prepared in accordance with ACI Detailing Manual, Publication SP-66. Show layouts, bending diagrams, assembly diagrams, dimensioned types and locations of all bar laps and splices, and shapes, dimensions, and details of bar reinforcing and accessories. Include layout plans for bar supports and chairs, with typical details. Dimensions and quantities shown on the shop drawings are the responsibility of the Contractor and Owner’s approval of shop drawings shall not constitute approval of dimensions and quantities thereon.

1.5 QUALITY ASSURANCE

A. Code Requirements: Unless otherwise specified all work specified herein and as shown on the drawings shall conform to the applicable requirements of the California Building Code (CBC), and the State Standard Specifications.

B. Standard: Reinforcing steel installations shall conform to the current specification requirements of the Concrete Reinforcing Steel Institute “Manual of Standard Practice” (herein referred to as the CRSI Manual) except as otherwise indicated or specified.

C. Field Quality Control: All continuous inspections shall be performed by “Special Inspectors” qualified and approved by Governing Building Code Authority or inspector as otherwise qualified and approved by the Owner. Reports as required by Code shall be prepared and submitted to Owner, Building Department, Design Professional in Responsible Charge and Contractor.

1. Inspection of Reinforcing. Provide 48-hour advance notice to permit inspection of in-place reinforcement prior to closing forms, and refer to applicable requirements of Section 03 30 00 of these Specifications.

2. Concreting Operations. During concrete placing, assign construction personnel to inspect reinforcement and maintain bars in correct positions at each pour location.
2.1 **REINFORCING**

A. Deformed bars conforming to ASTM A615, Grade 60 Type “S.”

2.2 **WELDED WIRE MESH**

A. Conform to ASTM A1064.

2.3 **TIE WIRE**

A. Annealed steel, 16-gage minimum.

2.4 **COUPLER SPLICE DEVICES**

A. Reinforcing bar coupler/splice devices which bear current ICC Evaluation Report Number, and which develop at least 125 percent of bar yield strength in tension may be used with Owner’s approval in lieu of lapped bar-type splices. Submit for Owner’s approval in each instance.

2.5 **DOWELS**

A. Where and as designated on Drawings, provide reinforcing bar dowels in new work and for anchorage to existing concrete. For anchorage where shown or required to existing construction, use non-shrink epoxy type grout or deferred bolting devices as approved in each instance and conforming to “Product” Article requirements of this Specification.

2.6 **FABRICATION AND DELIVERY**

A. Conform to CRSI Manual Chapters 6 and 7 except as otherwise indicated or specified. Bundle reinforcement and tag with suitable identification to facilitate sorting and placing, and transport and store at site so as not to damage material. Keep a sufficient supply of tested, approved, and proper reinforcement at site to avoid delays.

B. Bending and Forming. Fabricate bars of indicated size and accurately form to shapes and lengths indicated and required by methods not injurious to materials. Do not heat reinforcement for bending. Bars with kinks or bends not scheduled will be rejected.

3.1 **PLACING**

A. Unless otherwise indicated or specified, conform to CRSI Manual Chapter 8 including placement tolerances, except no reduction of concrete cover is allowable for bars at concrete surfaces exposed in liquid or water-containing structures.
B. Cleaning. Before placing reinforcing, and again before concrete is placed, clean reinforcement of loose mill scale, oil, or other coating that might destroy or reduce bond. Do not allow form coatings, release agents, bond breaker, or curing compound to contact reinforcement.

C. Concrete Coverage over reinforcing bars shall be in accordance with ACI 318 unless otherwise shown on the Drawings. Measure the coverage to the outer edge of ties, stirrups, bar spacers, hangers, and like items, and detail and fabricate the reinforcing accordingly.

D. Securing in Place. Accurately place reinforcement and securely wire tie in precise position at all points where bars cross. Tie stirrups to bars at both top and bottom. Bend ends of binding wires inward, allowing no encroachment on the concrete cover; exercise special care at surfaces to remain exposed and unpainted. Support bars in accordance with CRSI Manual Chapter 3, Specifications for Placing Bar Supports, using approved chairs and supports.

E. Splices. Provide wired contact lap splices unless otherwise indicated or approved. Provide lap lengths as indicated on the Drawings.

1. Vertical Bars. Except as specifically detailed or otherwise indicated, splicing of vertical bars in concrete is not permitted except at the indicated or approved horizontal construction joints or as otherwise specifically detailed.

2. Horizontal Bars. Except as specifically detailed or otherwise indicated, splicing of horizontal bars in concrete is not permitted except at the indicated or approved vertical construction joints or as otherwise specifically detailed.

F. Welding. Welding of reinforcing bars may be permitted on case-by-case basis. All welding of reinforcing bars will be approved by the Engineers.

G. Additional Reinforcing. Provide additional reinforcing bars at sleeves and openings as indicated on the Drawings.

H. Welded Wire Reinforcement. Install necessary supports and chairs to hold in place during concrete pours. Straighten mesh to lay in flat plane and bend mesh as shown or required to fit work. Provide laps of no less than one complete mesh unless otherwise detailed. Tie every other wire at laps. Welded wire reinforcement rolls are not acceptable.
CAST-IN-PLACE CONCRETE (SITE WORK):

1.1 WORK INCLUDED

A. Work required under this section consists of furnishing all materials, supplies, equipment, tools, transportation, and facilities, and performing all labor and services incidental to furnishing and installing concrete work as described in this section of the Specifications, shown on the accompanying Plans, or reasonably implied therefrom, except as hereinafter specifically excluded. The work shall include, but is not necessarily limited to:

1. All form work including special forms as required for any special construction and/or to accommodate the work of others and removal of forms.
2. All concrete reinforcement, placement, bending and forming thereof.
3. All concrete and cement finishing, all surface treatment and curing including non-slip finishes.
4. Installation of all reglets, bolts, anchors, cans, sleeves, column bolts, etc., whether furnished under this section or by others.
5. The furnishing of all items required to be or shown on the Plans as embedded in concrete, which are not specifically required under other sections.
6. Setting headers and screens finishing, curing, and protecting concrete.

B. Metal Building Foundation – Contractor’s metal building supplier shall also permit the foundation for the metal building as required as part of this scope of work. Any revisions necessary to the foundation detail shown on the plans shall be submitted to the Engineer for review prior to construction.

C. Trench Patching and Sawcut Area – Contractor shall re-construct these areas to the same thicknesses observed in the field. All work shall comply with this Section of the Project Specifications.

D. Where prior inspection and test of materials are required, documentary evidence, in the form of test reports, shall be furnished prior to the time the material is incorporated into the work. All rejected material shall be promptly removed from the premises.

1.2 RELATED WORK

A. Division 3 – Concrete

B. Division 10 – Specialties
C. Division 31 – Earthwork
D. Division 32 – Exterior Improvements
E. Division 33 – Utilities

1.3 REFERENCES
A. American Concrete Institute (ACI)
B. American Society for Testing and Materials (ASTM)
C. State Standard Specifications
D. California Building Code (CBC)

1.4 DEFECTIVE WORK
A. Work considered to be defective may be ordered, by the Engineer, to be replaced in which case the Contractor shall remove and replace the defective work at his expense. Work considered to be defective shall include, but not be limited to, the following:

1. Concrete incorrectly formed, or not conforming to details and dimensions on the Plans or with the intent of these documents or concrete the surfaces of which are out of plumb or level.

2. Concrete in which defective or inadequate reinforcing steel has been placed.

3. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the Plans.

4. Concrete below specified strength.

1.5 SUBMITTALS
A. Submittals shall be in accordance with Section 01 33 00 of these Specifications.

B. Provide material certificates, shop fabrication and placement drawings, and schedule for all reinforcing steel, embedded items, form release and curing compounds.

C. The Contractor shall provide a proposed concrete placement plan (to
minimize the effects of cracking and differential settlement) to the Engineer, and gain approval of said plan, prior to ordering of reinforcing steel. As a minimum this plan shall contain the layout of horizontal and vertical construction joints, spaced no greater than 50 feet apart (unless specifically approved otherwise by the Engineer), and a pour schedule for the individual slab and wall pours. All construction joints shall be sized in conformance with the Typical Longitudinal Keys Detail and shall contain water stops as shown on the Construction Joint with Waterstop Detail.

### 2.1 CONCRETE

1. Concrete shall conform to Section 90 of the State Standard Specifications. Unless otherwise shown or specified, all concrete shall contain not less than 611 pounds of Portland cement per cubic yard of concrete (6-1/2 sack) with a minimum 28-day compressive strength of 4500 psi. Portland cement shall be Type II

2. Concrete shall contain 6% ±1% entrained air.

3. Water/cement ratio shall not exceed 0.45 (by weight).

4. Slump at placement shall be 4 inches.

**B.** Concrete used for thrust blocks or for pipe encasement shall contain not less than 517 pounds of Type II Portland Cement per cubic yard of concrete (5 1/2 sack).

**C.** Slurry cement backfill used in lieu of compacted soil shall contain not less than 188- pounds of Type II Portland Cement per cubic yard of concrete (2 sack) and shall comply with Section 19-3.02E of the State Standard Specifications.

### 2.2 AGGREGATE

**A.** Aggregate for normal weight concrete shall conform to Section 90-1.02C, “Aggregates” of the State Standard Specifications. Aggregates shall be free of dirt, clay balls, roots, bark and other deleterious substances and shall be thoroughly washed before use.

**B.** The combined aggregates for concrete shall conform to the grading limits for the one-inch, maximum size specified in Section 90-1.02C(4)(d), “Aggregate Gradation” of the State Standard Specifications, Combined Aggregate Gradings.
2.3 **WATER**

A. Water shall comply with Section on Water of the State Standard Specifications, and shall be clean and free from injurious amounts of acids, alkalis, salts, oils, organic materials or other deleterious substances.

2.4 **FLYASH**

A. Fly Ash: Shall comply with SSS Section 90-1.02B(3), “Supplementary Cementitious Materials”, and shall comply with AASHTO M 295, Class F or N.

1. Type of fly ash shall be compatible with the type of cement and the intended use of the concrete.

B. The combined weight of fly ash conforming to AASHTO M 295, Class F or N shall not exceed the amount provided for in Section 90-1.02B(3), “Supplementary Cementitious Materials” of the State Standard Specifications.

2.5 **ADMIXTURES**

Admixtures shall comply with Section 90-1.02E, “Admixtures”, of the State Standard Specifications

A. Air Entraining: ASTM C260

B. Water Reducing: ASTM C494, Type A, D or F

C. Accelerating: ASTM C494, Type C or E

1. No admixture containing any chloride ions is acceptable.

D. Retarding: ASTM C494, Type B, D or G

2.6 **REINFORCING STEEL**

A. Rebar shall be ASTM designation A615, Grade 60.

B. Welded wire fabric shall conform to ASTM A 1064.

2.7 **EXPOSED-TO-VIEW CONCRETE**

A. For exposed-to-view concrete, where legs of metal supports are in contact with forms, provide supports with legs which are plastic
protected (CRSI, Class I).

B. Metal bar supports in slab covers for sewage-containing structures shall also be provided with plastic coated legs.

### 2.8 FORM MATERIALS

A. Exposed Concrete: Plywood complying with U.S. Plywood Standard PS-1 “BB (Concrete Form) Plywood” Class I, or better.

B. Textured Finish Concrete: Units of face design, size arrangement and configuration to match control sample.

C. Cylindrical Columns and Supports: Metal, fiberglass or waxed paper tubes of sufficient wall thickness to resist imposed loads without deformation.

D. Form Release Agent shall leave behind a paintable concrete surface.
   1. Release #1, The Burke Co., or Engineer approved equivalent.

### 2.9 CURING MATERIALS

A. Polyethylene film

B. Reinforced waterproof paper
   1. Sisal Kraft, Orange Label, or approved equal.

C. Liquid-membrane curing compound
   1. Curing compound shall comply with ASTM C309, Type 2.
      a. White pigmented material
      b. Clear pigment may be used for concrete that will be exposed to public view.

### 2.10 WATERSTOP

A. Comply with the provisions of Section on Concrete Accessories.

### 3.1 REINFORCING STEEL

A. Comply with CRSI, “Placing Reinforcing Bars” and as specified herein.
B. Place reinforcing steel and embedded items in accordance with approved shop drawings.

C. Splicing of bars shall be by lapping. Lapped splices shall be 45 bar diameters for bar size through #8 and 60 bar diameters for larger bars, unless otherwise shown on the Plans.

D. Splicing of the wire fabric shall be by lapping. Lapped splices shall be two full mesh, minimum.

E. All rebar in vertical walls shall be supported by concrete block spacers or metal chairs.

F. Prior to placement of the concrete, reinforcing steel shall be cleaned and free of all concrete, dirt, oil, mill scale, rust or other coatings that would reduce or destroy the bond.

G. All reinforcing steel and embedded items shall be reviewed and approved by the Engineer prior to concrete placement.

3.2 FORMS

A. All forms shall be cleaned, and an approved agent applied each time they are used and shall be so constructed and set as to resist, without springing or settlement, the pressure of the concrete and the placing operations.

B. In designing forms and falsework, the concrete shall be treated as a liquid weighing at least 150 lbs. per cubic foot for vertical loads and not less than 85 lbs. per cubic foot for horizontal pressure. The design of the forms and falsework system shall include allowances for temporary construction loads. The rate of placement of concrete shall be so regulated that the pressures caused by the wet concrete will not exceed the designed form pressure. The unsupported length of wooden columns and compression members shall not exceed 30 times the width of the least side.

C. All forms shall be set and maintained in true alignment, grade and section until the concrete has sufficiently set. The interior surfaces of forms shall be adequately treated with an acceptable material to insure non-adhesion of mortar. All forms shall be mortar-tight. When forms appear to be unsatisfactory in any way, concrete placement shall be stopped until the defects have been corrected.

D. All exposed outside corners, including the top edges of all walls, machinery bases and curbs shall have a ¾-inch chamfer.
E. Metal tie rods or anchorages within the forms shall be fitted with suitable cones or comparable devices. Metal tie rods or anchorages shall be removed to a depth of 1" from the surface without injury to the concrete. All fittings for metal ties shall be of such design that upon their removal, the cavities which are left will be of the smallest possible size, but of sufficient diameter to allow the cavity to be "dry packed" with cement mortar. The cavities shall be filled with cement mortar and the surface left sound, smooth and even.

F. Form release agent shall be applied to the form so that no agent comes in contact with reinforcing steel.

3.3 PLACING

A. All concrete shall be placed before it has taken its initial set and shall be placed in horizontal layers and in such a manner as to avoid segregation. The concrete adjacent to the forms and joints shall be thoroughly internal consolidated with a vibrator operating at not less than 4,500 vibrations per minute.

1. Pumping equipment shall be of suitable type, without Y-sections, and with adequate pumping capacity.
2. Loss of slump in pumping shall not exceed 1\(\frac{1}{2}\) ".
3. Concrete shall not be placed through reinforcing that may cause separation of aggregates.

B. The concrete shall be deposited as nearly as possible in its final position. Drop chutes and elephant trunks shall be used on drops greater than 5 feet. Concrete shall be placed at such a rate that all concrete in the same lift will be deposited on plastic concrete. The concrete comprising each unit of work shall be placed in a continuous lift.

C. The Contractor shall notify the Engineer 24 hours (1 working day) prior to concrete placement.

1. The form work and reinforcing steel placement shall be approved by the Engineer prior to ordering concrete.

D. Form Removal. Minimum times for removal after concrete placement are as follows:

- Beam sides but not shoring 3 days
- Column forms and wall forms 2 days
- Forms for supported slabs but not shoring 14 days
E. Construction Joints

1. At ends of the first concrete pour, provide forms that positively locate any waterstop. Ensure the end forms of walls are removable without releasing the side forms. Provide seals around reinforcement and water stop to prevent mortar leaks.

2. Overlap the hardened concrete of the first pour with forms for the second pour. Brace the ends of the forms against the hardened concrete to prevent joint offsets and mortar leakage. Align any exterior features required on the finished surface.

3.4 CONCRETE JOINTS

A. General

1. Provide joints:
   
   a. As shown on the Drawings and as noted below in these Specifications.
   
   b. As required for constructability
   
   c. After favorable review of layout, sequence and concrete placement program.

2. Provide minimum curing times before the second placement:
   
   a. 2 days after the first concrete placement at the joint.

   b. 10 days after each adjacent concrete placement, for infill pours or checkerboard placement pattern.

B. Control Joints:

1. Space typical control joints in slabs on grade or suspended slabs not exceeding 10 feet, or as shown on the Drawings. Control joints shall not be provided in water containment structures.

2. If cast-in with the concrete, positively locate the preformed joint filler and hold rigidly in place during concreting.

3. If saw-cut, use a wheeled power saw as soon as the concrete surface is firm enough. Saw-cut control joints must be constructed within 12-hours after concrete placement. Fill the groove with sealant over a backer rod.
C. Construction Joints:

1. Produce quality concrete, with full continuity of reinforcing and water tightness across the joints.

2. Space typical slab joints not exceeding 20 feet in the direction of the transverse or secondary reinforcing, typically the smaller reinforcing nearer to the center of the slab thickness. Space typical vertical wall joints no more than 30 feet apart.

3. Provide all joints in walls and slabs, retaining liquids, or earth with 6-inch waterstops. Continue all reinforcing through the joint unless otherwise noted.

4. After the first concrete placement at the joint, do not walk on or disturb any reinforcing extending into the second placement area for at least 48 hours.

5. Before depositing new concrete on or against concrete that has hardened, clean and roughen the entire surface of the joint exposing clean coarse aggregate solidly embedded in mortar matrix. Provide typically 1/4-inch roughness or amplitude of the concrete surface measured from the top of the exposed aggregate to the bottom of pockets between stones.

6. Drench the prepared joint with clean water and remove prior to the concrete pour.

7. Cover horizontal wall joints and wall-to-slab joints with a minimum thickness of 2 inches and a maximum of 6 inches of the modified concrete mix, consisting of the designated concrete mix with one-half of the coarse aggregate removed.

8. Use special care in vibrating adjacent to construction joints to ensure thorough consolidation of the concrete around the waterstops and against the hardened portion of the joint. Additional hand tamping may be required.

9. For joints that are shown on architectural drawings as having a continuous reveal or recess, leave the wood form or pour strip used to create the reveal or recess in place or re-insert before roughening. Prevent the next concrete placement from filling the reveal or recess.

D. Expansion Joints

1. Stop all steel reinforcing clear of the joint at each side.
2. Provide 9-inch center bulb waterstop continuously around the joint in walls and slabs retaining liquids.

3. Prepare a smooth first concrete surface with all voids filled.

4. Provide preformed joint filler, securely fastened to the existing concrete as directed by the Manufacturer.

5. Install bond breaker and sealant after curing is completed and when directed.

E. Bonding to Pre-existing Concrete: Mechanically roughen the old surface to a 1/4-inch amplitude, as defined in construction joint paragraph above. Apply epoxy bonding material prior to concreting, as recommended by the manufacturer.

F. Waterstop

1. Restrict field splices to butt joints in straight runs. For PVC type, make by heat welding, using a splicing iron. For rubber, provide sleeve joints and glue. Follow the manufacturer's specifications.

2. Positively locate and support in the forms so that concrete may be placed, consolidated, and vibrated on both sides of the embedded portion without displacement of the waterstop and without causing voids in the concrete. Protect the outstanding portion from damage during the first concrete pour and clean and positively support prior to the second pour. Place, consolidate and vibrate the second pour without displacement of the waterstop and without causing voids in the concrete.

3.5 CONCRETE CURING

A. Exposed concrete surfaces shall be protected from premature drying by covering as soon as possible with canvas, plastic sheets with sealed joints, burlap, sand or other satisfactory materials and kept continuously moist; or, if the surfaces are not covered, they shall be kept continuously moist by flushing or sprinkling.

1. Curing shall continue for a period of not less than 7 days after placing the concrete. If curing compound is used, two (2) applications will be made for even coverage. Curing methods must be approved by the Engineer.

3.6 FINISHING

A. Defective and honeycombed surfaces shall be chipped back to such a
depth to expose solid concrete. The surface shall be dampened and coated with a bonding agent and packed with mortar.

B. Concrete Finishes for Vertical Wall Surfaces:

1. Form facing material shall produce a smooth, hard, uniform texture.
   a. Use forms specified for surfaces exposed to view in accordance with the Plans and other Specification Sections.

2. At a minimum, repair the following surface defects:
   a. Tie holes
   b. Honeycombs deeper than ¼”
   c. Air pockets deeper than ¼”
   d. Rock holes deeper than ¼”
   e. Scabbing

3. Chip or rub off fins exceeding 1/8” in height.

4. Provide SF/ESF 3.0 finish and a smooth-rubbed finish for:
   a. Walls being waterproofed, painted, coated with some other material.
   b. Use at all exposed surfaces not specified to receive another finish.

C. Related Uniform Surfaces (Except Slabs):

1. Strike smooth tops of walls or buttresses, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces after concrete is placed.

2. Float surface to a texture consistent with that of formed surfaces.

3. Continue treatment uniformly across unformed surfaces.

D. Concrete Finishes for Horizontal Slab Surfaces:

1. General: Tamp concrete to force coarse aggregate down from surface. Screed with straightedge, eliminate high and low places,
bring surface to required finish elevations; slope uniformly to drains. Dusting of surface with dry cement or sand during finishing processes not permitted.

2. Slab Finish shall be as follows:

a. Surfaces intended to receive damp proofing or water proofing membranes: Float finish.

b. Floors intended to receive floor coverings and MCC rooms: Trowel finish.

c. Sidewalks, garage floors, drive-throughs and ramps: Broom finish.

d. Exterior slabs, platforms, steps and landings, exterior and interior pedestrian ramps and interior stairs and all process equipment areas, not covered by other finish materials: Broom finish.

3. Deviation in finish surface shall not exceed ¼” in 10 ft.

4. No tolerance will be allowed that will result in the maximum running, or cross, slope exceeding the requirements of the Americans with Disabilities Act.

3.7 TESTING

A. Testing of concrete shall be as required by the Engineer and in accordance with ACI 301, Chapter 16.

1. All costs of initial testing will be paid by the Owner unless otherwise noted.

2. All costs involved, including those required by the Engineer, in retesting of concrete required because of a failure to meet these Specifications shall be at the expense of the Contractor.

3.8 WATERTIGHTNESS OF CONCRETE WORK

A. It is the intent of this Specification to obtain concrete and grout with homogenous structure, which when hardened will have the required strength, is watertight, and resistance to weathering.

3.9 HYDRAULIC TESTINGS OF STRUCTURES

A. It is the intent of this Specification to obtain concrete and grout with
homogenous structure, which when hardened will have the required strength, water tightness, and resistance to weathering.

B. General: Test all concrete tanks, hydraulic channels, sumps, basins and other structures designed to contain water, after concrete has reached the design strength, prior to backfilling, and application of any coating system. Test shall be performed by filling the structure with water.

C. Preparation: Provide the following.

1. All water necessary for testing shall be of acceptable Quality.
2. All evaporation and level measuring devices required.
3. All pumps, power, piping and any other equipment required. Make all hook-ups necessary to fill tanks for testing.
4. The water disposal method after testing is complete, including pumping if necessary.
5. Fill the structure with water to the extreme high operating surface level or to overflow weir level. Furnish and install temporary bulkheads, if required.
6. Maintain full for 48 hours before beginning the test period to permit concrete absorption and adjustment of valves, slide gates, or temporary bulkheads.
7. At completion of tests remove all temporary piping and connections. Dispose of wastewater without creating a nuisance of damage to adjacent property.

D. Test Period: Five consecutive 24-hour periods totaling 5 consecutive days. Take daily measurements of air and water temperature, rainfall and water level.

E. Test Procedure:

1. After test period, measure water level at each side of the tank to determine leakage and loss from evaporation.
2. Determine evaporation loss, using a standard 48-inch evaporation pan and level measuring device located adjacent to the tank.
3. Mark all observed damp areas, running or dripping leaks on exposed surfaces that have not healed autogenously during the test. Damp areas includes areas if moisture can be transferred from the exterior surface to a dry hand. Repair all those areas.

4. If leakage from the structure exceeds that permitted for the types of mechanical equipment providing closure plus 0.075% of the storage capacity, in each 24-hour period over a period of five consecutive days, perform a retest after completing repairs.

5. Provide acceptable procedures prior to repairs. Repairs by painting or surface treatment will not be acceptable.

6. Continue the test and repair procedure until the structure satisfies both the leakage calculation requirement and the visible leakage requirement.

F. Test for Manholes and Drop Inlets

1. Furnish and dispose of water used for testing.

2. Hydraulically test all manholes and drop inlets installed.

3. After all pipe has been laid, backfilling has been completed, and after the testing of the pipes, plug the end of the pipe stubs in each manhole with flexible-joint caps, or acceptable alternate, securely fastened.

4. Fill the manhole with water and measure leakage over a period of not less than one hour.

5. Allowable Leakage: less than one (1) gallon per hour per 10-foot depth of manhole.

6. When leakage from the manhole exceeds the above amount, determine the source or sources of the leakage, and repair or replace defective materials and workmanship.

7. Repair all visible leaks even if manhole passes the leakage test.

CONCRETE CURING:

1.1 WORK INCLUDED

A. Work required under this section consists of furnishing all materials, supplies, equipment, tools, transportation, and facilities, and performing
all labor and services incidental to concrete curing.

1.2 RELATED WORK

A. Division 3 – Concrete

1.3 REFERENCES


1.4 SUBMITTALS

A. As specified in Section on Submittal Procedures.

2.1 METHODS OF CURING

A. Newly placed concrete shall be cured by the methods specified in Section 90-1.03B of the State Standard Specifications (SSS).

1. 90-1.03B(2), Water Method

2. 90-1.03B(3), Curing Compound Method

3. 90-1.03B(4), Waterproof Membrane Method

4. 90-1.03B(5), Forms-In-Place Method

3.1 CURING

A. Exposed concrete surfaces shall be protected from premature drying by covering as soon as possible with canvas, plastic sheets with sealed joints, burlap, sand or other satisfactory materials and kept continuously moist; or, if the surfaces are not covered, they shall be kept continuously moist by flushing or sprinkling. Curing shall continue for a period of not less than 7 days after placing the concrete.

B. If curing compound is used, it must be nontoxic and taste and odor free, and provide a paintable concrete surface. Curing compound shall include a dye and two (2) applications shall be made to insure coverage. Curing materials and methods require approval by the Engineer prior to use.

3.2 CURING PAVEMENT

A. The entire exposed area of the pavement, including edges, shall be cured by the waterproof membrane method, or curing compound method using curing compound (1) or (2) as the Contractor may elect. Should the side forms be removed
before the expiration of 72 hours following the start of curing, the exposed pavement edges shall also be cured. If the pavement is cured by means of the curing compound method, the saw-cut and all portions of the curing compound that have been disturbed by sawing operations shall be restored by spraying with additional curing compound.

B. Curing shall commence as soon as the finishing process provided in Section 40-1.03M, "Final Finishing," has been completed. The method selected shall conform to the provisions in SSS Section 90-1.03B, "Curing Concrete."

C. When the curing compound method is used, the compound shall be applied to the entire pavement surface by mechanical sprayers. Spraying equipment shall be of the fully atomizing type equipped with a tank agitator that provides for continual agitation of the curing compound during the time of application. The spray shall be adequately protected against wind, and the nozzles shall be so oriented or moved mechanically transversely as to result in the minimum specified rate of coverage being applied uniformly on exposed faces. Hand spraying of small and irregular areas, and areas inaccessible to mechanical spraying equipment, in the opinion of the Engineer, will be permitted. When the ambient air temperature is above 60°F (15°C), the Contractor shall fog the surface of the concrete with a fine spray of water as specified in SSS Section 90-1.03B(2), "Water Method." The surface of the pavement shall be kept moist between the hours of 10:00 a.m. and 4:30 p.m. on the day the concrete is placed. However, the fogging done after the curing compound has been applied shall not begin until the compound has set sufficiently to prevent displacement. Fogging shall be discontinued if ordered in writing by the Engineer.

3.3 CURING STRUCTURES

A. Newly placed concrete for cast-in-place structures, other than highway bridge decks, shall be cured by the water method, the forms-in-place method, or, as permitted herein, by the curing compound method, in conformance with the provisions in SSS Section 90-1.03B, "Curing Concrete."

B. The curing compound method using a pigmented curing compound may be used on concrete surfaces of construction joints, surfaces that are to be buried underground, and surfaces where only Ordinary Surface Finish is to be applied and on which a uniform color is not required and that will not be visible from a public traveled way. If the Contractor elects to use the curing compound method on the bottom slab of box girder spans, the curing compound shall be curing compound (1), pigmented, Type 2, Class B.
C. Concrete surfaces of minor structures, as defined in SSS Section 51-7, "Minor Structures," shall be cured by the water method, the forms-in-place method or the curing compound method.

D. When deemed necessary by the Engineer during periods of hot weather, water shall be applied to concrete surfaces being cured by the curing compound method or by the forms-in-place method, until the Engineer determines that a cooling effect is no longer required. Application of water for this purpose will be paid for as extra work as provided in SSS Section 00 63 44 – Changes to the Work.

3.4 CURING MISCELLANEOUS CONCRETE WORK

A. Exposed surfaces of curbs shall be cured by pigmented curing compounds as specified in SSS Section 90-1.03B(3), "Curing Compound Method."

B. Concrete sidewalks, gutter depressions, island paving, curb ramps, driveways, and other miscellaneous concrete areas shall be cured in conformance with any of the methods specified in SSS Section 90-1.03B, "Curing Concrete."

C. Shotcrete shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in SSS Section 90-1.03B, "Curing Concrete."

D. Mortar and grout shall be cured by keeping the surface damp for 3 days.

E. After placing, the exposed surfaces of sign structure foundations, including pedestal portions, if constructed, shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in SSS Section 90-1.03B, "Curing Concrete."

PRECAST CONCRETE STRUCTURES:

1.1 WORK INCLUDED

A. Work required under this section consists of furnishing and installing precast, reinforced concrete structures of the sizes and types called for on the Plans, complete with openings, inserts, and hardware

1.2 RELATED WORK

A. Section on Cast In Place Concrete
B. Section on Concrete Accessories
C. Section on Trenching, Backfilling, & Compaction

D. Section on Pipe and Fittings

1.3 REFERENCES

A. American Concrete Institute (ACI)

B. American Society for Testing and Materials (ASTM)

C. State Standard Specifications

D. California Building Code (CBC)

1.4 SUBMITTALS

A. As specified in Section on Submittal Procedures.

B. Manufacturer's descriptive details of the manufacturer's latest standard product proposed for use on this project, including, but not limited to:

1. All principal dimensions.

2. Knockout locations and dimensions.

3. Hardware details.

4. Certification that the cement conforms to ASTM C150.

C. Shop and erection drawings, including design criteria and calculations, locations and types of all inserts, and the locations of all openings and location and type of joints.

1. The calculations and design drawings shall be stamped and signed by a civil or structural engineer registered in the State of California.

1.5 DEFECTIVE WORK

A. Work considered to be defective may be ordered, by the Engineer, to be replaced in which case the Contractor shall remove and replace the defective work at his expense.

2.1 GENERAL

A. Design all precast structures as specified herein and in accordance with
the applicable requirements of ASTM C913, except that Type II modified Portland cement shall be used.

1. Comply with the provisions of Section on Cast In Place Concrete.

B. Structures shall be of the sizes and configurations shown on the Drawings, with openings as shown. Wall and floor thickness, roof thickness and joint location shall be determined by the fabricator.

2.2 STRUCTURES

A. Oldcastle Precast 10,000 Gallon Capacity Septic Tank, Model CST-10000, or Engineer approved Equivalent.

B. Oldcastle Precast Model Catch Basin, model U21, with a specified depth of 2 feet, or Engineer approved equal

2.3 GRATE AND FRAME

A. As shown on the Plans. Structural steel, ASTM A36-92, hot dip galvanized after fabrication, and in conformance with AASHTO M111-91.

3.1 GENERAL:

A. Precast structures shall be set vertically and in true alignment, at the elevations indicated and at the locations shown on the Plans

B. All holes in sections used for handling purposes shall be thoroughly plugged with rubber plugs or mortar.

C. If starter couplings are not supplied, place pipe sections flush on the inside of the structure wall, projecting outside sufficiently for proper connection with the next pipe section

D. Follow manufacturer’s recommended installation procedures.

METAL DOORS & FRAMES:

1.1 WORK INCLUDED

A. All metal door and frames and related items necessary required to complete the work as indicated in the Plans.

B. All labor, materials, equipment, and incidentals necessary and required for their completion.
1.2 RELATED WORK

A. Section on Metal Buildings

1.3 GOVERNING STANDARD

A. Except as modified or supplemented herein, all steel doors and frames shall conform to the requirements of ANSI/SDI 100.

1.4 NOMENCLATURE

A. The nomenclature used herein conforms to ANSI A123.1.

1.1 SUBMITTALS

A. Submit shop drawings of all items specified herein per the requirements of Section on Submittal Procedures.

B. Shop drawings shall indicate details of each frame type: location in the building for each item; conditions at openings with various wall thicknesses and materials; typical and special details of construction; methods of assembling section; location and installation requirements for hardware; size, shape and thickness of materials; joints and connections.

1.2 ACCEPTABLE PRODUCTS

A. Subject to the requirements specified herein, internally reinforced doors and accompanying frames shall be equivalent to the following:

1. The Ceco Corporation Medallion
2. Curries Manufacturing Company Series 747T
3. Pioneer Industries Series C
4. Republic Builders Products DS Series

1.3 SHOP FINISH

A. A primer shall be applied to all surfaces of ferrous metal furnished under this section. Metal surfaces shall be cleaned and given a phosphate or equivalent treatment to ensure maximum corrosion protection and paint adherence. A dip or spray coat of synthetic resin, rust-inhibitive, metallic oxide or zinc chromate primer shall be applied to all surfaces, then baked or oven-dried. Finished surfaces shall be smooth and free from irregularities.

B. All finishes shall be submitted to Engineer for approval prior to ordering.
1.4 **MEASUREMENTS**

A. Measurements are given to define the size of the door and the Contractor shall verify all dimensions at the project before proceeding with its manufacture.

2.1 **MATERIALS**

A. Materials used in the manufacture and installation of steel doors and frames shall be as follows:

1. Door and Frames ASTM A366 or A569, stretcher leveled, commercial quality sheet steel with smooth, clean surface.
2. Internal Reinforcing ASTM A366, cold-rolled steel.
3. Fillers for Internally Reinforced Doors Mineral wool or Fiberglass
4. Urethane Core Liquid urethane, expanded in place; self-bonding, self-hardening, and self-extinguishing.
5. Anchoring Devices Zinc plated where exposed; zinc plated or galvanized where concealed.
6. Expansion Anchors As specified in the anchor bolts and expansion anchors section.

2.2 **FRAMES**

Frames for doors shall be formed of steel to the sizes and shapes indicated. Metal for frames shall be not lighter than 16 gage.

A. The finished work shall be strong and rigid, neat in appearance, and free from defects. Molded members shall be fabricated straight and true with corner joints well formed, and with fastenings concealed where practicable.

B. Joints for frames shall be mitered or butted and continuously welded on the reverse side to produce rigid joints which are invisible on the face of the frame. Frame bottoms shall be held rigidly in position by spreader bars to maintain proper alignment during shipment and erection.

C. Frames shall be prepared at the factory for the specified hardware. Frames shall be mortised, reinforced, drilled, and tapped for mortised hardware, and shall be reinforced for surface-applied hardware. Cover
boxes shall be provided in back of all hardware cutouts. Lock strikes shall be set out and adjusted to provide clearance for silencers.

D. Concealed metal reinforcements shall be provided for hardware with the following minimum thicknesses:

1. Hinge reinforcement 10 gage
2. Strike reinforcement 14 gage
3. Closer reinforcement 12 gage
4. Other reinforcement 14 gage

2.3 DOORS

A. Doors shall be flush hollow metal with urethane core and shall be as specified herein. Doors shall be prepared to receive the hardware specified in the finish hardware section.

B. Doors shall be rigid, neat in appearance, and free from defects. All welded joints on exposed surfaces shall be dressed smooth so that they are invisible after finishing.

C. Doors shall be 1-3/4 inches thick, full flush type, of the sizes and design indicated. Clearances for doors shall be 1/8 inch at jambs and heads and 3/4 inch at bottom unless otherwise indicated or specified.

D. Doors shall have 18 gage seamless outer sheets. Side edges of doors shall be flush and closed watertight. All seams shall be continuously welded and ground smooth. Doors shall be prepared at the factory for hardware as indicated on the Plans and as specified. Door edges shall be beveled or rounded.

E. Internally reinforced doors shall have fillers placed in the spaces between reinforcing members and shall be reinforced by 22 gage or heavier vertical steel stiffeners installed on 6 inch centers and welded to face sheets.

F. Out swinging exterior doors shall be finished flush at the top with all seams and joints closed watertight as specified for side edges.

G. Doors shall be mortised, reinforced, drilled, and tapped for mortised hardware. Reinforcing units shall be provided for locksets. Reinforcing plates shall be provided for mortised and surface-applied hardware in at least the following thicknesses:
1. Hinge reinforcement 10 gage
2. Surface-applied closers and hold open arms 12 gage
3. Other reinforcement 14 gage

H. The location of hardware items shall be in accordance with DHI "Recommended Locations for Builders' Hardware for Standard Steel Doors and Frames."

2.4 HARDWARE

A. Each door shall be furnished with the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Number Required</th>
<th>Manufacturer and Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butts</td>
<td></td>
<td>Stanley, FBB 191-630 4 ½ x 4 ½ NRP</td>
</tr>
<tr>
<td>Lockset</td>
<td></td>
<td>CECO, BRS 448/12-630 w/square rosette</td>
</tr>
<tr>
<td>Cylinder</td>
<td></td>
<td>Schlage, 20-001-630 with cover as required by lock furnished.</td>
</tr>
</tbody>
</table>

B. Equivalent products of other manufacturers will be considered subject to approval by Engineer.

3.1 WORKMANSHIP

A. General: Insofar as possible, execute fitting, constructing and fabricating at shop, ready for erection at building. Provide holes, connections and fastenings for and to work of other trades abutting, adjoining or intersecting specified work.

B. Hardware: Execute hardware fitting at shop. Provide slackage or mortises as required; form accurately to template so that hardware will fit neatly into depressions with member flush, unless otherwise required.

3.2 HOLLOW METAL FRAMES

A. General: Hollow metal frames shall be installed where indicated.

B. Wall Anchors: Equip frames on each side with four (4) anchors at door frames. Weld anchors to flange returns or to flanges near the back of the frame.
C. Knee Anchors: For frame bottoms extending to the floor, use 14 gage knee angle anchors 2" x 2", width of frame; spot welded to frame; provide two 3/8-inch diameter holes in horizontal leg.

D. Rubber Bumper: Drill frames for approved rubber bumpers on all strike jambs except at exterior doors.

3.3 HOLLOW METAL DOORS

A. General: Hollow metal doors shall be the type, design, sized as specified and installed on a vertical plane.

B. Clearance: provide doors with minimum clearance necessary for operation without binding.

3.4 PROTECTION

A. Protect doors and frames from damage during transportation. Damaged work will be rejected and shall be replaced with new work.

B. Protect frames from damage at jobsite. Store, at the site, under cover on wood blocking or on suitable floors. After installation, protect frames from damages during subsequent construction activities. Damaged work will be rejected and shall be replaced with new work at no cost to the Owner.

3.5 INSTALLATION

Install work in correct locations, in alignment, plumb, and in true planes. Make breaks, angles and corners square with walls. Set work that is to be built-in correctly; maintain until enclosed or built-in and, except for moving parts, fasten securely in place; make rigid. Do required blocking and wedging for frames and hardware.

OVERHEAD COILING DOORS:

1.1 SUMMARY

A. Section Includes

1. Overhead coiling doors with operating hardware.

B. Related Sections

1. Section on Metal Building
1.2 REFERENCES

A. ASTM A653 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.


1.3 SYSTEM DESCRIPTION

A. Electric motor operated units with manual override in case of power failure.
B. Surface mounted.

1.4 DESIGN REQUIREMENTS

A. Design door assembly to withstand wind/suction load of 20 psf, without undue deflection or damage to door or assembly components.
B. Design door to be rust resistant.

1.5 SUBMITTALS

A. As specified in Section on Submittal Procedures.

B. Shop Drawings: Indicate gages and finish of metals, methods of joining members, location and reinforcement for hardware and anchorage, jamb side and head clearances required, pertinent dimensions, and installation details.

C. Product Data: Provide general construction, component connections and details; include information on materials and finishes.

D. Samples: Submit two door slats, 12 inch in size illustrating shape, color and finish texture.

E. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.

1.6 MAINTENANCE DATA

A. Maintenance Data: Indicate lubrication requirements and frequency, periodic adjustments required.
1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.8 COORDINATION

A. Coordinate the work with installation of support framing.

2.1 MANUFACTURERS

A. Provide model IMB V5® Insulated Rolling Service Doors as manufactured by Alpine Overhead Doors, Inc., East Setauket, NY, or Engineer approved equivalent.

2.2 MATERIALS

A. Curtain:

1. Slats: Constructed of 5/8” thick interlocking, roll-formed Insulated Metal Backed (IMB) V5 slats. (Slat construction allows for dual coiling flexibility)
   a. Slat/Back Cover Material:
      1) Aluminum
      2) Finish: Mill Finish Clear anodized
   b. Gauge: (Per manufacturer’s standard)
      1) Front slat: Minimum 0.050” thick aluminum.
      2) Back cover: Minimum 0.040” thick aluminum.

2. Endlocks and Windlocks (as required):
   a. Ductile cast iron, hot-dip galvanized endlocks riveted (solid rivets, minimum 3/16” thick) to each end of alternate slats to prevent lateral movement and to limit slat deflection and bending stress.

3. Bottom Bar:
   a. Two roll formed aluminum angles, minimum 2”x2” x1/8”, which extend into guides, designed to reinforce curtain bottom.
      1) Aluminum
      2) Finish: Mill Finish Clear anodized
B. Guides

1. Guides shall be designed using structural angles with a minimum thickness of 3/16”, minimum 1¼” slotted connections, and removable bellmouth curtain stops to allow for curtain maintenance without removal of guides. Bellmouth stops shall be flush with guide groove. Guides shall be fastened with minimum 3/8” bolts at minimum 24” o.c.

   a. Material:

      1) Extruded Aluminum

      2) Finish: Mill Finish Clear anodized

C. Door Support Brackets and Mounting Plates

1. Steel plate not less than 1/4” thick. Provide ball bearings at rotating support points. Bolt plates to wall mounting angles with minimum 1/2" fasteners. Plate supports counterbalance assembly and forms end enclosures.

   a. Material:

      1) ASTM 240 Stainless Steel 300 Series

      2) Finish: Mill Finish #2B

   b. Stop Lock bearing: To prevent door from free falling in the event hand chain fails/slips.

D. Counterbalance Assembly: Torsion

1. Counterbalance assembly: Steel pipe barrel of a size capable of carrying a curtain load with a maximum deflection of 0.03” per foot of door width. Heat- treated helical torsion springs encased in a steel pipe and designed to include an overload factor of 25% to ensure minimum effort to operate. Sealed and prelubricated high speed ball bearing at rotating support points. Torsion spring charge wheel for applying spring torque and for future adjustments.

   a. Material:

      1) A 312 Stainless Steel 300 Series

      2) Finish: Mill finish

   b. Life Cycle: Design doors of standard construction for normal use of 10,000 cycles standard (up to 400,000 cycles).
E. Hood

1. 0.040” aluminum. Formed to fit the contour of the end brackets with reinforced top and bottom edges. Provide support bracing for doors wider than 20 feet at every 10 feet to prevent excessive sag. Fastened to end brackets.

2. Shape: Hexagon

3. Material:
   a. Aluminum
   b. Finish: Mill Finish Clear anodized

4. Fascia: Galvanized Aluminum, provided where areas behind door hood are open. Materials and finish same as hood.

F. Locking

1. Manual chain hoist: Provide padlockable chain keeper on guide

G. Weatherstripping


2. Guides: Snap-on vinyl.


2.3 OPERATION

A. Manual hand chain:

1. Provide chain hoist operator with endless steel chain, chain pocket wheel and guard, geared reduction unit, and chain keeper secured to guide.

2.4 MOUNTING

A. Interior face mounted on prepared opening.

3.1 EXAMINATION

A. Verify conditions are satisfactory for the installation of the work of this Section.
B. Verify that opening sizes, tolerances and conditions are acceptable.

C. If unsatisfactory conditions exist, do not begin installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 INSTALLATION

A. Install door unit assembly with electric operators and controls in accordance with manufacturer's instructions. Coordinate installation with electric service.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

E. Coordinate installation of sealants and backing materials at frame perimeter as specified per manufacturer’s instructions.

F. Install perimeter trim and closures.

3.3 ERECTION TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum variations: Do not exceed manufacturer's standards.

3.4 MANUFACTURER'S FIELD SERVICE

A. Manufacturer to furnish maintenance and call-back service for the duration of Contractor's warranty period.

B. Perform service by manufacturer's trained employees during regular working hours. Provide emergency service when requested.

C. Service

1. Include examination of equipment, adjustments, supplies, lubrication and parts necessary to keep equipment in proper operation.
2. The cost of adjustments, parts, and repairs made necessary by abuse, misuse, and other cause beyond manufacturer's control will be paid by Department at manufacturer's standard hourly rate.

3. Department will pay for emergency service, except where attributable to faulty materials or equipment.

3.5 **ADJUSTING**

A. Test each assembly for proper operation.

B. Adjust and lubricate door, hardware and operating assemblies for smooth, quiet operation, free from binding.

3.6 **CLEANING**

A. Clean door and components.

B. Exposed surfaces shall be free from scratches, dents, tool marks, stains, discoloration, other defects and damage.

C. Remove labels and visible markings.

**GENERAL EQUIPMENT STIPULATIONS:**

**1.1 SCOPE**

A. Contractor to furnish and install a Heavy Duty 3 Brush Combination Rollover with overlapping side brushes per Appendix A of these Project Specifications, or an Engineer approved equivalent.

B. All equipment furnished and installed under this Contract shall conform to the general stipulations set forth in this section except as otherwise specified in other sections.

**1.2 RELATED WORK**

A. Section on Anchor Bolts

B. Section on Cast-In-Place Concrete

C. Section on Electrical

D. Section on Medium-Voltage Cables
1.3  **COORDINATION**

A. Contractor shall coordinate all details of the equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alterations in the Work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.

1.4  **MANUFACTURER'S EXPERIENCE**

A. Unless specifically named in the Specifications, a manufacturer furnishing equipment of the type and size specified shall have been in successful operation for not less than the past five years.

1.5  **WORKMANSHIP AND MATERIALS**

A. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage, or other failure. Materials shall be suitable for service conditions.

B. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and gages so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required by tests.

C. Except where otherwise specified, structural and miscellaneous fabricated steel used in equipment shall conform to AISC standards. All structural members shall be designed for shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment shall be at least 1/4 inch thick.

1.6  **LUBRICATION**

A. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during start up or shutdown and shall not waste lubricants.

B. Lubricants, of the type recommended by the equipment manufacturer, shall be provided in sufficient quantity to fill all lubricant reservoirs and to replace all consumption during testing, startup, and operation prior to acceptance of equipment by Owner.
C. Lubrication facilities shall be convenient and accessible. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal installed position.

2.1 ELECTRIC MOTORS

A. Unless otherwise specified, motors furnished with equipment shall meet the following requirements:

1. High efficiency motors shall be supplied for the motor driven equipment specified to be furnished in this contract. Certification shall be supplied for each size, speed, and type of motor indicating the guaranteed minimum efficiency at full load and that the efficiency tests were done in accordance with IEEE Standard 112, Test Method B, using accuracy improvement by segregated loss determination including stray load loss improvement as specified in NEMA Standard MG1-12.53a.

2. Designed and applied in accordance with NEMA, ANSI, IEEE, AFBMA, and NEC for the duty service imposed by the driven equipment, such as frequent starting, intermittent overload, high inertia, mounting configuration, or service environment.

3. Rated for continuous duty at 40º C ambient, unless the application is well recognized for intermittent duty service as a standard industry practice.

4. Insulated with Class B, Class F, or Class H insulation and designed for a service factor of 1.00, 1.15, or greater.

5. Three-phase motors used in conjunction with variable speed drives shall have Class F insulation with a Class B temperature rise at rated nameplate horsepower, and 1.15 service factor.

6. When operating at service factor load, maximum observable temperature rise of insulation and motor parts, as determined by resistance or thermometer methods, shall not exceed the NEMA allowable limits for the type of motor, the type of enclosure, and the particular application with regard to continuous or intermittent duty.

7. To ensure long motor life, nameplate horsepower, regardless of service factor, shall be at least 115 percent of the maximum load imposed by the driven equipment.
8. Designed for full voltage starting.

9. Designed to operate from an electrical system that may have a maximum of 5 percent voltage distortion per IEEE Standard 519.

10. De-rated, if required, for the altitude at which the equipment is installed.

11. Clamp-type grounding terminal shall be inside motor conduit box.

12. External conduit boxes shall be oversized at least one size larger than NEMA standard.

13. Totally enclosed motors shall have a continuous moisture drain which also excludes insects.

14. Bearings shall be either oil or grease lubricated.

15. Manufacturer's standard motor may be supplied on integrally constructed, packaged assemblies such as appliances, tools, unit heaters, and similar equipment specified by model number, in applications where a redesign of the unit would be required to furnish motors of other than the manufacturer's standard design. However, in all cases, totally enclosed motors are preferred and shall be furnished if offered by the manufacturer as a standard option.

16. Totally enclosed motors shall be furnished on:

   a. Outdoor equipment.

   b. Equipment for installation below grade.

   c. Chemical feeding and chemical handling equipment.

   d. Equipment operating in wet or dust-laden locations.

17. Drip-proof motors, or totally enclosed motors at the supplier's option, shall be furnished on equipment in indoor, above-grade, clean, and dry locations.
18. Explosion-proof or submersible motors shall be furnished as required by applicable codes, as specified in other sections, or at the supplier's option.

19. Motors shall be rated and constructed as follows:

   a. Below 1/2 HP.

      1) 115 volts, 60 Hz, single phase.
      2) Built-in manual-reset thermal protector, or integrally mounted stainless steel enclosed manual motor starter.

   b. 1/2 HP and above.

      1) 230 volts, 60 Hz, 3 phase, or
      2) 460 volts, 60 Hz, 3 phase, as specified on the Drawings
      3) Where specified or required by the drawings, motors used on 240 volt systems shall be 230 volts, 60 Hz, 3 phase.

2.2 DRIVE UNITS

A. The nominal input horsepower rating of each gear or speed reducer shall be at least equal to the nameplate horsepower of the drive motor. Drive units shall be designed for 24-hour continuous service.

1. Gear motors. Unless otherwise specified, the use of gear motors will not be acceptable.

2. Gear Reducers. Each gear reducer shall be a totally enclosed unit with oil or grease lubricated, rolling element, antifriction bearings throughout.

3. Helical, spiral bevel, combination bevel-helical, and worm gear reducers shall have a service factor of at least 1.50 based on the nameplate horsepower of the drive motor. Shaft-mounted and flange-mounted gear reducers shall be rated AGMA Class II. Helical gear reducers shall have a gear strength rating to catalog rating of 1.5. Each gear reducer shall bear an AGMA nameplate.

4. The thermal horsepower rating of each unit shall equal or exceed the nameplate horsepower of the drive motor. During continuous operation, the maximum sump oil temperature shall not rise more than 100º F above the ambient air temperature in the vicinity of
the unit and shall not exceed 200°.

5. Each grease lubricated bearing shall be installed in a bearing housing designed to facilitate periodic re-greasing of the bearing by means of a manually operated grease gun. Each bearing housing shall be designed to evenly distribute new grease, to properly dispose of old grease, and to prevent over-greasing of the bearing. The use of permanently sealed, grease lubricated bearings will not be acceptable. An internal or external oil pump and appurtenances shall be provided if required to properly lubricate oil lubricated bearings. A dipstick or sight glass arranged to permit visual inspection of lubricant level shall be provided on each unit.

6. Gear reducers which require the removal of parts or periodic disassembly of the unit for cleaning and manual re-greasing of bearings will not be acceptable.

7. Certification shall be furnished by the gear reducer manufacturer indicating that the intended application of each unit has been reviewed in detail by the manufacturer and that the unit provided is fully compatible with the conditions of installation and service.

   a. Variable Speed Drives. Each mechanical variable speed drive shall have a service factor of at least 1.75 at maximum speed based on the nameplate horsepower of the drive motor. A spare belt shall be provided with each variable speed drive unit employing a belt for speed change. Unless specifically permitted by the detailed equipment specifications, bracket type mounting will not be acceptable for variable speed drives.

   b. V-Belt Drives. Each V-belt drive shall include a sliding base or other suitable tension adjustment. V-belt drives shall have a service factor of at least 1.6 at maximum speed based on the nameplate horsepower of the drive motor.

2.3 SAFETY GUARDS

A. All belt or chain drives, fan blades, couplings, and other moving or rotating parts shall be covered on all sides by a safety guard. Safety guards shall be fabricated from 16 USS gage or heavier galvanized or aluminum-clad sheet steel or 1/2-inch mesh galvanized expanded metal. Each guard shall be designed for easy installation and removal. All necessary supports and accessories shall be provided for each guard. Supports and accessories, including bolts, shall be galvanized. All safety guards in outdoor locations shall be designed to prevent the entrance of rain and dripping water.
2.4  **ANCHOR BOLTS**

A. Equipment suppliers shall furnish suitable anchor bolts for each item of equipment. Anchor bolts, together with templates or setting drawings, shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete is placed. Anchor bolts shall comply with the anchor bolts and expansion anchors section and, unless otherwise specified, shall have a minimum diameter of 3/4 inch.

B. Unless otherwise indicated or specified, anchor bolts for items of equipment mounted on base plates shall be long enough to permit 1-1/2 inches of grout beneath the base plate and to provide adequate anchorage into structural concrete.

2.5  **EQUIPMENT BASES**

A. Unless otherwise indicated or specified, all equipment shall be installed on concrete bases at least six inches high. Cast iron or welded steel base plates shall be provided for pumps, compressors, and other equipment. Each unit and its drive assembly shall be supported on a single base plate of neat design. Base plates shall have pads for anchoring all components and adequate grout holes. Base plates for pumps shall have a means for collecting leakage and a threaded drain connection. Base plates shall be anchored to the concrete base with suitable anchor bolts and the space beneath filled with grout as specified in the grout section.

2.6  **SPECIAL TOOLS AND ACCESSORIES**

A. Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

2.7  **SHOP PAINTING**

A. All steel and iron surfaces shall be protected by suitable paint or coatings applied in the shop. Surfaces which will be inaccessible after assembly shall be protected for the life of the equipment. Exposed surfaces shall be finished, thoroughly cleaned, and filled as necessary to provide a smooth, uniform base for painting. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed or finished with a high-grade, oil-resistant enamel suitable for top coating in the field with an alkyd enamel. Coatings shall be suitable for the environment where the equipment is installed.
B. Surfaces to be painted after installation shall be prepared for painting as recommended by the paint manufacturer for the intended service, and then shop painted with one or more coats of the specified primer.

1. All shop primers shall be submitted to the Engineer for review prior to application.

C. Machined, polished, and nonferrous surfaces which are not to be painted shall be coated with rust preventive compound, such as Houghton "Rust Veto", Rust-Oleum "R-9" or Engineer approved equivalent.

3.1 PREPARATION FOR SHIPMENT

A. All equipment shall be suitably packaged to facilitate handling and protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.

B. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of Engineer.

C. Grease and lubricating oil shall be applied to all bearings and similar items.

D. Each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.

3.2 STORAGE

A. Upon delivery, all equipment and materials shall immediately be stored and protected until installed in the Work.

B. Pumps, motors, electrical equipment, and all equipment with antifriction or sleeve bearings shall be stored in weathertight structures maintained at a temperature above 60º F. Equipment, controls, and insulation shall be protected against moisture and water damage. All space heaters furnished in equipment shall be connected and operated continuously.

C. Equipment and materials shall not show any pitting, rust, decay, or other deleterious effects of storage when installed in the Work.

3.3 INSTALLATION AND OPERATION

A. Equipment shall not be installed or operated except by, or with the
guidance of, qualified personnel having the knowledge and experience necessary to obtain proper results. When so specified, or when employees of Contractor or his Subcontractors are not qualified, such personnel shall be field representatives of the manufacturer of the equipment or materials being installed.

B. Qualified field representatives shall be provided by the equipment manufacturers as required to perform all manufacturer's field services called for in the Specifications. Manufacturer's field representatives shall observe, instruct, guide, and direct Contractor's erection or installation procedures, or perform an installation check, as required. The field representative shall revisit the site as often as necessary to attain installation satisfactory to Engineer.

C. All equipment installed under this Contract shall be placed into successful operation according to the written instructions of the manufacturer or the instructions of the manufacturer's field representative. All required adjustments, tests, operation checks, and other startup activity shall be provided.

D. Acceptance of Work in connection with the installation of equipment furnished by others will be subject to approval of the field representative. Contractor shall be responsible for planning, supervising, and executing the installation of Work, and the approval or acceptance of Engineer or the field representative will not relieve Contractor of responsibility for defective Work.

3.4 OBSERVATION OF PERFORMANCE TESTS

A. Where the Specifications require the presence of Engineer, initial tests shall be observed or witnessed by Engineer. Owner shall be reimbursed by Contractor for all costs of subsequent visits by Engineer to witness or observe incomplete tests, retesting, or subsequent tests.

3.5 WARRANTY

A. A written manufacturer’s warranty shall be provided for equipment supplied under this contract. The warranty shall be for a minimum of one (1) year or as specified in accordance with other Sections of the contract documents, after the date the equipment is accepted for use by the Owner by filing of the notice of completion, unless otherwise agreed in writing by Owner. The warranty shall cover all defects or failures of materials, design, or workmanship that occur as the result of normal operation and service.
METAL BUILDING:

1.1 WORK INCLUDED

A. Design and Fabrication

1. Designed, pre-engineered and shop fabricated structural steel building frame for both open and closed structures.

2. Metal wall and sloped roof system including soffits, gutters and downspouts.

3. Exterior doors.

4. Flashings.

B. Erection of the metal building on concrete foundations, which are to be designed and permitted by the contractor/fabricator, including anchor bolts and all building accessories specified and indicated on the Plans.

C. Field painting, and other items on building construction not specifically covered herein and covered in other sections shall be provided in the construction of the prefabricated metal building.

D. All labor, materials, equipment and incidentals necessary and required for the completion of the building.

1.2 RELATED WORK

A. Section on Cast-In-Place Concrete

1.3 REFERENCES

A. AAMA 603.8 – Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.


D. AISI – Specification for the Design of Cold-Formed Steel Structural Members.

E. ASTM A36 – Structural Steel.
F. ASTM A123 – Zinc Coatings (Hot Dip Galvanized) on Iron and Steel Products.

G. ASTM A153 – Zinc Coating (Hot Dip) on Iron and Steel Hardware.

H. ASTM A307 – Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

I. ASTM A325 – Structural Bolts, Heat Treated, 120/105 ksi Minimum Tensile Strength.

J. ASTM A490 – Heat-Treated Steel Structural Bolts 150 ksi Minimum Tensile Strength.

K. ASTM A500 – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

L. ASTM A653 – Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.

M. ASTM A529 – Structural Steel with 42 ksi (290 MPa) Minimum Yield Point (2 inch (13mm) Maximum Thickness).

N. ASTM A570 – Steel, Sheet and Strip, Carbon, Hot Rolled, Structural Quality.

O. ASTM A572 – High Strength Low Alloy Columbium-Vanadium Steel of Structural Quality.

P. ASTM A792 – Steel Sheet, Aluminum-Zinc Alloy Coated by the Hot-Dip Process, General Requirements.

Q. ASTM F593 – Stainless Steel Bolts, Hex Cap Screws, and Studs.

R. AWS A2.4 – Standard Welding Symbols.

S. AWS D1.1 – Structural Welding Code - Steel.

T. CCR – California Code of Regulations.

U. SSPC – Steel Structures Painting Council.

1.4 SUBMITTALS

A. As specified in Section on Submittals.

B. Submit structural drawings and calculations, signed and sealed by a structural engineer licensed in the State of California.
1. Submit five copies of complete structural design calculations. Submit with shop drawings.

2. Include vertical loads, lateral seismic loads, and wind loads.

3. Calculations shall be complete and shall include roof decks, wall panels, structural members, equipment supports, framing around openings, braces, connections, lateral bracing of equipment, bracing of interior and exterior walls, suspended ceilings, and suspended equipment.

4. When structural calculations are electronically prepared, submit diagrammatic models of each element, clearly cross-referenced to calculations.

C. Shop Drawings

1. Indicate assembly dimensions, locations of structural members, connections, attachments, openings, cambers, loads.

2. Indicate wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, method of installation.

3. Indicate framing anchor bolt settings, sizes, and locations from datum, and foundation loads.


5. Indicate openings, attachments, components, primers, finishes, and other information required for fabrication and erection.

D. Product Data: Provide data on profiles, component dimensions, fasteners, and manufacturer's specifications.

E. Certificates of welders performing structural welding.

F. Certificates that all bolts supplied and installed meet the requirements of these specifications.

G. Manufacturer's certificate that products meet or exceed specified requirements.

H. Submit location and schedule of off-site fabrication.

I. Manufacturer's Installation Instructions: Indicate requirements for
assembly sequence, field bolting and welding, and painting and cleanup.

1.5 **SYSTEM DESCRIPTION**

A. Clear span rigid frame type and modular rigid frame type supported with intermediate columns as indicated.

B. Primary Framing: Rigid frame of rafter beams and columns, canopy beams, intermediate columns, end wall columns, and wind bracing.

C. Secondary Framing: Purlins, girts, eave struts, flange bracing, sill supports, clips, and other items detailed.

D. Wall and Roof System: Preformed metal panels of indicated profile, with sub-girt framing/anchorage assembly, sag rods, and accessory components.

E. Roof Slope: One inch in 12 inches, unless otherwise indicated.

1.6 **DESIGN REQUIREMENTS**

A. Design building structure and components in accordance with requirements of CCR Title 24, Part 2. State Chapters apply. Alternate methods of analysis are not acceptable.

B. Conform to AISC and AISI Specifications.

C. Assembly to permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 60° F.

D. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

E. Metal building system shall be provided in accordance with the per the Plans.

1.7 **STRUCTURAL DESIGN - VERTICAL LOADS**

A. Design for in-place loads generated by the materials used, equipment supported on roofs or walls, equipment suspended from roofs or walls, suspended finishes, and other items indicated to be supported.

B. Design for minimum 10 psf dead load for mechanical piping and ceiling
loads in addition to the metal building dead load. Add 5 psf collateral load for mechanical piping in areas where no ceiling is specified.

C. Where operating equipment is located on, or suspended from the structure, the design weight of the equipment shall be increased 20 percent for impact.

D. In addition to the loads specified above, design structure to support the following minimum live loads, unless greater loads are indicated:

1. Uniform live load on roofs and canopies: 20 pounds per sq ft.

E. Allowable Deflections Under Dead and Live Loads

1. Structural Members: L/240 of the clear span.
2. Roof: L/240 of the center to center span.

1.8 STRUCTURAL DESIGN - LATERAL LOADS

A. Design structure to resist wind loads allowable per City of Bakersfield design standards.
1. Design and detail skin, roof decks, walls, and roof supporting members for pressure and suction acting perpendicular to the surface.
2. Deflection of skin, roof decks, walls, and roof supporting members for pressure and suction acting perpendicular to the surface shall not exceed L/240 of the center to center span.
3. Limit drift due to wind forces, computed at the eave, to H/200 times the eave height.

B. Design structure to resist seismic forces. Determine V per CBC Chapter 16A (Building Category 3):

1. 

\[
\begin{align*}
Z &= 0.40 \text{ (PGA = 0.26 g)} \\
\text{Soil Profile} &= \text{Type SD} \\
Na &= 1.0 \text{ source factor} \\
Nv &= 1.0 \text{ source factor} \\
I &= 1.00 \\
\end{align*}
\]

\[R = 4.5 \text{ for moment-resisting frames.}\]
\[R = 4.2 \text{ for braced frames, provided that all members and connections in braced frames be designed for } 3(Rw/8) \text{ times the design seismic force.}\]
\[R = 2.2 \text{ cantilevered column building}\]

2. Limit drift due to seismic forces, computed at the eave, to H/200.
3. Design structure to carry equipment loads including, but not limited to, mechanical equipment, plumbing, electrical, suspended ceilings, interior and exterior partitions, masonry walls, and storage contents of mezzanines.
1.9 **STRUCTURAL DESIGN - LATERAL BRACING SYSTEM**

A. Bracing and connections shall be capable of transferring loads from structure to foundations in a direct manner. Eccentricities shall be avoided, and shall be accounted for where they occur. Wall bracing shall clear all openings and not penetrate rated walls.

B. There shall be a complete and continuous "collector" and "chord" system capable of delivering the code specified lateral forces to the bracing systems. Collector and chord members shall be designed to resist axial tension and compression forces in combination with any other loads delivered simultaneously to these members.

C. Provide adequate tie-downs for overturning forces to the foundations. Coordinate column base details with details indicated on structural Drawings.

D. **Longitudinal Vertical (Wall) Bracing**

1. Lateral Force Resisting System: Concentric diagonal braced frames on member center lines or moment resisting frames.

2. Braces: Steel angle sections.

3. Washers: Cast iron or similar brittle material shall not be used for washers.

4. Where moment frames are used in conjunction with braced frames, moment frames must have compatible (equivalent) stiffness to the braced frames, and the "R" value for the most stringent system shall be used for computing loads on the entire structure.

E. **Roof Bracing**: Design braces for three times the code-specified forces, including the importance factor "I", if tension only braces are used, and where the slenderness ratio exceeds 120.

F. **Metal building Foundation**: Foundation design presented on drawings is generic in nature and intended only to provide general scope of foundation required. Contractor shall submit engineering calculations and drawings for foundation construction sealed by an engineer having a current California registration as a Civil or Structural Engineer. Such calculations and drawings shall show modifications to the foundations as required for the specific roofing and framing system proposed.
Foundation system shall be designed using CBC soil pressures or geotechnical recommendations. Foundations and anchorages shall accommodate building reactions from gravity loads, live loads, seismic forces and wind loads.

1.10 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum ten years experience.
   
   1. Certified under the AISC Quality Certification Program.
   
   2. ICBO Approved.

B. Design Work under direct supervision of a Professional Civil or Structural Engineer experienced in design of this work and licensed in the State of California.

1.11 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this Section, under provisions of Division 1.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Provide factory wrapping, packaging, and other means necessary to prevent damage or deterioration during shipping, handling, and storage.

B. Maintain protective coverings in place and in good repair until removal is necessary for the work.

C. Store products inside enclosed storage facilities or closed building, supported above grade or on slabs-on-grade.

D. Maintain storage spaces and products in dry conditions and within temperature and humidity conditions recommended by manufacturer.

1.13 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication and installation.

1.14 SEQUENCING AND SCHEDULING

A. Coordinate the work of this section with other Sections whose work affects or is affected by the work of this Section.
B. Ensure proper sequencing and fitting of construction.

1.15 **WARRANTY**

A. Provide ten-year warranty.

B. Warranty

1. Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading.

2. Include coverage for weather tightness of building enclosure elements after installation.

2.1 **ACCEPTABLE MANUFACTURERS - BUILDING SYSTEM**

A. Armco

B. Butler Builders

C. Star Building Systems

D. Varco Pruden

2.2 **MATERIALS - FRAMING**

A. Structural Steel Members: ASTM A36, A529, or A572, Grade 50.

B. Structural Tubing: ASTM A500, Grade B.

C. Plate or Bar Stock: ASTM A529.


E. Structural Bolts, Nuts, and Washers: ASTM A325 or A490.

F. Welding Materials: AWS D1.1; type required for materials being welded.

G. Primer: SSPC 15, Type 1, Red Oxide.

H. Grout: Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 2400 psi in two days and
7000 psi in 28 days.

2.3 MATERIALS - WALL AND ROOF SYSTEM

A. Sheet Steel Stock: ASTM A653 Grade A; ASTM A792 zinc-aluminum coating on roof; galvanized to ASTM A653 G90 designation elsewhere.

B. Joint Seal Gaskets: Manufacturer's standard type.

C. Fasteners: Manufacturer's standard type, galvanized to ASTM A153 1.25 oz/sq ft, finish to match adjacent surfaces when exterior exposed.

D. Bituminous Paint: Asphaltric type.

E. Sealant: Manufacturer's standard type, non-staining, elastomeric, skinning.

2.4 OVERHEAD DOORS

A. Overhead Doors: Specified in Section 08 33 23.

B. Overhead Door Frame: Formed steel sections braced to building frame.

2.5 HOLLOW METAL DOORS AND FRAMES

A. Hollow metal doors and frames are specified in Section 08 11 00

B. Finish hardware is specified in Section 08 11 00

2.6 FABRICATION - GENERAL

A. Form exposed work true to line and level, with accurate angles and surfaces, and straight, sharp edges.

B. Ease exposed edges unless otherwise indicated.

C. Form bent metal corners to smallest radius possible without causing grain separation or other damage to work.

D. Form joints exposed to weather to exclude water.

E. Make permanent connections in ferrous metal surfaces using welds wherever possible; do not use bolts or screws where they can be avoided. Conceal fastenings where practical.

2.7 FABRICATION - SHOP ASSEMBLY
A. Preassemble items in the shop to greatest extent possible to minimize field splicing and assembly.

B. Disassemble units only as necessary for shipping and handling limitations.

C. Clearly mark units for reassembly and installation coordination.

2.8 FABRICATION - FRAMING

A. Fabricate structural steel members in accordance with AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

B. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.

C. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete. Do not galvanize anchor bolts embedded in concrete.

D. Provide framing for openings.

2.9 FABRICATION - WALL AND ROOF SYSTEMS

A. Siding

1. Panel Configuration: Building manufacturer's standard, meeting specified requirements; minimum 24 gage thick; 36-inch net coverage width, 1-1/8-inch deep minimum; sculptured for rigidity.


B. Roofing

1. Panel Configuration: Provide specified load carrying capabilities and deflection limitations; minimum 16 inches wide; minimum 24 gage.

2. Seams

   a. Standing seams with factory applied non-hardening sealant.

   b. Seams shall be continuously locked or crimped together by mechanical means during erection.

   c. Panels with lap type longitudinal side joints and exposed fasteners are not acceptable.
3. Provide resilient gaskets as necessary for complete weather seal.

4. Structural Fastening System
   a. Panels shall be fastened to the purlins or secondary support members with a concealed clip or backing device of steel having a protective metallic coating.
   b. Through penetration of the roof surface by exposed fasteners shall occur only at terminal locations of roof panels.
   c. System shall allow the roof covering to move independently of differential thermal movement of the structural framing system.

5. Except at the concealed fastener, there shall be no thermal contact of the roof panels with the supporting purlins.

6. Where roof panels are to be used as structural diaphragms to resist wind or seismic forces, roof decks must have an ICBO approval and be installed in conformance with ICBO requirements. Shear values shall not exceed ICBO approved values.

7. Roof panels shall support walkways where indicated. Provide complete assembly and attach to structure.

C. Girts
   1. Manufacturer's standard rolled formed structural shape meeting specified requirements.
   2. Provide minimum one sag rod between spans.

D. Purlins
   1. Rolled formed structural shape.
   2. Design Capacity: Calculated in accordance with AISI Specification of the Design of Cold Formed Steel Structural Members.
   3. Configuration, Thickness, Spacing: Manufacturer's standard.
E. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed to required angles. Back brace mitered internal corners with 0.07-inch thick sheet.

F. Expansion Joints: Same material and finish as adjacent material where exposed, 0.07-inch thick, manufacturer's standard brake formed type, of profile to suit system.

G. Flashings, Closure Pieces, Facia, Infills, Caps, and Trim: Same material and finish as adjacent material, profile to suit system. Provide at rake, corners, and eaves; at framed openings and wherever necessary to provide weather tightness and a finished appearance.

H. EPDM Rubber Boots: Flashing devices around pipe penetrations shall be flexible, one-piece devices molded from EPDM rubber. Rubber boot material shall be approved by the metal building manufacturer, as compatible with the system. Boots shall have base rings fabricated of minimum 0.07-inch-thick aluminum conforming to the contours of the roof panel, to form a weather tight seal.

I. Fasteners: To maintain load requirements, and weathertight installation, same finish as cladding, non-corrosive type.

   1. Siding

      a. Manufacturer's standard screws or bolts.

   2. Roofing

      a. Stainless steel screws, bolts, or rivets with weather seal washers, or carbon steel shank fasteners with vinyl or stainless steel capped heads.

J. Roof Openings

   1. Openings Larger Than Eight Inches Round or Square: Framed with a welded base fabricated from minimum 0.07-inch-thick aluminum.

   2. Support base with roof purlins and header framing.

   3. Base shall project minimum 12 inches above the roof weather surface; the configuration of the base flanges shall match the roof panel.

   4. Fasten base flange to provide complete support and weather-tightness.
K. Roof Curbs: Minimum 12-inch height, top of curb level; conform to NRCA standards.

L. Ventilators and Ridge Vents: Metal building manufacturer's standard; finish to match building.

2.10 FABRICATION - GUTTERS AND DOWNSPOUTS

A. Fabricate of same material and finish as roofing metal; minimum 26 gage unless otherwise indicated.

B. Form gutters and downspouts to profile and size indicated to collect and remove water. Fabricate with connection pieces.

C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.

D. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.11 FINISHES

A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.

B. Roof Panels: ASTM A792; zinc-aluminum coating over steel substrate; Galvalume.

C. Wall Panels: Factory applied thermoset siliconized polyester finish coatingsystem; color selected from manufacturer's standard range.

3.1 EXAMINATION

A. Verify site conditions under provisions of Division 1.

B. Verify conditions are satisfactory to receive the work of this Section.

C. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position.

D. Do not begin installation until unsatisfactory conditions have been corrected. Beginning installation means acceptance of existing conditions.
3.2 **PROTECTION**

A. Protect adjacent, existing, and newly placed construction as necessary to prevent damage during installation of the work of this Section.

B. Do not remove wrappings or protective coatings on prefinished components until the component is ready for installation.

C. Provide bitumastic paint, minimum 15 mils thick, between dissimilar materials to prevent corrosion due to electrolytic action.

3.3 **ERECTION - FRAMING**

A. Erect framing in accordance with AISC Specification.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.

C. Set column base plates with non-shrink grout to full plate bearing.

D. Field cutting, altering, or burning of openings or framing will not be permitted.

E. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized including portions of anchor bolt assemblies not embedded in concrete.

3.4 **ERECTION - WALL AND ROOFING SYSTEMS**

A. Install in accordance with manufacturer's instructions.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Fasten cladding system to structural supports, aligned level and plumb.

D. Locate end laps over supports. End laps minimum 2 inches. Place sidelaps over bearing.

E. Provide expansion joints where indicated.

F. Use exposed fasteners.

G. Install sealant and gaskets to prevent weather penetration.

H. System: Free of rattles, noise due to thermal movement and wind whistles.
3.5  **ERECTION - GUTTER AND DOWNSPOUT**

A. Rigidly support and secure components. Joint lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Apply bituminous paint on surfaces in contact with cementitious materials.

C. Provide positive slope in gutters to downspouts.

D. Install splash blocks.

3.6  **INSTALLATION - ACCESSORIES**

A. Install door frames, doors, overhead doors, in accordance with manufacturer's instructions.

B. Seal wall and roof accessories watertight and weather tight with sealant in accordance with Section 03 15 00

3.7  **TOLERANCES**

A. Framing Members: 1/4 inch from level; 1/4 inch from plumb.

B. Siding and Roofing: 1/8 inch from true position.

3.8  **MANUFACTURER'S FIELD SERVICE**

A. Manufacturer's representative shall provide inspection services during the work of this Section.

B. Manufacturer's representative shall certify to Department that work has been installed in accordance with manufacturer's instructions.

3.9  **ADJUSTING**

A. Clean shop-primed ferrous metals of dirt and rust; touch-up shop applied primer using same material.

B. Touch-up minor damage on painted finishes.

1. Use touch-up paint of type recommended by finish manufacturer.

2. Minimize overlap to undamaged areas.

3. Match color, gloss, and appearance of surrounding area.
C. Remove damaged panels and component parts of the work.
D. Replace with undamaged components of the type specified.

3.10 CLEANING

A. Remove coverings from the face of siding and refinish surfaces as necessary to prevent rusting and discoloration of finished surfaces.
B. Clean exposed surfaces of prefinished work promptly after completion of installation. Comply with coating manufacturer's instructions.

ELECTRICAL:

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

Work in general includes, but is not limited to, the following:

A. New 4160 volt tap and switch.
B. New underground, 5KV feeder.
C. Grounding of equipment, service, etc.
D. New 500KVA transformer.
E. New 480 volt distribution panel.
F. Complete lighting and power system as shown on Drawings and specified herein, including conduit, wiring, panelboards, circuit breakers, relays, switches, receptacles, and other items necessary for complete and operable systems.
G. Electrical connection of equipment furnished by others as shown on the Drawings.
H. Trenching boring and backfill as required for electrical Work.
1.03 SITE VISITS, COORDINATION OF CONTRACT DOCUMENTS, VERIFICATION OF DIMENSIONS

A. Examine existing conditions as applicable. Become acquainted with Specifications and Drawings for all portions of the Project. Notify Project Manager of apparent Discrepancies and of inconsistency between the Specifications and the existing conditions. Secure and follow Project Manager's instructions. The Drawings serve as working drawings only, indicating diagrammatically the general layout of the systems and their various components and equipment.

B. Scaled and figured dimensions are approximate and are given for estimate purposes only. Carefully check and verify dimensions and sizes in order to determine if equipment and materials will fit together and if the dimensions of the assembly are compatible with the space provided. Where equipment is furnished by others, verify that dimensions and requirements for assembly are compatible with the space provided before proceeding with the roughing-in connections. Field verifications of locations shown on Drawings are necessary since actual locations, distances, mounting heights, etc., may be affected by field conditions. The right is reserved to make reasonable changes in locations of equipment or other features shown on Drawings prior to rough-in without additional cost to the Owner.

C. Where apparatus and equipment have been indicated on the Drawings, dimensions have been taken from typical equipment of the class indicated. Carefully check the Drawings to see that the contemplated equipment will fit into the spaces provided, regardless of whether or not it may have been approved for quality and utility as an equal.

D. Rough in all equipment, fixtures, etc., as designated on the Drawings and as specified herein. The Drawings indicate only the approximate location of rough-ins. The exact rough-in locations must be determined from large-scale certified Drawings. The Contractor shall obtain all certified rough-in information before progressing with any Work for rough-in connections.

E. Be responsible for providing outlets and services of proper size at the required locations.

F. Be responsible for providing outlets and services of proper size at the required locations.

G. Coordinate requirements of equipment furnished by others, prior to ordering and installation.

H. No allowance will be made for extra expense due to failure or neglect to follow foregoing directives.
1.01  RULES AND REGULATIONS

A. Materials and installation shall be in accordance with current rules and requirements of California Code of Regulations and local codes and ordinances including, but not necessarily limited to, the current editions of the following:

1. The California Electrical Code (CEC).
2. Title 8, Chapter 4, California Code of Regulations (Low Voltage Electrical Safety Orders).
3. Local Building Codes.
5. California Statewide Qualified Product List (QPL), Title 20.
7. NEMA (National Electrical Manufacturers Assoc.).
8. IEEE (Institute of Electrical and Electronic Engineers).
12. UL (Underwriters Laboratories).
13. OSHA (Occupational Safety & Health Act) Federal.
17. NECA Standards of Installation.
   c. NECA 408-2002, Recommended Practice for Installing and Maintaining Busways (ANSI).
   d. NECA 409-2002, Recommended Practice for Installing and Maintaining Dry-Type Transformers (ANSI).
   e. NECA 410-2005 Standard for Installing and Maintaining Liquid-Filled Transformers (ANSI).
g. NECA 420-2007 Standard for Fuse Applications (ANSI).
h. NECA 430-2006, Standard for Installing Medium-Voltage Metal-Clad Switchgear (ANSI).
i. NECA/EGSA 404-2007 Standard for Installing Generator Sets (ANSI).
j. NECA/IESNA 500-2006, Standard for Installing Indoor Lighting Systems.
l. NECA 331-2004, Standard for Building and Service Entrance Grounding and Bonding

B. Where these Specifications call for a higher standard than the above-mentioned rules, the Specifications shall govern.

C. Should there be any direct conflict between the above-mentioned rules and these Specifications, the rules shall govern.

D. Nothing in the Drawings or Specifications is to be construed to permit Work not conforming to the rules, codes, and regulations.

E. All materials utilized shall be new and the best of their respective grades or kinds.

1.02 DEFINITIONS

A. Article 100 of the California Electrical Code shall serve as a guide for definitions.

B. Industry standard definitions.

C. Specific Definitions:

1. Concealed: Hidden from sight, as in trenches, chases, hollow construction, above furred spaces, suspended ceilings (acoustical or plastic type), or exposed to view only in tunnels, attics, shafts, crawl spaces, unfinished spaces, or other areas solely for maintenance and repair.

2. Exposed: Not concealed.

3. Unfinished Space: A room or space that is ordinarily accessible only to building maintenance personnel, a room noted on the "Finish Schedule" with exposed and unpainted construction for walls, floor or ceilings, or specifically mentioned as "unfinished".

4. Finished Spaces: Any space ordinarily visible to the visiting public, including exterior areas.
1.03 RECOGNIZED TEST LAB

A. All equipment specified or installed under this project shall be listed by a recognized test lab and bear that label of approval.

1.04 PERMITS AND FEES

A. Procure licenses and permits necessary for the completion of the Work, and inspection and other applicable fees. Before final payment, deliver to the Owner certificates and permits, approved and signed by the authorities having jurisdiction.

1.05 RECORD DRAWINGS

A. Include under this Work complete and accurate record information both during construction and before final acceptance by the Owner, and costs associated therewith shall be included under this Work.

B. Obtain from the Project Manager, at cost, a complete set of applicable, full size, blue-line prints. On these prints, systematically and accurately keep an up-to-date and legible dimensional record of Work installed differently from the location or manner indicated by the Drawings, as well as exact locations of stub-outs and hidden or underground features. Have these Drawings readily available for reference and review. When job status permits, submit them to the Project Manager and amend or correct and re-submit if requested.

C. When the above information is complete and acceptable, deliver Record Drawings to the Project Manager.

1.06 SUBMITTALS - SUBSTITUTIONS

A. Bids shall be based on Drawings and Specifications and references exactly as shown except as substitutions are permitted under terms of the Instructions to Bidders. Acceptance by the Project Manager of a variation or alternate shall not of itself waive other requirements of the Drawings and Specifications.

B. Before a substitute is used, it shall be equal in quality and utility to the material or make of equipment specified, and furthermore, shall be suitable for the particular application. The decision of the Project Manager as to the quality and utility of the substitute offered shall be final.

C. When submitting a substitute to a specified item, provide complete data for both the specified item and the substitute. Complete data includes:

1. Catalog cuts with complete dimensions, characteristics, electrical properties, Under-writer's Laboratory listing, harmonics, light output, mounting and support requirements.
2. Calculations, photometrics, system load data, energy effect on system, etc.

If the substitute is not deemed equal in both utility and quality to the specified item, the specified item will be approved and it shall be provided by the Contractor.

D. Submit in one package complete systematized lists of equipment and Drawings, catalog cuts, brochures, capacity tables and curves, descriptive information, performance data and guarantees and warranties referenced either to applicable Specification paragraphs or to item numbers as shown on the Drawings, or both. Submit six (6) copies.

E. Do not order or install equipment until submittals have been reviewed and approved.

F. Where accepted materials or equipment other than is specified or shown on the Drawings require redesign of structural, architectural, electrical or mechanical features or layouts, such changes shall be made by, or at the expense of the Contractor - all subject to complete review by the Project Manager.

G. Because of the contingencies involved, review and general acceptance of proposed substitutes shall not relieve the Contractor's responsibility under this Work for ensuring in all respects the suitability of such materials and equipment for the particular Project requirements.

1.07 **SHOP DRAWINGS**

A. Prepare shop Drawings of items as required by the Project Manager or by Drawings and Specifications; submit six (6) copies of each to the Project Manager as part of the submittal package, sufficiently in advance of construction, if necessary.

B. The shop drawings shall be submitted sufficiently in advance of construction to allow time for review and for resubmission, if necessary.

C. Submit all shop drawings and data at one time for equipment provided under this Section. The complete electrical shop drawings shall be bound in one pamphlet or binder indexed to this Section.

D. Shop drawing submittals processed are not change orders. The purpose of shop drawing submittals by the Contractor is to demonstrate that the Contractor understands the design concept; he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. If deviations, discrepancies or conflicts between shop Drawings and Specifications are discovered, either prior to or after shop drawing submittals are processed, the design Drawings and Specifications shall control and shall be followed.

E. Manufacturers' data and dimension sheets shall be submitted giving all pertinent
physical and engineering data including weights, cross-sections and maintenance instructions. Standard items of equipment such as receptacles, switches, plates, etc., which are cataloged items, shall be listed by manufacturer.

F. Index all submittals and reference to these Specifications.

1.08 COMPLETION DATA

A. Submit completion data to the Project Manager in acceptable quantity and form before requesting a final inspection. Such submittal shall be corrected, amended, or completed before final acceptance of the Work.

B. Include Record Drawings, maintenance manuals, and data; test results; control and wiring diagrams.

1.09 CUTTING, PATCHING, AND REPAIRING

A. Cutting, patching, and framing of wood members to accommodate this Work shall be done by the Contractor and shall be in conformance with Sections 613 and 617 (F) and (K), Title 24, California Code of Regulations. All such cutting, patching and framing shall be approved by the Project Manager.

B. Do minor miscellaneous cutting, drilling, and patching necessary and normally required at the time of actually installing this Work. Patching shall be of the same materials, workmanship, and finish as the original or surrounding Work to the complete satisfaction of the Project Manager. Comply with Division-1 CUTTING AND PATCHING Section.

C. Adequately inform other trades of openings and framing requirements for this Work and provide suitable instructions for establishing locations and sizes of openings or sleeves so that these may be provided in the proper location at the proper time. Concrete shall not be cut, except where approved by the Project Manager.

1.10 SIMILARITY OF MATERIALS

A. Unless specified otherwise, fixtures, fittings, hangers, and respective type features and equipment, of a similar type or having similar operative or functional features, shall be of the same manufacturer throughout the Project.

1.11 MANUFACTURERS' DIRECTIONS

A. Follow manufacturers' directions and recommendations in all cases where the manufacturers' equipment or articles are used for this Work. Compliance with the manufacturer's direction is a requirement for that product's listing with a recognized test lab.
1.12 **VERIFICATION OF DIMENSIONS**

A. Scaled and figured dimensions are approximate only. Before proceeding with Work, carefully check and verify dimensions, etc., on architectural Drawings, and be responsible for properly fitting equipment and materials together and to the structure in spaces provided.

B. Drawings are essentially diagrammatic, and many offsets, bends, pull boxes, special fittings, and exact locations are not indicated. Carefully study Drawings and premises in order to determine best methods, exact locations, routes, building obstructions, etc., and install apparatus and equipment in available locations. Install apparatus and equipment in manner and locations to avoid obstructions, preserve headroom, and keep openings and passageways clear.

1.13 **IDENTIFICATION OF EQUIPMENT**

A. All electrical equipment shall be labeled, tagged, stamped, or otherwise identified in accordance with the following schedule:

1. **Branch Circuit Panelboards:**
   a. Panel identification shall be P-Touch ¾" label.
   b. Circuit directory shall be a two-column, 8-1/2 x 11" sheet attached to the inside of the door. Each odd numbered circuit shall be in sequence in the left column and the even numbered circuit in the right column (e.g., 1, 3, 5..., 2, 4, 6...). Each circuit shall be identified as to the use and room name(s) or area(s). Confirm room names and/or room numbers with the Project Manager prior to project completion. Circuit breaker identification shall be by permanently installed metal numbers or plastic numbers under acrylic plastic. "Paste-on" numbers will not be accepted. Refer to "Panelboards" section for additional requirements.

2. **Distribution Panelboards:** Identification shall be with 1" x 4" laminated, white on black, micarta nameplates on each major component, each with name and/or number of unit and other pertinent data as required. Emergency power distribution panels shall be identified with white on red micarta nameplates. Letters shall be no less than 3/8" high.

3. **Circuit breakers** shall be identified by number and name with 3/4" x 1-1/2" laminated micarta nameplates with 3/16" high letters mounted adjacent to circuit breaker or switch.

4. **Miscellaneous equipment (electrical),** such as individually mounted safety switches, starters, step-down transformers, pull boxes, junction boxes, etc., shall be identified by the use of such equipment with P-Touch labels as required.

5. In general, the installed nameplates, as herein called for shall also clearly indicate its
use, area served, circuit identification, voltage and any other useful data.

6. All auxiliary systems, including communications, shall be labeled to indicate function.

7. Motor control and motor control centers shall be labeled with the identification given on drawing schedules.

1.14 ARC FLASH LABELING

A. All panels, circuit breaker enclosures, switchboards and motor control centers shall be labeled with Arc Flash Warning Stickers.

B. These labels shall contain the following:

1. Arc Flash Boundary
2. Minimum arc rating
3. Personal Protective Equipment Level, PPE
4. Shock Hazard Level
5. Fault Current
6. Date

1.15 CLOSING IN OF UNREVIEWED WORK

A. Do not allow or cause any of this Work to be covered up or enclosed until it has been reviewed by the Project Manager. Should any of this Work be enclosed or covered up before such review, uncover the Work and make repairs with such materials as may be necessary to restore the Work and that of the other trades to its original and proper condition at no additional cost to the Owner.

1.16 SAFETY PRECAUTIONS

A. It is intended that within the scope of this Work during construction and until final acceptance, strict attention be given to matters pertaining to public safety and to safety of the construction workers and complementing personnel; and to other health and building safety requirements as specified and indicated including, but not limited to: Protection of openings in fire-rated construction; clearances from and/or protection of combustibles; proper securement for fixtures, equipment materials; method of performing the Work, operational and safety check of electrical devices, etc.; erection and maintenance of suitable barriers, protective devices, lights and warning signs and adequate provisions for storage and protection of Work, materials and equipment.

B. It is understood that the responsibility for the proper attention to the above stipulations is included under this Work.

1.17 WIRING OF EQUIPMENT FURNISHED UNDER OTHER SECTIONS
A. All electrical wiring including power wiring and control wiring (except as specified under Automatic Temperature Control), including raceways, wiring, outlet and junction boxes, and labor for installation of the wiring and equipment shall be included in this section of the Specifications.

B. All control devices, and starters not in motor control centers, for equipment furnished under the Air Conditioning section (except as specified under Automatic Temperature Control paragraph), Plumbing section, Fire Sprinkler or Lawn Sprinkler section are to be furnished under that particular section and installed under this section.

C. Wiring diagrams complete with all connection details shall be furnished under each respective section.

D. Coordinate requirements with Division 15 sections prior to ordering and installation.

E. Comply with requirements of Article 430 of the California Electrical Code.

1.18 EXCAVATION AND BACKFILL

A. Do excavation, trenching, and backfilling required for this Work. Do shoring, pumping, or draining that is necessary to keep the excavations and trenches safe and free from water. Where possible and practical, avoid planted or paved areas, walkways, floors, and other finished surfaces. See CONDUITS Sections for depth of conduits. Remove all excess excavated materials from the site, unless otherwise directed by the Project Manager.

B. Where required, do cutting and drilling of walls, pavements, walkways, etc., by means of cutting and drilling (coring) machines unless specifically approved otherwise.

Excavation, trenching, and backfill methods and procedures shall be in strict accordance with industry standards and local requirements.

C. Backfilling shall be done in one-foot layers, with each layer tamped before another layer is added. No stones or coarse lumps shall be laid directly on conduits.

1.19 BORING

A. Boring/Horizontal Drilling:

a. Perform survey and verification at all existing underground utilities in the area of boring.

b. Prepare a detailed boring plan identifying where bore pit(s) and recurring pit(s) will be.
c. Define boring procedure.

d. Keep interior of conduit clean and clear. Clean underground conduits by pulling a mandrel through conduit run followed with a swab before pulling wire.

e. Reroute conduit from locations shown on the Drawings where it is necessary to clear obstructions. Routes on plan are diagrammatic only.

f. Provide junction or pull boxes where required for pulling conductors due to excessive number of bends or length of conduit runs.

g. Bored conduit, except those under buildings, shall be a minimum of 24 inches below finished grade. Conduits under roadways shall be a minimum of 36 inches below finished grade. Conduit runs 3/4 inch and smaller in slabs shall be located above vapor barriers. Conduit runs larger than 3/4 inch shall have a minimum depth of 12 inches below floor slabs.

h. Standard factory ells shall not be used in underground service conduits or other long underground runs. Field bends shall not be flattened or kinked and shall not materially reduce the internal diameter of the conduit. Bends in long underground runs shall be made in long sweeping bends. Do not bend at couplings. Approved conduit bending methods shall be used.

i. All conduit runs shall have a code size insulated grounding conductor.

j. Locate conduit stub-outs dimensionally from building or curb lines on Record Drawings.

k. Pull wires shall be installed in empty conduits including telephone conduits and stub-outs, No. 12 AWG, type "THWN" insulated copper wire or 1/8-inch polyethylene rope shall be used.

l. Spare underground conduits shall be sealed with duct plugs that have pull tabs. Duct tape shall not be used to seal unused conduits.

1.20 PROTECTION OF EXISTING LINES

A. Exercise special care to avoid damaging and to maintain in operation, all existing utility runs during the construction period. Also avoid damaging existing piping, conduits, or equipment that is to remain, whether or not specifically indicated on the Drawings. Existing utilities, piping, conduits, and equipment may or may not be shown on the Drawings. The Drawings only reflect information intended to suggest the probable extent and possible location of indicated runs and equipment. There may be other runs. There may be other locations. Neither the Owner nor the Project Manager represents that either has any precise knowledge as to either the full extent or exact location of equipment and runs that may fall within the building or Project Site.
B. Execute excavation and demolition on the Site and in the building with extreme care (by hand or small tools wherever appropriate) and at the sole risk of the Contractor and the workers involved.

C. Locate all known existing installations before proceeding with construction operations which may cause damage to such installations. The existing installations shall be kept in service where possible and damage to them shall be repaired at no increases in Contract Sum.

D. If other structures or utilities are encountered, request Project Manager to provide direction on how to proceed with the Work.

1.21 MOUNTING

A. Provide materials and accessories necessary to properly mount and secure equipment furnished and/or installed under the electrical Work. This includes but is not limited to such items as conduit, outlets, junction boxes, switches, relays, disconnect switches, lighting fixtures, cabinets, and transformers.

B. Inserts and Anchors shall be:

7. Furnished and installed for support of Work under this Division.

8. Adjustable concrete hanger inserts installed in new concrete work as manufactured by Hilti or as approved.

9. Installed in locations as approved by Project Manager.

10. Expandable lead type anchors installed in existing concrete with minimum surface damage, as manufactured by Hilti.

11. Toggle bolts, or "molly anchors", where installed in concrete block walls.

12. Complete with 3/16" or heavier steel backup plate where used to support heavy items. Through-bolts or backup plate shall be concealed from view, except as otherwise indicated.

C. Mounting of equipment that is of such size as to be freestanding and that equipment which cannot conveniently be located on walls, such as motor starters, etc., shall be rigidly supported on a framework of galvanized steel angle, Unistrut or as approved.

D. Furnish and install sleeves for the installation of Work under all sections of this Division. Sleeves through floors, roof and walls shall be as described in conduit section.
1.22 MOUNTING HEIGHTS

A. Receptacles shall be mounted no lower than 15” to the bottom of the device.
B. Switches and lighting control stations shall be mounted no higher than 48” to the top of the device.
C. Overcurrent devices and circuit breakers or disconnect switches shall be mounted no higher than 6 feet-7 inches.

1.23 TESTS

A. Perform electrical tests as required or directed. Provide materials, labor, and equipment necessary for performances of these tests, and at completion of the Work perform a complete "in-service" operation of the entire electrical and power system to show compliance with the Drawings and Specifications. Replace Work showing faults under tests without additional cost to the Owner. Test system voltage at switchboards at completion of Work and provide a written report to the Project Manager.

1.24 EQUIPMENT LISTS AND MAINTENANCE MANUALS

A. Prior to completion of job, Contractor shall compile a complete equipment list and maintenance manual. The equipment list shall include the following items for every piece of material and equipment supplied under this section of the Specifications.

1. Name, model and manufacturer.
2. Complete parts Drawings and list.
3. Local supply for parts and replacement and telephone number.
4. All tags, inspection slips, instruction packages, etc. removed from equipment as shipped from the factory, properly identified as to the piece of equipment it was taken from.

B. Maintenance manuals shall be furnished for each applicable section of the Specifications, shall be suitably bound with hard covers, and shall include all available manufacturers' operation and maintenance instructions, together with as-built Drawings and lists hereinbefore specified and other diagrams and instructions necessary to properly operate and maintain the equipment. The equipment lists and maintenance manuals shall be submitted in duplicate to Architect for approval not less than 10 days prior to the completion of the job. The maintenance manuals shall also include the name, address and phone number of the General Contractor and all subcontractors involved in any of the Work specified herein. The maintenance manuals shall be finally provided in four copies.
1.25 **CLEANING**

A. During construction on a daily basis, and upon completion of the Work, remove from the site all debris and excess materials, tools, and removed items, resulting from this Work. Clean equipment, including lighting fixtures, free of dust, dirt, grease, paint, etc.

1.26 **SALVAGE**

A. Deliver salvaged equipment and material deemed salvageable by Project Manager to location designated by Project Manager. Remove other removed material and equipment from site.

1.27 **GUARANTEE**

A. Leave the entire installation in complete working order, free from defects in materials, workmanship or finish. Guarantee to repair or replace parts that may develop defects due to faulty materials, equipment, or workmanship within a period of one year after the Work is accepted by the Owner. Also, guarantee to repair or replace with like materials, other existing Work in the building damaged from or during the repair of any such defective equipment, materials, or workmanship.

1.28 **INSTALLERS QUALIFICATIONS**

A. Installer must have electrical certification per California Labor Code Section 3099.2.

B. All work described in the Electrical Specifications and shown on Electrical Drawings shall be performed by California State Certified Electricians.

C. All electricians shall have a minimum of 500 hours of documented classroom training.

D. All electricians shall have a minimum of 3,000 hours of documented on-the-job training.

E. At the time equipment submittals are made, provide copies of State Certification and training documents for electricians working on this project.

2.01 **GROUNDING**

A. Grounding shall be executed in accordance with applicable codes and regulations of the State of California, California Electrical Code and local authorities having jurisdiction as well as any additional provisions specified or shown on Drawings.

B. Grounding bushings shall be used wherever conduits are grounded. Feeder conduits to panels and air conditioners shall have grounding bushings.

C. Grounding conductors should be located to permit, the shortest and most direct path
to ground. Connections shall be readily accessible for inspection and connections shall not be permanently concealed in floors or walls.

D. Non-current carrying metallic parts of electrical equipment and raceways shall be securely grounded to the common system ground. In all locations, ground conductors shall be run through conduits and shall be securely bonded to the conduit at the entrance and exit. The conduit for the grounding conductors shall be continuous from the point of attachment to cabinets or equipment to the grounding electrode, and shall be securely fastened to the ground clamp fittings.

E. Ground connections to equipment shall be made with an approved type of exothermic weld or shall be bolted or clamped to equipment or conduit. Sheet metal strap types of ground clamps shall not be used. Contact surfaces shall be thoroughly cleaned and bright before connection is made so as to ensure a good metal to metal contact.

F. Where nonmetallic conduit is used, ground shall be achieved through use of a separate, green-insulated, copper, code-size, ground conductor included in the conduit.

G. Bonding of cold water piping system shall be achieved at the service entrance. A copper saddle shall be installed over the copper pipe at the location of the clamp to avoid damage to the pipe.

2.02  CONDUIT

A. Rigid Steel Conduit:

1. Rigid steel conduit shall have zinc coated exterior, zinc or enamel interior, standard weight, zinc coated couplings, locknuts and bushings and shall bear the U.L. label. Rigid conduit shall not be installed underground.

2. Use rigid conduit only for exposed exterior conduit runs, wherever subject to physical damage, or where specifically called for on the Drawings or required by a serving utility.

3. Intermediate metallic conduit (I.M.C.) may be used in lieu of rigid steel conduit.

B. Electrical Metallic Tubing:

1. Electrical metallic tubing (E.M.T.) shall bear the U.L. label and shall be zinc coated thinwall conduit with zinc-coated couplings and connections. "Indent" type fittings shall not be used.

2. E.M.T. may be used where rigid, flexible or non-metallic conduit is not required.

3. E.M.T. shall be used for interior dry locations. EMT shall be used where no specified conduit type is called for on the Drawings.
C. Flexible Metallic Conduit:

1. Flexible metallic conduit shall be galvanized steel and bear the U.L. label. Fittings for flexible conduit shall be squeeze type. Screw-in connectors and other connectors that decrease the interior diameter of the conduit shall not be used unless specifically approved by the Project Manager.

2. Liquid-tight flexible conduit shall bear the U.L. label and be plastic jacketed moisture and oil resistant with oil and vapor tight connectors.

3. Use flexible conduit for final connection to equipment where vibration may injure direct conduit connection. It may be used for indoor dry locations, for fixture whips not to exceed 72 inches and in other locations where structural conditions will not permit the use of EMT not to exceed six feet, only if approved by the Project Manager.

4. Use liquid-tight flexible conduit in lieu of flexible conduit for wet, damp, or outdoor areas or where weatherproof flexible conduit is called for on the Drawings or by code.

D. Plastic Conduit:

1. Plastic conduit shall be rigid polyvinyl chloride (PVC) Underwriter's approval, Schedule 40. Connections and fittings shall be "outside" type assembled in accordance with the recommended methods of the manufacturer.

2. Underground PVC conduit shall be buried a minimum of 24 inches below grade. Where more than two conduits are installed adjacently underground, use factory made conduit spacers.

3. PVC conduit shall be used for underground conduit runs in lieu of wrapped rigid conduit except as noted otherwise on the Drawings or required by the serving utility.

4. Provide a code size ground conductor in each conduit.

5. Only braided polyethylene or similar pull rope shall be used.

E. Installation of Conduit:

1. Underground conduit.

   a. Keep interior of conduit clean and clear. Clean underground conduits by pulling a mandrel through conduit run followed with a swab before pulling wire.

   b. Reroute conduit from locations shown on the Drawings where it is necessary to clear obstructions.
c. Provide junction or pull boxes where required for pulling conductors due to excessive number of bends or length of conduit runs.

d. Bury underground conduit, except those under buildings, a minimum of 24 inches below finished grade. Conduits under roadways shall be a minimum of 36 inches below finished grade. Conduit runs 3/4 inch and smaller in slabs shall be located above vapor barriers. Bury conduit runs larger than 3/4 inch to a minimum depth of 12 inches below floor slabs.

e. Standard factory ells shall not be used in underground service conduits or other long underground runs. Field bends shall not be flattened or kinked and shall not materially reduce the internal diameter of the conduit. Bends in long underground runs shall be made in long sweeping bends. Do not bend at couplings. Approved conduit bending methods shall be used.

f. All conduit runs shall have a code size insulated grounding conductor.

g. Properly separate two or more conduits installed underground in a common concrete envelope with approved factory made conduit spacers.

h. Locate conduit stub-outs dimensionally from building or curb lines on Record Drawings.

i. Pull wires shall be installed in empty conduits including telephone conduits and stub-outs, No. 12 AWG, type "THWN" insulated copper wire or 1/8-inch polyethylene rope shall be used.

j. Spare underground conduits shall be sealed with duct plugs that have pull tabs. Duct tape shall not be used to seal unused conduits.

2. Exposed/Concealed Conduit:

a. Provide secure mounting facilities for conduits. Wire or plumbers tape shall not be used for hanging conduit. Strap shall be factory made of the one hole malleable iron or two-hole galvanized clamp type.

b. Provide expansion couplings wherever conduits cross expansion joints.

c. Run conduit at right angles or parallel to structural members, walls, floors and ceilings. Where several conduits are run together or suspended, they shall be hung on Unistrut trapezes with minimum 3/8-inch rod hangers.

d. Cut ends of conduit square and ream to remove burrs or sharp edges. Terminate conduits properly with bushings, locknuts, etc. Terminate one (1) inch and larger conduits with insulated bushings.
e. Render conduits projecting through the roofing watertight by proper flashings. Securely fasten a sheet metal cap and tighten bank or storm collar to the conduits. Extend flashing a minimum of six (6) inches in all directions. Coordinate and install roof flashing for conduits to the satisfaction of the Project Manager.

f. All conduit runs shall have a code size insulated grounding conductor.

g. Pull wires shall be installed in empty conduits including telephone conduits and stub-outs, No. 12 AWG, type "THWN" insulated copper wire or 1/8-inch polyethylene rope shall be used.

h. Flexible conduit connections shall comply with NEC Section 350-22.

i. Provide Dura Block or similar support for roof-mounted conduits.

2.03 OUTLET, JUNCTION AND PULL BOXES

A. Outlet boxes and junction boxes shall be galvanized one-piece pressed steel, knockout type. The size of each box shall be determined by the number of wires or conduits or size of conduits entering the box, but shall not be less than 4" square and 1-1/2" deep unless otherwise noted. All boxes shall be UL listed.

B. Single gang boxes in concrete, for fixture outlets, shall be 4-3/8" octagonal concrete boxes, 2-1/2" deep minimum.

C. Single gang boxes in concrete, for wiring devices, shall be 3-1/2" deep, 3-3/4" long and 1-7/8" wide.

D. Single gang outlet boxes installed in concrete or masonry walls shall be a minimum of 3-1/2" deep, 4" long and 2" wide, set flush with the wall and provided with a single gang wall plate.

E. Install wood blocking for outlet boxes in a rigid, workmanlike manner using new material where wood studs are used. Provide rigid support to avoid twisting of outlet boxes where steel studs are used. Boxes shall be secured such that they are level and plumb.

F. Locknuts shall be used on both sides of conduit connections to box or panel, in addition to bushing. Where a larger size opening occurs than size of conduit, use reducing washers.

G. Exposed boxes shall be weatherproof, threaded or hub condulet with gasketed condulet cover suitable for device installed or with blank cover plate when condulet is used as a junction box. Condulet wire fill capacity shall not be exceeded.
H. Recessed weatherproof outlets or junction boxes shall be equipped with neoprene gasketed covers.

I. Large size junction or pull boxes shall be fabricated from code gauge sheet steel. Where located indoors, finish shall be gray enamel and covers shall be secured with screws. Where exposed to weather, they shall be weatherproof, NEMA 3R, and rain-tight and hot-dip galvanized after fabrication; also, they shall have weatherproof gaskets, flat covers and galvanized iron screws. Provide knockouts and/or threaded hubs as required for the conduit used. Boxes in finished areas shall be prime painted.

J. Any unused, removed knockouts shall be filled with a K.O. cover.

K. Provide bonding or grounding from metal conduit terminating in junction with concentric KO’s.

2.04 PLATES AND DEVICE COVERS

A. Plates for switches, receptacles, telephone and blank outlets shall be stainless steel, Hubbell 302/304 alloy or Legrand "S" line, unless otherwise noted. Plates shall be engraved per Drawings or as covered under the Article of this Specification titled “Identification of Equipment”.

2.05 RECEPTACLES

A. Duplex convenience outlets shall be specification grade, backwire, three wire, NEMA #5-20R, self-grounding type, 20 ampere, 125 volt parallel slots, polarized, in white. Additional receptacles shall be as indicated on the Drawings. Receptacles shall be Hubbell #5253W.

B. Receptacles indicated weatherproof shall have expanding cover plates that are weatherproof "while in use" Hubbell/Taymac or equal.

C. Ground fault current interrupter outlets shall be self-testing, Hubbell #GFR5352WST.

D. USB receptacles shall be Hubbell #USB8200W or equal.

2.06 WIRE AND CABLE

A. 600 Volt Conductors:

1. Conductors shall be copper and delivered to the site in their original, unbroken packages plainly marked or tagged with U.L. label, size, kind, insulation, name of manufacturer and trade name of the wire.

2. Type "THWN/THHN", 600-volt insulation shall be used for all locations.
3. Minimum size conductor shall be #12.

4. Conductors shall be stranded.

5. Ground conductors shall be bare copper or have green insulation.

6. 120 volt and 277 volt circuits shall have separate neutrals.

7. See Section 26 20 00 for medium voltage cable specifications.

B. Installation:

1. Conductors shall be continuous between outlets or junction boxes and no splices shall be made except in outlet boxes, pull boxes, panelboard gutters or handholes.

2. Joints, splices and taps No. 10 or smaller (including fixture pigtails) shall be connected with "floating spring" type connectors. No. 8 and larger shall be connected with solderless connectors of 100% electrolytic copper. Split-bolt connectors are not acceptable.

3. Tighten pressure type lugs on panels and equipment, and then retighten 24 hours or more later after energizing. Provide written report of torque values on lugs.

4. Oil or grease shall not be used when pulling conductors. Use U.L. approved cable lubrication only.

5. Lace or train conductors neatly in panels, cabinets and equipment. Use plastic wire ties to route conductors at edge of enclosure away from overcurrent devices.

6. Branch circuits shall be color coded in compliance with Section 210-5 of the California Electrical Code. Colored tape is not acceptable.

7. All wiring, both line and low voltage, shall be installed in conduit unless otherwise noted.

8. Conductors from different panels or from different power sources shall not be installed in the same conduit, junction box, gutter, or raceway.

C. Tag:

1. Branch circuits shall be left tagged with circuit numbers in gutters and junction boxes where unused circuits terminate.

2. Feeder conductors shall be tagged as phase "A" or "B" or "C".

3. The method of tagging shall be with adhesive preprinted tape numbered or lettered
wrap around tags. Colored tape is not acceptable.

4. Tagging shall be applied after wire is installed in conduit.

5. Feeders in panel or equipment shall be tagged by phase letter in each panel or equipment.

6. Where it is impractical to use printed markers on certain wires or cables, use blank tape with identification marked thereon with indelible pen or pencil.

D. Color Coding for Phase Identification: Color code secondary service, feeder, and branch circuit conductors with factory applied color as follows:

<table>
<thead>
<tr>
<th>208y/120Volts</th>
<th>Phase</th>
<th>480y/277Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>A</td>
<td>Yellow</td>
</tr>
<tr>
<td>Red</td>
<td>B</td>
<td>Brown</td>
</tr>
<tr>
<td>Blue</td>
<td>C</td>
<td>Orange</td>
</tr>
<tr>
<td>White</td>
<td></td>
<td>Neutral</td>
</tr>
<tr>
<td>Green</td>
<td></td>
<td>Ground</td>
</tr>
</tbody>
</table>

2.07 DISCONNECT SWITCHES

A. Non-fusible or fusible as shown on the Drawings, heavy duty, 250 or 600 volts as required, NEMA Type 1 enclosure, except where WP is indicated or required by code, use NEMA Type 3R enclosure.

2.08 PANELBOARDS

A. Section Includes:

1. Power Distribution Panelboard: Furnish and install distribution panelboard(s) as specified herein and where shown on the associated schedules on Drawings.

2. Lighting and Appliance Panelboard: Furnish and install lighting and appliance panelboard(s) as specified herein and where shown on the associated schedules on Drawings.

B. References: The panelboard(s) and circuit breaker(s) referenced herein are designed and manufactured according to the latest revision of the following Specifications.

1. NEMA PB-1 - Panelboards.

2. NEMA PB-1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

3. NEMA AB 1 - Molded Case Circuit Breakers.
4. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

5. UL 50 - Enclosures for Electrical Equipment.

6. UL 67 - Panelboards.

7. UL 489 - Molded-Case Circuit Breakers and Circuit Breaker Enclosures.

C. Power Distribution Panelboards: (Square D I-Line, no equal)

1. Interior:

   a. Shall be rated 600 VAC. Continuous main current ratings as indicated on associated schedules on Drawings not to exceed 1200 amperes maximum. Panelboard bus current ratings shall be determined by heat-rise tests conducted in accordance with UL 67.

   b. Provide UL Listed short circuit current ratings (SCCR) as indicated on the associated schedules on Drawings not to exceed the lowest interrupting capacity rating of any circuit breaker installed with a maximum of 200,000 rms symmetrical amperes. Main lug and main breaker panelboards shall be suitable for use as Service Equipment when application requirements comply with UL 67 and NEC Articles 230-F and -G.

   c. The panelboard interior shall have three flat bus bars stacked and aligned vertically with glass reinforced polyester insulators laminated between phases. The molded polyester insulators shall support and provide phase isolation to the entire length of bus.

   d. The bussing shall be fully rated with sequentially phased branch distribution. Panelboard bussing rated 100 through 600 amperes shall be plated copper. Bussing rated 800 amperes and above shall be plated copper. The entire interleaved assembly shall be contained between two (2) U-shaped steel channels, permanently secured to a galvanized steel-mounting pan by fasteners employing the use of a tamper-resistant warning label.

   e. Interior trim shall be of dead-front construction to shield user from all energized parts. Main circuit breakers through 800 amperes shall be vertically mounted. Main circuit breaker and main lug interiors shall be field convertible for top or bottom incoming feed.

   f. Equipment ground bar shall be insulated or bonded as shown on the Drawings. Ground bar shall be copper. Solid neutral shall be equipped with a full capacity grounding strap for service entrance applications. Gutter-mounted neutral will not be acceptable.
g. Nameplates shall contain system information and catalog number or factory order number. Interior wiring diagram, neutral wiring diagram, UL Listed label, and Short Circuit Current Rating shall be provided. Leveling provisions shall be provided for flush mounted applications.

h. Arc Flash labeling shall be provided in accordance with Section 1.18 of these specifications.

i. Panelboard lugs shall be tightened with a torque wrench to values listed on the equipment.

2. Molded Case Circuit Breakers - Mains and Branches:

a. Common Characteristics:

1) Circuit breakers shall be constructed in accordance with the following standards:
   - UL 489 Federal Specification W-C-375B/GEN
   - NEMA AB1 CSA 22.2, No. 5-M91
   - IEC 157-1 BS 4752

2) Circuit breakers shall be constructed using glass reinforced polyester insulating material providing superior dielectric strength. Current-carrying components shall be completely isolated from the handle and the accessory mounting area.

3) Circuit breakers shall have an overcenter, trip-free, toggle operating mechanism which will provide quick-make, quick-break contact action. The circuit breaker shall have common tripping of all poles.

4) Circuit breakers shall have a push-to-trip button for maintenance and testing purposes.

5) Circuit breaker escutcheon shall have international I/O markings, in addition to standard ON/OFF markings. Circuit breaker handle accessories shall provide provisions for locking handle in the ON or OFF position.

6) Breaker faceplate shall indicate rated ampacity. Breaker faceplate shall indicate UL and IEC certification standards with applicable voltage systems and corresponding AIR ratings.

7) Circuit breakers shall be factory sealed and shall have a date code on the face of the circuit breaker. Poles shall be labeled with respective phase designations.

   (a) Circuit breakers shall be UL Listed for use with the following accessories: Shunt Trip, Under Voltage Trip, Auxiliary Switch, Alarm Switch, Ground
Fault Shunt Trip, Electrical Operators, Cylinder Locks, Mechanical Lugs Kits, Compression Lugs Kits, and Handle Accessories.

8) Lugs shall be UL Listed to accept solid or stranded copper conductors only. Lugs shall be suitable for 90° C rated wire, sized according to the 75° C temperature rating per NEC Table 310-16. Lug body shall be bolted in place; snap-in designs are not acceptable. Lugs shall be torqued with a torque wrench to the value listed on the circuit breaker.

9) Two- and three-pole circuit breakers shall have an internal common trip crossbar to provide simultaneous tripping. Circuit breaker frame sizes above 100 amperes shall have a single magnetic trip adjustment located on the front of the breaker, which allows the user to simultaneously select the desired trip level of all poles.

10) Standard circuit breakers up to 250 amperes at 600 VAC shall be UL Listed with HACR ratings.

11) Enclosures:

(a) Type 1 Boxes:
1. Boxes shall be galvanized steel constructed in accordance with UL 50 requirements. Zinc-coated galvannealed steel will not be acceptable.

2. Boxes shall have removable blank endwalls and interior mounting studs. Interior support bracket shall be provided for ease of interior installation.

3. Maximum enclosure dimensions shall be 42 in. wide and 9.5 in. deep.

(b) Type 1 Trim Fronts:
1. Trim front steel shall meet strength and rigidity requirements per UL 50 standards. Shall have an ANSI 49 medium gray enamel electrodeposited over cleaned phosphatized steel.

2. Trim front shall be [4-piece surface] [1- piece with door] [hinged 1-piece with door] available in [flush] [surface] mount. Trim front door shall have rounded corners and edges free of burrs. A clear plastic directory cardholder shall be mounted on the inside of the door.

3. Locks shall be cylindrical tumbler type with larger enclosures requiring sliding vault locks with 3-point latching. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with
(c) Type 3R, 3S, 5 and 12:
   1. Enclosures shall be constructed in accordance with UL 50 requirements. Endwalls shall be welded and sealed. Enclosures shall be painted with ANSI 49 gray enamel electrodeposited over cleaned phosphatized steel.

   2. All doors shall be gasketed and be equipped with a tumbler type vault lock and two (2) additional trunk type latches. A clear plastic directory cardholder shall be mounted on the inside of door. All lock assemblies shall be keyed alike. Two (2) keys shall be provided with each lock.

   3. Maximum enclosure dimensions shall not exceed 42 in. wide and 12.95 in. deep.

2.11 TRANSFORMERS

   A. Transformers shall be as specified on the Drawings.

   B. Transformers shall have weather shields.
MEDIUM-VOLTAGE CABLES:

1.01 SUMMARY

A. Section Includes:
1. Medium voltage cable.
2. Cable terminations.
3. Fireproofing tape.

1.02 REFERENCES

A. Institute of Electrical and Electronics Engineers:
   1. IEEE 48 – Standard Test Procedures and Requirements for Alternating Current Cable Terminations 2.5kV thru 765kV.

B. National Electrical Manufacturers Association:

1.03 SUBMITTALS

A. Product Data: Submit for cable, terminations, and accessories.

B. Test Reports: Indicate results of cable test in tabular form and in plots of current versus voltage for incremental voltage steps, and current versus time at 30 second intervals at maximum voltage.

2.01 MEDIUM VOLTAGE CABLE

A. Manufacturers:
   1. The Okonite Company.
   2. General Cable.

B. Voltage: 5, 8 Kv.

C. Insulation Level: 133 percent of operating voltage.

D. Cable Continuous Operating Temperature Rating: MV-105.

E. Configuration: Single conductor.
F. Conductor Material: Copper.

G. Conductor Construction: Compact stranded.

H. Conductor Shield: Metal Tape.

I. Insulation: Ethylene Propylene Rubber (EPR).

J. Cable Jacket: Sunlight resistant PVC or Chlorosulfonated polyethylene, CPE.

2.02 CABLE TERMINATIONS

A. Manufacturers:
   1. 3M.
   2. Cooper.
   3. Thomas & Betts.

B. Location: Indoor or Outdoor.

C. Conductor Quantity: Single core.

D. Type: Dual extrusion thick wall heat shrink.

2.03 FIREPROOFING TAPE

A. Manufacturers:
   1. 3M.
   2. Plymouth Rubber Co.

B. Product Description: Flexible, conformable fabric, coated on one side with flame retardant, flexible polymeric or chlorinated elastomer. Non-corrosive to and compatible with cable sheaths jackets. Does not support combustion.

C. Width: Approximately 3 inches.

D. Thickness: Not less than 0.03 inch.

E. Weight: Not less than 2.5 pounds per square yard.

2.04 UNDERGROUND CABLE MARKERS

A. Trace Wire: Magnetic detectable conductor, red colored plastic covering, imprinted with "Medium Voltage Cable" in large letters.

2.05 CABLE IDENTIFICATION

A. Colored Conductor Tape for Phases: Yellow colored, self-adhesive vinyl tape not less than 3
mils thick by 1 inch wide; 1 stripe for the Phase A conductor, 2 stripes for the Phase B conductor, 3 stripes for the Phase C conductor. Tape shall be located at all terminations, splices and pull boxes.

B. Metal Tags: Brass with ¼ inch embossed legend, punched for use with self-locking nylon tie fastener. Tags shall be located at all terminations, splices and pull boxes. Legend shall include the feeder circuit breaker identifier and phase.

3.01 PREPARATION

A. Use swab to clean conduits and ducts before pulling cables.

3.02 EXISTING WORK

A. Remove abandoned medium-voltage cable.

B. Maintain access to existing medium-voltage cable and other installations remaining active and requiring access. Modify installation or provide access panel.

3.03 INSTALLATION

A. Avoid abrasion and other damage to cables during installation.

B. Use suitable manufacturer approved lubricants and pulling equipment.

C. Sustain cable pulling tensions and bending radii below manufacturer’s recommended limits.

D. Ground cable shield at each termination and splice.

E. Install cables in manholes along wall providing longest route.

F. Arrange cable in manholes to avoid interference with duct entrances.

3.04 FIREPROOFING

A. Apply fireproofing tape to cables when installed in manholes, cable rooms, pull boxes, or other enclosures.

B. Smooth out irregularities, at splices or other locations, with insulation putty before applying fireproofing tape.

C. Apply fireproofing tape tightly around cables spirally in half-lapped wrapping or in butt jointed wrapping with second wrapping covering joints first. D. Extend fireproofing 1 inch into conduit or duct.

E. Install tape with coated side toward cable.
F. Install random wrappings of plastic tape around fireproofing tape to prevent unraveling.

G. Install fireproofing to withstand a 200 Ampere arc for 30 seconds.

3.05 FIELD QUALITY CONTROL

A. Inspect exposed cable sections for physical damage.

B. Inspect cable for proper connections.

C. Inspect shield grounding, cable supports, and terminations for proper installation.

D. Inspect and test in accordance with NETA ATS.

3.06 PROTECTION OF INSTALLED CONSTRUCTION

A. Protect installed cables from entrance of moisture.

MEDIUM VOLTAGE METAL-ENCLOSED LOAD INTERRUPTER SWITCHGEAR (AIR INTERRUPTER SWITCHES):

1.01 SECTION INCLUDES

A. Medium voltage metal-enclosed switchgear with air load interrupter switches.

1.02 REFERENCES

A. ANSI/IEEE C37.20.3 - Standard for Metal-Enclosed Interrupter Switchgear.

B. ANSI/IEEE C37.20.4 - Standard for Indoor AC Medium Voltage Switches used in Metal-Enclosed Switchgear.

C. NEMA.

1.03 SUBMITTALS

A. The metal-enclosed switchgear assembly shall be in accordance with the contract documents, applicable codes, whichever is the most stringent.

B. The manufacturer shall furnish a detailed Bill of Material and complete set of drawings.

C. The manufacturer shall furnish comprehensive instruction manuals.

1.04 QUALITY ASSURANCE

A. Manufacturer: The manufacturer of the switchgear must be the same as the manufacturer of the load interrupter switch.
1.05 **DELIVERY, STORAGE, AND HANDLING**

The following paragraphs apply only to the installing contractor.

A. Accept equipment on site and inspect for shipping damage.

B. Protect equipment from weather and moisture by covering with heavy plastic or canvas and by maintaining heat within enclosure in accordance with manufacturer's instructions.

2.01 **MANUFACTURERS**

A. Switchgear: The metal-enclosed load interrupter switchgear shall be Square D or approved equal.

B. Fuses:
   1. Direct acting, 5KV, E-Rated fuses.
   2. Fuses shall be installed in fuse holders downstream of the switch operating mechanism.

2.02 **LOAD INTERRUPTER SWITCH ASSEMBLY**

A. The metal-enclosed load interrupter switch shall be as shown on the Drawings. The equipment shall be factory-assembled. The assembly shall be a self-supporting, floor mounted bay and shall be securely bolted.

B. The switch shall withstand the effects of closing, carrying and interrupting currents up to the assigned maximum short circuit rating.

C. A viewing window shall be installed in the switch enclosure and located so as to enable visible inspection of the switch blades and blown fuse indicators from outside the enclosure.

D. System Voltage: 5 kV, 3-phase, 3-wire.

E. Operating Frequency: 60 Hz.

F. Maximum Short Circuit Current: 2501A rms symmetrical.

G. Maximum Design Voltage: 15 kV.

H. Basic Impulse Level (BIL): 95 kV.

I. Power Frequency Withstand: 36 kV.

J. Short-Time Current (two second): 25 kA.

K. Main Bus Ampacity: 200 amps, continuous.

2.03 COMPONENTS

A. Mini Load Break Switch: The mini load break switch shall be rated at 200 amperes continuous and interrupting; and fixed mounted on glass reinforced polyester standoff insulators. The stored-energy, manually operated mechanism shall be equipped with separate opening and closing springs. Operation of the load interrupter switch shall be by means of a close/open lever. Operation shall be quick-make, quick-break with the speed of operation independent of the operator.

B. Switches shall utilize main current carrying paths and arcing interruption path type poles.

C. The switch operating handle shall be permanently attached to the outside front of the switchgear and ready for immediate use, except for outdoor applications where the front of the switchgear shall be covered by a full-height solid door. The handle must operate in the conventional fashion with the switch closed with the handle in the up position and the switch open with the handle in the down position. Provisions shall be available for padlocking the switch in either the open or closed position.

D. Voltage and Short Circuit Ratings: Match ratings specified for assembly.

E. Momentary Rating: 40 kA, rms asymmetrical.

F. Fault Closing: 40 kA, rms asymmetrical.

2.04 ACCESSORIES

A. Incoming Cable Termination: Cable Lug.

B. Provide mechanical lugs for terminating cables onto the switch terminal pads.

C. Mechanical Interlocks: The high-voltage compartment door shall be interlocked to prevent opening with the load interrupter in the closed position.

2.05 FABRICATION

A. Construction: Outdoor, per the Drawings. Minimum sheet metal thickness shall be 11 gauge steel on all exterior surfaces. To assist installation and maintenance of bus and cables, the rear covers shall be removable. Each individual unit shall be braced to prevent distortion.

B. A viewing window shall be installed in a fixed panel of the enclosure to enable visual inspection of the disconnect blades from outside the enclosure.

C. Include a ground pad with lug.

2.06 FACTORY FINISHING
A. All steel parts, shall be cleaned and a zinc-phosphate pre-treatment applied prior to paint application.

B. Paint color shall be ANSI-49 (medium light gray)] TGIC polyester powder, applied electrostatically through air. Following paint application, parts shall be baked to produce a hard durable finish. The average thickness of the paint film shall be 2.0 mils. Paint film shall be uniform in color and free from blisters, sags, flaking and peeling.

FINISH GRADING:

1.1 WORK INCLUDED

A. All areas within limits of grading and all areas outside limits of grading which are disturbed in the course of the work.

1.2 RELATED WORK

A. Section on Trenching, Backfilling, & Compacting

B. Section on Excavation

1.3 REFERENCES

A. Section 19 – Earthwork, State Standard Specifications

1.4 QUALITY ASSURANCE

A. Relative Compaction:

1. All costs for initial compaction tests shall be borne by the Owner. All areas that fail to meet the minimum compaction requirements shall be reworked as required by the Engineer and retested until minimum compaction requirements are obtained.

2. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project. Testing will be required as directed by the Engineer. Test locations shall be determined by the Engineer upon notification from the Contractor that the grade is ready for tests. Contractor shall be present when samples of materials are gathered for analysis or testing.

B. Tests for compaction shall conform to references listed in Part 1.3 of this section

C. Sample backfill materials per ASTM D 75.
D. Compaction testing will be performed in accordance with Section 19-5.03, State Standard Specifications.

1. Test every 10,000 square feet of engineered fill or aggregate base material placed.

E. Where compaction tests indicate failure to meet the specified compaction, the Contractor will rework the entire failed area until the specified compaction has been achieved at his sole expense.

2.1 MATERIALS

A. Soil:

1. Original surface soil typical of the area.

2. Capable of supporting native and specified plant growth.

3.1 SURFACE FINISH WORK

A. Grade all disturbed areas, blending with adjacent terrain. Minor irregularities will be permitted.

1. Bring all sub-grades to specified contours, even and properly compacted.

B. Remove all stones and debris over two inches in any dimension.

C. Restore drainage ditches to appropriate line and grade, using approved surface erosion prevention techniques.

D. Clean Up: Remove all rubbish and excess material for disposal as approved, and leave area in a neat, satisfactory condition.

3.2 TOLERANCES

A. Prior to placing subsequent layers of material thereon, the grading plane shall conform to one of the following:

1. Finish Grading Tolerance: ±0.10 foot from required elevations

2. When subbase of base material to be placed on the grading plane is to be paid for by the ton, the grading plane at any point shall not vary more than 0.10 FT. above or below the design grade established by the Engineer.

3. When the material to be placed on the grading plane is to be paid
for by the cubic yard, the grading plane at any point shall be not more than ±0.05 foot above the design grade established by the Engineer.

4. When asphalt concrete or asphalt concrete base is to be placed on the grading plane, the grading plane at any point shall not vary more than ±0.05 foot from the design grade established by the Engineer.

3.3 **ACCEPTANCE**

A. Upon completion, obtain Engineer’s acceptance of grade and surface.

**EXCAVATION:**

1.1 **WORK INCLUDED**

A. Excavate earth and rock as necessary to allow the installation or construction of various items of work, regardless of character and subsurface conditions.

B. Dispose of unsuitable material off-site or in designated areas, as directed by the Engineer

C. Structure excavation.

D. Shoring excavations.

1.2 **RELATED WORK**

A. Section on Dust Control

B. Section on Demolition

C. Section on Earthwork.

D. Section on Trenching, Backfilling, and Compacting

E. Section on Structure Excavation & Backfilling

1.3 **REFERENCES**


B. ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Sol-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop. (Curve)


E. ASTM D 2937 – Density of soil and in place by Tube method.


1.4 SUBMITTALS

A. As specified in Section on Submittal Procedures.

1.5 PROJECT CONDITIONS

A. Underground utilities may exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.

1.6 PROTECTION

A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.

B. Grade excavation top perimeter to prevent surface water run-off into excavation.

1.7 CONTROL AND DIVERSION OF WATER

A. General – The Contractor shall furnish or procure all materials and labor required for constructing and maintaining all necessary cofferdams, channels, flumes, drains, sumps, and/or other temporary diversion and protective works and shall furnish, install, maintain, and operate all necessary pumping and other equipment for removal of water from the various parts of the work and for maintaining the foundations and other parts of the work free from water.

1.8 QUALITY ASSURANCE

A. Compaction Testing

All compaction testing shall be in accordance with Section on Quality Control and Testing.
B. Compaction tests will be performed for each lift or layer.

C. Tests for compaction shall conform to references listed in Part 1.3 of this section.

D. Sample backfill materials per ASTM D 75.

E. Where compaction tests indicate failure to meet the specified compaction, the Contractor will rework the entire failed area until the specified compaction has been achieved.

F. Provide for visual inspection of bearing surfaces under provisions of Section 19, State Standard Specifications.

G. Compaction testing will be performed in accordance with Section 19-5, State Standard Specifications.

Test every 10,000 square feet of engineered fill or aggregate base material.

2.1 MATERIALS

A. Native Material: Excavated material, graded free of all debris, and all lumps larger than three inches in largest dimension.

B. Pea Gravel: Mineral aggregate graded 1/4 inch to 5/8 inch; free of soil, subsoil, clay, shale, or foreign matter.

C. Drain Rock: Mineral aggregate graded 3/4 inch to 1 inch; free of soil, subsoil, clay, shale, or foreign matter.

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum.

3.2 EXCAVATION

A. Excavate for all foundations, slabs, curbs, walks and/or similar work. Remove any curbs, slabs, paving, trees, bushes, shrubs, stumps, roots, buried objects, or any objects that interfere with construction of building foundations, or as required by the Engineer.

B. Excavations for all footings, piers, finished walls and grade beams shall be sufficiently large so that forms for concrete may be properly placed, removed, and inspected.

C. Excavation for footings may be made to the net footing size plus two inches if the earth banks are sufficiently stable to remain in position until
the concrete is in place and if approved by the Engineer.

D. The bottoms of footings, piers, slabs, walls, and grade beams to receive concrete shall be level before placing concrete. All foundations shall rest on firm bearing in undisturbed soil, or on controlled compacted fill.

1. The exposed surface shall be scarified to a depth of eight inches, conditioned to optimum moisture content and compacted to at least 95 percent of the maximum dry density.

E. If any existing foundations, roots, stumps, debris, waste materials, pipes, or similar items have been removed, the Contractor shall excavate below these portions to solid undisturbed earth and foundations in these areas shall be built to necessary levels.

F. If soil conditions in excavations are not in accordance with the geotechnical report and seem to indicate that footings need not be carried down as deep as shown, or must be carried deeper, the changes shall be made by the Contractor after approval by the Engineer.

1. Over excavation shall be required a minimum of 2 feet below proposed structural footings and 5 feet outside footings extents.
2. Native soil may be used for Engineered fill provided they are cleansed of excessive organics, debris, and fragments larger than 4 inches in maximum dimension. Prior to backfilling the Soils Engineer should inspect bottom of excavation.

G. Slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulation, e.g. OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations.

H. Excavation shall not interfere with normal 45-degree bearing splay of any foundation.

I. Fill over-excavated areas under structure bearing surfaces in accordance with direction by Engineer.

3.3 SURPLUS MATERIAL

A. Unless otherwise specified, surplus excavated material shall be used to widen embankments uniformly or to flatten slopes, or it shall be disposed of in a uniform manner along the adjacent roadway around the site or otherwise as approved.

B. Unless otherwise specified, surplus excavated material shall be used as fill for other areas requiring fill as shown on the Plans. Excess material
that is not needed for engineered fill may be disposed of at an off-site spoil area. The location of the off-site spoil area, the limits of the fill area, the depths of fill, and the manner of work shall be as directed by the Engineer.

3.4 UNSUITABLE MATERIAL

A. Unsuitable material shall be excavated and disposed of in a uniform manner off the project site, within the Owner’s property as approved, however all disposal shall be approved by the Engineer prior to initiating the work.

3.5 MOISTURE CONTROL

A. Water development, hauling, and application shall be in accordance with Section 10-6, “Watering,” State Standard Specifications.

3.6 DEWATERING

A. The Contractor shall keep all excavation free from water. Furnish, install, maintain, and operate all necessary pumping and other equipment for dewatering of excavations. The Contractor shall at all times have on the project sufficient pumping equipment for immediate use, including stand-by pumps for use in case other pumps become in-operable.

B. The dewatering operation shall be continuous, so that the excavated areas are kept free from water during the construction, until backfill has been placed to a sufficient height to anchor the work against possible floatation.

C. Dewatering devices shall be adequately filtered to prevent the removal of fines from the soil.

D. Repair any damage caused by the failure of any part of the protective works. Remove temporary protective works when they are no longer needed for dewatering purposes.

E. Provision of dewatering and dewatering equipment shall be considered part of the project with no additional compensation allowed.

F. Any drain rock required in the trench bottom to convey water or stabilize wet soil shall be included at no extra cost to the Owner.

3.7 TOLERANCES

A. Top Surface of Backfilling: ±0.1 foot from design grade.
TRENCHING, BACKFILLING AND COMPACTING:

1.1 WORK INCLUDED

A. This section includes material, testing, and installation for trench excavation, backfilling and compacting.

1.2 RELATED WORK

A. Section on Storm Drain Pipe and Appurtenances

1.3 REFERENCES


B. ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop.


E. ASTM D 2937 – Density of soil and in place by Tube method.

F. Section 26 – Aggregate Bases, State Standard Specifications.


1.4 SUBMITTALS

B. Submit plans as required for worker protection against caving ground in excavations. Submittals shall be in accordance with Section on Submittals Procedures.

1.5 SAMPLES

A. Submit samples under provisions of Section on Quality Control and Testing.

1.6 PROTECTION

A. Protect excavations by shoring, bracing, sheet piling, underpinning, or
other methods required to prevent cave-in or loose soil from falling into excavation.

1. Trenches shall have sloping, sheeting, shoring, and bracing conforming with 29CFR1926, Subpart P—Excavations, CAL/OSHA requirements, and the Contract Documents.

B. Notify Engineer of unexpected subsurface conditions.

C. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

D. When the pipe laying is not in progress, including the noon hours, close the open ends of pipe. Do not allow trench water, animals or foreign material to enter the pipe.

1.7 QUALITY ASSURANCE

A. Compaction Testing

All compaction testing shall be in accordance with Section on Quality Control and Testing.

1.8 CONTROL AND DIVERSION OF WATER

A. General – The Contractor shall furnish or procure all materials and labor required for constructing and maintaining all necessary cofferdams, channels, flumes, drains, sumps, and/or other temporary diversion and protective works and shall furnish, install, maintain, and operate all necessary pumping and other equipment for removal of water from the various parts of the work and for maintaining the foundations and other parts of the work free from water.

B. Plan – Prior to beginning any work on the removal of water from trenches, the Contractor shall submit for the Engineer’s approval a water control plan showing his proposed method for the removal of water from trenches and other parts of the work.

C. Dispose of the water in a manner that will prevent damage to the adjacent property and in accordance with regulatory requirements.

D. Do not drain trench water through the pipeline under construction.

1.9 PROJECT CONDITIONS

A. Underground utilities may exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.
B. Obtain all required permits and licenses before installing utilities and follow the rules and requirements of the authority having jurisdiction.

C. Arrange construction sequences to provide the shortest practical time that the trenches will be open to avoid hazard to the public, and to minimize the possibility of trench collapse.

2.1 **NATIVE EARTH BACKFILL**

A. Native earth backfill used above the pipe zone shall be fine-grained materials free from roots, debris, and rocks larger than 3 inches.

2.2 **MATERIALS FOR TRENCH BACKFILLING**

A. Furnish required bedding, select backfill and backfill materials listed under the appropriate types of utility line in the sections to which this work relates.

B. All fill material will be subject to the approval of the Engineer.

C. Materials used in backfill, as shown in trench details, are defined as follows:

1. **Bedding:** When rock, unstable material, or wet trench is encountered at the excavated grade for utility installation, bedding is required. Materials shall be predominantly sand and gravel, having a Plasticity Index less than 6.
   
   a. Gradation as follows:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ inch</td>
<td>100</td>
</tr>
<tr>
<td>No. 4</td>
<td>50-80</td>
</tr>
<tr>
<td>No. 200</td>
<td>10-25</td>
</tr>
</tbody>
</table>

   b. Bedding material shall have a Sand Equivalent of 30, per ASTM D 2419.

2. Bedding may be omitted if, in the opinion of the Engineer, the excavated trench bottom will adequately support and not damage the utility line.

3. **Select Backfill:** Materials shall be predominantly sand and gravel, having a Plasticity Index less than 6.

   a. Gradation as follows:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1½ inch</td>
<td>100</td>
</tr>
</tbody>
</table>
b. Select backfill material shall have a Sand Equivalent of 30 per ASTM D 2419.

4. Backfill: Soils that contain no rock larger than three inches at greatest dimension. If expansive clays are present, such content shall not exceed one-third of the material by volume and shall be well mixed with non-cohesive soils.

2.3 SELECT AND IMPORT MATERIAL IN PIPE AND BEDDING ZONE

A. Gravel: Pit run, natural stone; free of shale, clay, friable materials and debris; graded in accordance with 1½” x ¼” aggregate grading in Section 90-3, State Standard Specifications.

B. Pea Gravel: Natural stone; washed, free of clay, shale, organic matter; 1/4-inch minimum to 5/8-inch maximum size.

C. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter, graded in accordance with Section 90-3, State Standard Specifications, within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing By Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 4</td>
<td>75 – 100</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 - 10</td>
</tr>
</tbody>
</table>

D. Imported sand shall have a sand equivalent of 30 per ASTM D 2419.

2.4 SAND-CEMENT SLURRY

A. Sand-cement slurry backfill shall be as specified in Section 03 30 01 – Cast in Place Concrete.

2.5 WATER FOR COMPACtION

A. Water shall be free of organic materials injurious to the pipe coatings, have a pH of 7.0 to 9.3, maximum chloride concentration of 500 mg/l, and a maximum sulfate concentration of 500 mg/l.

3.1 GENERAL
A. Excavation and backfilling of trenches used for construction of communications, power, process piping, and water distribution and sewer systems shall conform to State Standard Specifications, Section 19, Earthwork.

B. Excavation shall be by open cut except that short sections of a trench may be tunneled if the utilities can be safely and properly installed and backfill can be properly compacted in such tunnel sections.

3.2 INSPECTIONS

A. Verify stockpiled material has been approved for reuse.

B. Verify areas to be backfilled are free of debris, snow, ice, or water, and surfaces are not frozen.

3.3 PREPARATION

A. Identify required lines, levels, contours, and datum.

3.4 AC PAVEMENT AND CONCRETE REMOVAL

A. Cut bituminous and concrete pavements, regardless of the thickness, curbs, gutters and sidewalks prior to excavation of trenches.

1. Width of material removed shall be at least equal to the required width of the trench at ground surface.

2. Width of material removed shall be as shown on the Plans

3. AC pavement and concrete rubble shall not be used for trench backfill.

3.5 TRENCH EXCAVATION

A. Excavate the trench to the lines and grades shown on the Drawings for storm sewer, sanitary sewer, water, and other utilities and points of connection, with allowance for pipe thickness, sheeting and shoring if used, and for special bedding.

B. Paved Areas: Cut existing pavement to full depth to a true line before excavation and maintain the edge suitable for repaving. Pavement removed shall not be used as backfill.

A. Trenching Guidelines: Excavate the trench to the approximate level of the grade of the utility line to be installed, using adequate trench width
and side slopes to safely accommodate worker access.

1. Rocky Trench Bottom: Where ledge rock, hard pan, boulders, or sharp-edged materials are encountered, over excavate a minimum depth of 6 inches below the bottom of the utility exterior wall to permit adequate bedding preparation. The installed utility shall have at least 6 inches of clearance from any rock protrusion.

   a. Unstable Trench Bottom: Secure approval of depth of overexcavation and stabilization method. For wet trench construction, use approved method of dewatering through diversion, damming and pumping, well points, or underdrain systems. Dispose of removed fluidized materials as approved. Use bedding material to build a suitable foundation to within 6 inches of finished utility grade, prior to bedding with the specified material. Compact layers to 95 percent of maximum density in not greater than 6-inch layers. Do not proceed with utility installation until wet trench and unstable conditions are corrected to the satisfaction of the Engineer.

B. Remove areas of sub-grade not readily capable of it-situ compaction.

   1. Backfill with Bedding or Select Backfill material and compact to density equal to requirements for subsequent backfill.

C. Correct unauthorized excavation at no cost to Owner.

   1. If the trench is excavated below the required grade, refill any part of the trench excavated below the grade.
   2. Place the refilling material over the full width of trench in compacted layers not exceeding eight inches deep to the established grade with allowance for special bedding.

D. Trench widths in the pipe zone shall be as shown on the drawings. If no details are shown, maximum width shall be 24 inches greater than the pipe outside diameter.

   1. Trench width at the top of the trench will not be limited except where width of excavation would undercut adjacent structures and footings. In such case, width of trench shall be such that there is at least two feet between the top edge of the trench and the structure or footing.

E. Hand trim for bell and spigot pipe joints.
F. Remove lumped soil, boulders and rock.

G. Excavation shall not interfere with normal 45 degree bearing splay of foundations.

H. During trench excavation, place the excavated material only within the working area. Do not obstruct roadways or streets. Conform to federal, state, and local codes governing the safe loading of trenches with excavated material.

I. Foundation stabilization

1. After the required excavation has been completed, the Engineer will inspect the exposed subgrade to determine the need for any additional excavation. It is the intent that additional excavation be conducted in all areas within the influence of the pipeline where unsuitable materials exist at the exposed subgrade. Over excavation shall include the removal of all such unacceptable material that exists directly beneath the pipeline to a width 24 inches greater than the pipe outside diameter and to the depth required.

2. Rock refill used by the Contractor for his convenience will not receive any additional payment.

3.6 LENGTH OF OPEN TRENCH

A. Limit the length of open trench to 300 feet in advance of pipe laying or amount of pipe installed in one working day.

B. Complete backfilling, temporary or first layer paving, not more than 300 feet in the rear of pipe laying operation.

3.7 TRENCH EXCAVATION IN EMBANKMENT AREAS

A. Construct and compact the embankment to an elevation one foot, minimum, over the top of the largest pipe or conduit to be installed prior to trench excavation.

3.8 UNSUITABLE MATERIAL

A. Unsuitable material shall be excavated and disposed of in a lawful manner off the project site, all disposal shall be approved by the Engineer prior to initiating the work.

3.9 TRENCH BACKFILLING
A. Support pipe during placement and compaction of bedding fill.

B. Backfilling and cleanup work shall be accomplished as sections of pipe or conduit are tested and approved. Vehicular travel through the work site shall be impeded or obstructed as little as possible.

C. Compaction: Use vibratory compactors for sands and gravels (non-cohesive soils). Use mechanical tampers for sand and gravel containing a significant portion of fine-grained materials, such as silt and clay (cohesive soils). Hand tamp around pipe or cable to protect the lines until adequate cushion is attained. Puddling or water flooding for consolidation of backfill or compaction by wheel rolling will not be permitted.

D. Bedding: Unless otherwise specified, compact the specified material to 95 percent of maximum density to the finished utility grade.

E. Select Backfill: Fill by hand placement around the utility to just over half depth, and compact in a manner to ensure against lateral or vertical displacement. Place select backfill to 12 inches above the utility line by hand placement in not more than 6-inch layers.

F. Backfill: To minimize settling, soils shall be backfilled in layers, with each layer compacted prior to addition of the next layer. Unless otherwise specified, place and compact the specified material as follows:

1. Vehicular Traffic Areas: Fill and compact in 8-inch maximum layers as follows:
   a. From top of select backfill to two feet below top of subgrade, compact to 90 percent of maximum density.
   b. From two feet below top of subgrade to top of subgrade, compact to 95 percent of maximum density.

2. Non-traffic Areas: Fill and compact in 8-inch maximum layers to 90 percent of maximum density.

G. Employ a placement method that will not disturb or damage pipe or utilities.

H. Maintain optimum moisture content of backfill materials to attain required compaction density.

I. Compact trench backfill to the specified relative compaction. Compact by using mechanical compaction or hand tamping. Do not use high impact hammer type equipment except where the pipe manufacturer warrants in writing that such use will not damage the pipe.
Compact material placed within 12 inches of the outer surface of the pipe by hand tamping only.

Carefully place the material around the pipe so that the pipe barrel is completely supported and that no voids or uncompacted areas are left beneath the pipe.

Use particular care in placing material on the underside of the pipe to prevent lateral movement during subsequent backfilling.

After pipe has been bedded, place pipe zone material simultaneously on both sides of the pipe, in maximum 8-inch lifts, keeping the level of backfill the same on each side.

Do not use any axle-driven or tractor-drawn compaction equipment within 5 feet of building walls, foundations, and other structures.

Do not permit free fall of the material until at least two feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of material directly onto the pipe or the tamped material around the pipe. Do not operate heavy equipment over the pipe until at least 3 feet of backfill has been placed and compacted over the pipe.

Remove surplus backfill materials from site.

Leave stockpile areas completely free of excess fill materials.

3.10 **TOLERANCES**

A. Top Surface of Backfilling: ±0.1 foot.
3.11 SAND CEMENT SLURRY, CONCRETE ENCASEMENT AND THRUST BLOCKS

A. Place in accordance with the Contract drawings.

3.12 COMPACTION REQUIREMENTS

A. Relative compaction requirements shall be as shown on the Plans:

STRUCTURE EXCAVATION & BACKFILLING:

1.1 WORK INCLUDED

A. The work of this section consists of excavation and backfill for concrete structures, and preparation of subgrade for concrete flatwork.

B. Haul, place, rough grade, compact, and finish grade excavated material as engineered fill on those portions of the project site where it is necessary in order to construct the facilities indicated on the Plans.

C. Dispose of unsuitable material off-site or in designated areas, as directed by the Engineer.

1.2 RELATED WORK

A. Section on Trenching Backfilling & Compacting

B. Section on Finish Grading

C. Section on Compacting Earth Materials

D. Section on Cast in Place Concrete

1.3 REFERENCES


B. ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop. (Curve)


E. ASTM D 2937 – Density of soil and in place by Tube method.

F. Section 25 – Aggregate Subbases, State Standard Specifications

G. Section 26 – Aggregate Bases, State Standard Specifications.

1.4 SUBMITTALS

A. Submit plans as required for worker protection against caving ground in excavations. Submittals shall be in accordance with Section on Submittals Procedures.

1.5 SAMPLES

A. Submit samples under provisions of Section on Quality Control and Testing.

B. Submit 10 lb sample of each type of fill to testing laboratory, in airtight containers.

1.6 QUALITY ASSURANCE

A. Compaction Testing

All compaction testing shall be in accordance with Section on Quality Control and Testing.

B. Compaction tests will be performed for each lift or layer.

C. Tests for compaction shall conform to references listed in Part 1.3 of this section

D. Sample backfill materials per ASTM D 75.

E. Compaction testing will be performed in accordance with Section 19, State Standard Specifications.

1. Test every 10,000 square feet of engineered fill or aggregate base material placed.

F. Where compaction tests indicate failure to meet the specified compaction, the Contractor will rework the entire failed area until the specified compaction has been achieved.

G. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project.

1.7 DEFINITION
A. Unsuitable Material: Unsuitable material is material determined to be

1. Incapable of being compacted to specified density using ordinary methods at optimum moisture content.

2. Too wet to be properly compacted if circumstances prevent satisfactory in-place drying prior to incorporation into the work.

3. Otherwise unsuitable for the planned use.

1.8 PROTECTION

A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.

B. Notify Engineer of unexpected subsurface conditions

C. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

D. Grade excavation top perimeter to prevent surface water run-off into excavation.

1.9 CONTROL AND DIVERSION OF WATER

A. General – The Contractor shall furnish or procure all materials and labor required for constructing and maintaining all necessary cofferdams, channels, flumes, drains, sumps, and/or other temporary diversion and protective works and shall furnish, install, maintain, and operate all necessary pumping and other equipment for removal of water from the various parts of the work and for maintaining the foundations and other parts of the work free from water.

1.10 CLASSIFICATION

A. Expected material that will be excavated at this site has been identified in the Geotechnical Report.

B. Regardless of the nature of material excavated, all excavation will be considered unclassified.

1.11 SITE CONDITIONS

A. Underground utilities may exist at this site. Contractor shall take all necessary precautions to protect said utilities. Notify Engineer of any deviation in utility location from that which is shown on the drawings.
2.1 SELECT BED AND FILL MATERIALS

A. Conform to Section on Trenching, Backfilling, and Compacting.

2.2 SELECT MATERIAL

A. Gravel: Pit run, natural stone; free of shale, clay, friable materials and debris; graded in accordance with 1½" x ¾" aggregate grading in Section 90-1.02C, State Standard Specifications.

B. Pea Gravel: natural stone; washed, free of clay, shale, organic matter; ¼ inch minimum to ⅝ inch maximum size.

C. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter, graded in accordance with ANSI/ASTM C136 within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
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</thead>
<tbody>
<tr>
<td>No. 4</td>
<td>75 – 100</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 - 10</td>
</tr>
</tbody>
</table>

D. Class 2 Aggregate Base: material as specified for ¾" maximum grading in the State Standard Specifications, Section 26.

2.3 CONCRETE SLURRY

A. Concrete slurry mix shall be as specified in Section on Cast in Place Concrete.

2.4 ENGINEERED FILL MATERIAL

A. Native granular soil materials may be used as engineered fill. Pulverized asphalt concrete or Portland cement concrete may be incorporated into engineered fill provided no rock pockets or voids are produced. Particles larger than three inches shall be removed from trench backfill, particles larger than six inches shall be removed from engineered fill.

B. All imported fill material placed in structural areas shall consist of predominantly granular soil that is non-expansive and shall be approved by the Engineer prior to use.
   1. The R-value of the imported fill material shall be at least 50.

2.5 GRANULAR BACKFILL/AGGREGATE BASE COURSE

A. Granular backfill and aggregate base course shall meet the requirements of State Standard Specifications, Section 26, Class 2 aggregate base, ¾ inch maximum.
B. Material from concrete crushing operations may be used as granular backfill provided it meets the above requirements.

2.6 WATER

A. Water development, hauling, and application shall be in accordance with the State Standard Specifications, Section 10-6, Watering.

3.1 GENERAL

A. Provide required shoring, sheeting, and slope layback necessary to protect the excavation, as needed, for the safety of the employees and as required by applicable State and Federal laws. Provide suitable barricades for public safety, regardless of trench depth.

B. Upon completion of excavation and before placing forms or structures, notify the Engineer who will inspect the excavation and may take tests to determine soil-bearing values.

C. Identify required lines, levels, contours, and datum.

1. Stake and identify the extent of all earthwork operations prior to starting work.

D. Use suitable material removed from excavation before importing backfill.

E. Verify that stockpiled fill to be reused is approved by the Engineer.

F. Verify areas to be backfilled are free of debris, snow, ice, or water, and surfaces are not frozen.

3.2 DEWATERING

A. The Contractor shall keep all excavation free from water. Furnish, install, maintain, and operate all necessary pumping and other equipment for dewatering of excavations. The Contractor shall at all times have on the project sufficient pumping equipment for immediate use, including standby pumps for use in case other pumps become in-operable.

B. The dewatering operation shall be continuous, so that the excavated areas are kept free from water during the construction, until backfill has been placed to a sufficient height to anchor the work against possible floatation.

C. Dewatering devices shall be adequately filtered to prevent the removal of fines from the soil.
D. Repair any damage caused by the failure of any part of the protective works. Remove temporary protective works when they are no longer needed for dewatering purposes.

E. Provision of dewatering and dewatering equipment shall be considered part of the project with no additional compensation allowed.

F. Any drain rock required in the trench bottom to convey water or stabilize wet soil shall be included at no extra cost to the Owner.

3.3 EXCAVATION

A. Carefully excavate to the established lines and grades shown on the drawings, or as revised and approved by the engineer, to provide a firm, uniform, and unyielding foundation for the proposed structures.

B. Excavations for all footings, piers, finished walls and grade beams shall be sufficiently large so that forms for concrete may be properly placed, removed, and inspected.

1. Excavation for footings may be made to the net footing size plus two inches if the earth banks are sufficiently stable to remain in position until the concrete is in place and if approved by the Engineer.

C. The bottoms of footings, piers, slabs, walls, and grade beams to receive concrete shall be level before placing concrete. All foundations shall rest on firm bearing in undisturbed soil, or on controlled compacted fill.

1. The exposed subgrade surface shall be scarified to a depth of 8 inches, conditioned to optimum moisture content and compacted to at least 95 percent of the maximum dry density.

D. If any existing foundations, roots, stumps, debris, waste materials, pipes, or similar items have been removed, the Contractor shall excavate below these portions to solid undisturbed earth and foundations in these areas shall be built to necessary levels.

E. If soil conditions in excavations are not in accordance with the geotechnical report and seem to indicate that footings need not be carried down as deep as shown, or must be carried deeper, the changes shall be made by the Contractor after approval by the Engineer.

1. Over excavation shall be required a minimum of two feet below top of proposed slab grades under all structures, including but not
limited to the tank, tank ring wall, all concrete slabs, etc., unless shown otherwise on the Plans.

2. Engineered fill in over excavated areas shall be import fill material, free from organic materials or deleterious substances.

F. Common Fill Material (native material) is not acceptable for use as Engineered fill under any structure, tank, tank ring wall, or concrete slab.

3.4 SURPLUS MATERIAL

A. Unless otherwise specified, surplus excavated material shall be used to widen embankments uniformly or to flatten slopes, or it shall be disposed of in a uniform manner along the adjacent roadway around the site or otherwise as approved.

B. Unless otherwise specified, surplus excavated material shall be used as fill for other areas requiring fill as shown on the Plans. Excess material that is not needed for engineered fill may be disposed of at an off-site spoil area. The location of the off-site spoil area, the limits of the fill area, the depths of fill, and the manner of work shall be as directed by the Engineer.

C. Stockpile surplus material as shown on the plans and/or as directed by the Engineer

D. Leave stockpile areas completely free of excess fill materials.

3.5 UNSUITABLE MATERIAL

A. Unsuitable material shall be excavated and disposed of in a uniform manner off the project site, within the Owner’s property as approved, however all disposal shall be approved by the Engineer prior to initiating the work.

3.6 OFF-SITE BORROW AREAS

A. Engineered fill material may be obtained from off-site borrow areas, if on-site sources prove to be insufficient.

1. The location of borrow areas, limits of the area to be excavated, and the depths of cut shall be as directed in the field by the Engineer.

3.7 BACKFILLING

A. Unless otherwise shown in the Plans, all backfill shall conform to Section
19-3 of the State Standard Specifications.

B. Do not place backfill against concrete until concrete has cured sufficiently to accept the load as determined by Section 19-3.03E of the State Standard Specifications.

C. Place and compact common fill material in continuous layers not exceeding eight inches loose depth.

D. Employ a placement method so not to disturb or damage pipes or utilities.

E. Maintain optimum moisture content of backfill materials to attain required compaction density.

F. Remove surplus materials from site.

3.8 **TOLERANCES**

A. Top Surface of Backfilling: ±0.1 foot from design grade.

3.9 **SLURRY CEMENT**

A. Slurry cement backfill shall be placed and shown on the Drawings and in accordance with State Standards Specifications, Section 19-3.02E.

**COMPACTING EARTH MATERIALS:**

1.1 **WORK INCLUDED**

A. The Contractor shall provide all labor, materials and equipment and perform all operations necessary to complete all earthwork required as specified, shown on the drawings, or as directed.

1.2 **RELATED WORK**

A. Section on Cast-In-Place Concrete

B. Section on Compacting Earth Materials

C. Section on Pipe Earthwork

D. Section on Finish Grading

E. Section on Earthwork

1.3 **REFERENCES**
A. ASTM D75 – Practice for Sampling Aggregates.
C. ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop.
D. ASTM D1556 – Density and Unit Weight of Soil in Place by Sand-Cone Method.
E. ASTM D2419 – Sand Equivalent Value of Soil and Fine Aggregate
F. ASTM D6938 – Density of Soil and in Place by the Drive Cylinder Method.
G. ASTM D4254 - Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
J. ASTM D6938 – In Place Density and Water Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth).
K. ASTM D7382-08 - Standard Test Methods for Determination of Maximum Dry Unit Weight and Water Content Range for Effective Compaction of Granular Soils Using a Vibrating Hammer
L. Section 26 – Aggregate Bases, State Standard Specifications.
M. Section 16 – Clearing and Grubbing, State Standard Specifications
N. Section 17 – Watering, State Standard Specifications
O. Section 19 – Earthwork, State Standard Specifications

1.4 SUBMITTALS

A. Submittals shall be in accordance with Section on Submittal Procedures.

1.5 QUALITY CONTROL

A. Compaction Testing

All compaction testing shall be in accordance with Section on Quality Control and Testing.

B. In-Place Density:

1. Compacted backfill for structures and structure foundations: At least one test per lift or per 500 cubic yards placed, whichever is more frequent.

2. Embankments: At least 1 test per lift or every 200 lineal foot of embankment, or 2000 cubic yards of fill placed, whichever is more
frequent.

3. Pipeline Trenches: At least 1 test per lift per every 200 feet of trench backfill placed or every 500 cubic yards placed, whichever is more frequent.

4. A greater frequency of testing may be required at the start of work or when new materials, crews, or equipment are introduced to the site. A lesser frequency can be utilized if approved by the Owner’s Representative.

C. Laboratory Index Testing:

1. Compacted backfill for structures, structure foundations, embankments, and pipelines: Maximum dry density and optimum moisture content, Plasticity Index, and Gradation (when applicable) shall be confirmed at least once for every 2,500 cubic yards of fill placed.

2. In addition, at least one set of applicable index tests shall be performed for each distinct material type used as compacted fill at the site.

3. Additional tests may be performed, as directed by the Owner’s Representative, whenever deviations in material properties or quality of workmanship are suspected.

D. Test Reports:

1. Once a week, the Contractor’s Independent Laboratory shall submit, through the Contractor, inspection test reports to the Owner’s Representative documenting the results of each test. The test reports shall provide the minimum information:

   a. Date and time of test
   b. Test method used
   c. Test result
   d. Location of test (elevation, station and offset)

E. Tests for compaction shall conform to references listed in Part 1.3 of this section

F. Sample backfill materials per ASTM D 75.

3.1 GENERAL
A. Where compacting of earth materials is required, the materials shall be deposited in horizontal layers and compacted as specified in this section. The excavation, placing, moistening, and compacting operations shall be such that the material will be uniformly compacted and will be homogeneous, free from lenses, pockets, streaks, voids, laminations, or other imperfections.

B. Relative Compaction:

1. All areas that fail to meet the minimum compaction requirements shall be reworked as required by the Owner’s Representative and retested until minimum compaction requirements are obtained.

3.2 COMPACTION REQUIREMENTS

A. Unless otherwise specified or shown on the Drawings, a minimum of 95 percent of relative compaction.

3.3 COMPACTING CLAYEY AND SILTY (COHESIVE) MATERIALS

A. Where compaction of earth materials containing appreciable amounts of clay or silt is required, the materials shall be deposited in horizontal layers. The thickness of each horizontal layer prior to compaction shall not be more than eight inches. The excavating and placing operations shall be such that the materials when compacted will be blended sufficiently to secure the highest practicable density.

B. Moisture Content:

1. Prior to and during compaction operations, the materials shall have an above optimum moisture content, but not greater than three percentage points of optimum moisture content, and the moisture content shall be uniform throughout each layer. The optimum moisture content is defined as that moisture content which will result in the laboratory maximum dry density of the soil.

2. Insofar as practicable, as determined by the Owner’s Representative, moistening of the material shall be performed at the site of excavation; but if necessary, such moistening shall be supplemented by sprinkling at the site of compaction.

3. If the moisture content is less than optimum for compaction or is greater than optimum for compaction by more than three percentage points, the compaction operations shall not proceed, except with the specific approval of the Owner’s Representative, until the material has been wetted or allowed to dry out, as may be
required, to obtain a moisture content within the tolerances permitted above, and no adjustment in price will be made on account of any operations of the Contractor in wetting or drying the materials or on account of any delays occasioned thereby.

C. When the material has been conditioned as herein before specified, it shall be compacted by rollers or by hand or power tampers. Where hand or power tampers are used to compact soils in confined areas such as under pipe, they shall be equipped with suitably shaped heads to obtain the required density.

3.4COMPACTING COHESIONLESS FREE-DRAINING MATERIALS

A. Where compaction of cohesion less free-draining materials, such as sands and gravels, is required, the materials shall be deposited in horizontal layers and compacted to the relative density specified in paragraph 3.2 above. The excavating and placing operations shall be such that the materials, when compacted, will be blended sufficiently to secure the highest practicable density. Water shall be added to the materials as may be required to obtain the specified density by the method of compaction being used.

B. The thickness of the horizontal layers prior to compaction shall not be more than eight inches.

3.5COMPACTING COHESIONLESS MATERIALS CONTAINING SOME CLAY AND SILT

A. Cohesionless materials containing clay and silt may not be free draining.

B. When compaction of cohesionless materials containing clay and silt is required, the material shall be compacted using the procedures described in either paragraph 3.3 or 3.4 above, utilizing whichever method results in the higher dry density of the compacted material in the placement. Water shall be added to the materials as may be required to obtain the specified density by the method of compaction being used.

3.6ROLLERS

A. Rollers used for compacting earth materials shall have staggered and uniformly spaced tamping feet and be of sufficient weight for proper compaction.

B. The tamping heads and cleaner bars shall be properly maintained, and the spaces between the tamping feet shall be kept clear of materials which impair the effectiveness of the tamping rollers.
PIE EARTHWORK:

1.1 WORK INCLUDED

A. The Contractor shall provide all labor, materials and equipment and perform all operations necessary to complete all earthwork required as specified, shown on the drawings, or as directed.

1.2 RELATED WORK

A. Section on Cast-In-Place Concrete
B. Section on Compacting Earth Materials
C. Section on Structure Earthwork
D. Section on Pipe Earthwork
E. Section on Disposal of Materials

1.3 REFERENCES

A. ASTM D75 – Practice for Sampling Aggregates.
C. ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop.
F. ASTM D 2937 – Density of soil and in place by Tube method.
G. Section 26 – Aggregate Bases, State Standard Specifications.
H. Section 16 – Clearing and Grubbing, State Standard Specifications
I. Section 17 – Watering, State Standard Specifications
J. Section 19 – Earthwork, State Standard Specifications

1.4 SUBMITTALS

A. Submittals shall be in accordance with Section on Submittal Procedures.

2.1 SELECT AND IMPORT MATERIAL IN PIPE AND BEDDING ZONE

A. Gravel: Pit run, natural stone; free of shale, clay, friable materials and debris; graded in accordance with 1½” x ¾” aggregate grading in Section 90-3, State Standard Specifications.

B. Pea Gravel: Natural stone; washed, free of clay, shale, organic matter; 1/4-inch minimum to 5/8-inch maximum size.

C. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter, graded in accordance with Section 90-3, State Standard Specifications, within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing By Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 4</td>
<td>75 – 100</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 - 10</td>
</tr>
</tbody>
</table>

D. Imported sand shall have a sand equivalent of 30 per ASTM D 2419.

2.2 NATIVE EARTH BACKFILL

A. Native earth backfill used above the pipe zone shall be fine-grained materials free from roots, debris, and rocks larger than 3 inches.

2.3 BACKFILL

A. The type of material used for backfill, the amount thereof, and the manner of depositing the material shall be subject to approval. Insofar as practicable, backfill material shall be obtained from material moved in required excavations.

A. Pipe backfill shall contain no stones larger than 3 inches in diameter.

B. The material used for backfill to be compacted about pipe or culverts shall be selected or processed material containing no stones larger than 3 inches in diameter, approved by the Owner’s Representative, and
obtained from required excavation. All materials in backfill to be compacted shall be placed, moistened, and compacted as provided in Section 31 23 31 (Compacting Earth Materials).

2.4 SAND-CEMENT SLURRY

A. Sand-cement slurry backfill shall be as specified in Section on Cast in Place Concrete.

2.5 WATER FOR COMPACTION

A. Water shall be free of organic materials injurious to the pipe coatings, have a pH of 7.0 to 9.3, maximum chloride concentration of 500 mg/l, and a maximum sulfate concentration of 500 mg/l.

3.1 EXCAVATION FOR PIPELINES

A. The Contractor shall perform all necessary excavation for pipelines, fittings, valves, supports, collars, and other related items (not including manholes and structures) to the required lines, grades, and depths, all in conformance with these Specifications and details shown on the Drawings, or as directed. All trench widths shall be of adequate width for proper pipe installation based upon the particular method of backfilling allowed by the Owner’s Representative.

B. Trench Excavation. - The minimum trench width to be excavated for either method of backfilling shall be the width of the pipe outer diameter plus twenty-four (+24) inches. Trench excavation shall include removal and disposal of all materials of whatever nature encountered, including all obstructions that would interfere with the proper construction and completion of the work, and shall include furnishing, placing, and maintaining all shoring necessary to safely support the sides of the excavation. The work shall also include all pumping, ditching, and other required measures for the removal or exclusion of water. Subject to the determination of the Owner’s Representative, if any of the following conditions are encountered in pipe trench excavation, separate payment will be made in conformance with the contract terms and conditions for required additional work authorized or directed by the Owner’s Representative:

1. If the bottom of the pipe trench is in soft, unstable material, it shall be excavated below grade for the full width of the trench as directed and the below-grade excavation subsequently refilled with approved compacted materials.

2. If the pipe trench is excavated in rock, hardpan, or other similar hard and unyielding material, or has rocks or cobbles which, in the
opinion of the Owner’s Representative, will be detrimental to the pipe, the bottom of the trench shall be over excavated six (6) inches below grade, and said over excavation refilled with approved compacted material.

C. Subgrade. - If natural foundation or subgrade material is disturbed or loosened during the excavation process or otherwise, it shall be compacted to a degree satisfactory to the Owner’s Representative, or where directed, it shall be removed and replaced with approved material and compacted in accordance with requirements of paragraph 3.02 (Pipe Backfill) and details shown on the Drawings, all at no additional cost to the District.

D. Over excavation. - Any and all excess excavation or over excavation performed by the Contractor for any purpose or reason, except as may be authorized in writing by the Owner’s Representative, and whether or not due to the fault of the Contractor, shall be at the expense of the Contractor. Fill and compacting of fill for such unauthorized excess excavation or over excavation shall be placed and compacted by and at the expense of the Contractor. Insofar as practicable, material excavated shall be used for backfill; otherwise, it shall be wasted as directed. When water is encountered in the trench, it shall be removed by pumping or draining.

3.2 PIPE BACKFILL

A. Backfill about pipe includes all backfill required to be placed under these specifications.

B. Where pipes penetrate embankments, all pipes shall be backfilled to springline elevation with controlled low strength material.

C. Backfill shall be placed to the lines and grades shown on the drawings, as prescribed in this paragraph, or as directed by the Owner’s Representative. Backfill includes that shown as compacted foundation on the drawings.

D. All backfill shall be placed carefully and spread in uniform layers so that all spaces about rocks and clods will be filled. Backfill shall be placed to the same elevation on both sides of the pipe portions of structures and culverts to prevent unequal loading and displacement of the pipe. The difference in elevation of the backfill on both sides of the pipe portions of the structures and culverts shall not exceed 6 inches at any time. The Contractor shall be responsible for providing adequate earth cover over pipe to prevent damage from construction equipment loads.

E. Method of Backfilling - The method(s) allowed for placement of
compacted backfill shall be any of the methods listed following:

1. Mechanical compaction of native materials - The material shall be compacted in accordance with Section on Compacting Earth Materials.

F. Backfill in pipe trenches shall be placed to the required level of the top of trench, or original ground surface with additional backfill placed, as required to allow for settlement. Backfill shall be obtained from approved, suitable material removed during Contract excavation or imported from a source approved by the Owner’s Representative. Prior to backfilling, the excavated area shall be cleaned of all trash and debris.

G. Backfill shall be thoroughly worked under the haunches and shall be a minimum of the density as shown in the drawings. Backfill shall not be dropped directly on the pipe and all materials within six (6) inches of the pipe shall be free from rocks, hard lumps, and clods greater than three (3) inches in diameter. Backfill shall be compacted to the limit lines shown on the Drawings, or as specified herein. Each layer or lift of compacted backfill shall be inspected and approved by the Owner’s Representative before placement of any subsequent layer of material, including testing for specified densities in conformance with Section 31.23.31 (Compacting Earth Materials), if so required, as determined by the Owner’s Representative.

H. To prevent unequal loading and displacement of the pipe, backfill shall be placed at approximately the same elevation on both sides of the pipe. The Contractor shall take all necessary precautions to prevent water from flooding the trenches. Unless otherwise directed, pipe trenches shall be backfilled within 48 hours after the time the pipe has been installed; provided, however, that no backfilling shall be performed until trenching and pipe installation have been approved. Sufficient over-backfill shall be placed as directed to compensate for subsequent settlement or shrinkage of fill material.

I. Pipe trench backfill under all structures or compacted embankments shall be consolidated or compacted for the full height of the trench or to the bottom of embankment or to other limits if so shown. Methods of placement of compacted backfill shall be in conformance with applicable requirements as specified for backfill about structures in Section on Structure Excavation and Backfilling. As shown on the drawings and as directed by the Owner’s Representative, the Contractor shall perform all pipe-related final grading/restoration work.

**DISPOSAL OF MATERIALS:**

1.1 WORK INCLUDED
A. Disposal of unsuitable material, concrete, asphalt concrete, rubbish, and other debris, as described below.

1.2 RELATED WORK

A. Section on Cast-In-Place Concrete
B. Section on Compacting Earth Materials
C. Section on Pipe Earthwork

1.3 REFERENCES

A. ASTM D75 – Practice for Sampling Aggregates.
C. ANSI/ASTM D1557 – Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10 lb (4.54 kg) Hammer and 18-inch (457 mm) Drop.
F. ASTM D 2937 – Density of soil and in place by Tube method.
G. Section 26 – Aggregate Bases, State Standard Specifications.
H. Section 16 – Clearing and Grubbing, State Standard Specifications
I. Section 17 – Watering, State Standard Specifications
J. Section 19 – Earthwork, State Standard Specifications

1.4 SUBMITTALS

A. Submittals shall be in accordance with Section on Submittal Procedures.
1.5 GENERAL

A. The Contractor shall be responsible for the cleanup and disposal of waste materials and rubbish. The disposal of waste materials and rubbish shall be in accordance with applicable Federal, State, and local laws and regulations, and with the requirements of this paragraph. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement shall apply.

B. The Contractor shall keep records of the types and amounts of waste materials produced, and of the disposal of all waste materials on or off the jobsite.

C. The cost of disposing of waste materials other than unsuitable materials shall be included in the prices bid in the schedule for other items of work.

3.1 DISPOSAL OF EXCAVATED MATERIAL

A. All excess excavated material shall be hauled off site to a location selected by the Contractor, meeting the conditions of Paragraph 3.4 below.

B. All unsuitable material shall be hauled off-site and properly disposed.

3.2 DISPOSAL OF CONCRETE AND A. C. SURFACING

A. All concrete, A.C. and pavement removed from the project site shall be disposed of at a site obtained by the Contractor and approved by the Owner’s Representative. No recyclable material shall be disposed of at any landfill. All disposable recyclable materials shall be disposed in a manner that facilitates recycling. Payment for disposal, including all costs of hauling, shall be as specified in the Technical Specifications or Explanation of Bid Items. The Contractor shall report quantities of disposed material in a manner that enables the Owner to utilize diverted quantities as diversion credits pursuant to California Integrated Waste Management Act of 1989 (Public Resources Code Sections 40000 et seq.)

3.3 DISPOSAL OF OTHER DEBRIS

A. All oil cake, wood debris, structure demolition, vegetation and any other debris removed from the project site shall be legally disposed of at a site(s) obtained by the Contractor with prior written permission of the Owner’s Representative. Contractor shall identify the proposed Disposal Site(s) at the pre-construction conference. Such Disposal Site(s) shall be a properly licensed and permitted facility pursuant to state and local
regulations for purposes of accepting delivery of the respective materials. No recyclable material shall be disposed of at any landfill. All disposable recyclable materials shall be disposed in a manner that facilitates recycling. In addition to the following, a certificate of compliance stating disposal location and manner of disposal of recyclable materials shall be submitted to the Owner’s Representative.

1. Disposal of combustible materials shall be by removal from the construction area. Disposal of combustible materials by burning will not be permitted. Disposal of waste materials by burying will not be permitted.

2. Waste materials shall be disposed of or recycled at a State approved disposal or recycle facility. The Contractor shall make any necessary arrangements with private parties, and State and county officials pertinent to locations and regulations of such disposal or recycle facilities and shall pay any fees or charges required for such disposition.

3.4 CONTRACTOR’S DISPOSAL SITES

A. Contractor shall make arrangements for disposing of the materials at the Disposal Site(s) and pay all costs involved. Arrangements shall include, but not be limited to, obtaining written authorization from the property owner of the Disposal Site(s) and before disposing of any material off the project site, Contractor shall furnish to the Owner’s Representative the authorization or a certified copy thereof together with a written release from the property owner absolving the Owner from any and all responsibility in connection with the disposal of material on the property of the Disposal Site(s). Before any material is disposed of on the Disposal Site(s), the Contractor shall obtain written permission from the Owner’s Representative to dispose of the material at the location designated in the authorization.

B. It is expressly understood and agreed that the Owner assumes no responsibility to the Contractor whatsoever by the granting of such permission and Contractor shall assume all risks in connection with the use of the Disposal Site(s). The Contractor is cautioned to make such independent investigation and examination as the Contractor deems necessary to be satisfied as to the quantity and types of materials which may be disposed of on the Disposal Site(s) and the status of any permits or licenses in connection therewith.

C. Within 24 hours of removing the respective material from the project site for disposal, Contractor shall provide Owner’s Representative with a certified copy of the weight slip from the Disposal Site obtained by Contractor upon delivery of such debris, and a certified statement from
Contractor identifying the material constituting the debris and that it was disposed of at the Disposal Site (identifying the and name of the owner) in accordance with all laws and applicable regulations promulgated by Federal, State, regional, or local administrative and regulatory agencies.

3.5 **DISPOSAL OF HAZARDOUS WASTE AND MATERIALS**

A. Materials or wastes, defined as hazardous by 40 CFR 261.3, or by other Federal, State, or local laws or regulations, used by the Contractor or discovered in work or storage areas, shall be disposed of in accordance with these specifications and applicable Federal, State, and local laws and regulations. Unknown waste materials that may be hazardous shall be tested, and the test results shall be submitted to the Owner’s Representative for review.

B. Waste materials known or found to be hazardous shall be disposed of in approved treatment or disposal facilities. Hazardous wastes shall be recycled whenever possible. A copy of all hazardous waste manifest shall be sent to the Owner’s Representative.

C. Waste materials discovered at the construction site shall immediately be reported to the Owner’s Representative. If the waste may be hazardous, the Owner’s Representative may order delays in the time of performance or changes in the work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of the contract.

D. If necessary, the Contractor will be required to conduct an environmental site assessment at the following Contractor use locations:

1. All hazardous waste accumulation areas;

2. All hazardous material and petroleum dispensing and storage areas where the aggregate storage of hazardous materials or petroleum at the site is or has been over 110 gallons.

3. This site assessment shall be performed by a qualified environmental consultant or equivalent and shall document through appropriate analytical sampling that the site is free of the effects of contamination (i.e., contaminant concentrations less than State action cleanup levels).

3.6 **CLEANUP**

A. The Contractor shall keep work and storage areas free from accumulations of waste materials and rubbish, and before completing the work, shall remove all plant facilities, buildings, including concrete footings and
slabs, rubbish, unused materials, concrete forms, and other like materials, which are not a part of the permanent work.

B. Upon completion of the work, and following removal of construction facilities and required cleanup, work areas shall be regraded and left in a neat manner conforming to the natural appearance of the landscape.

**UTILITY LINE MARKING:**

1.1 *WORK INCLUDED*

A. The work of this section consists of furnishing and installing utility line marking tape in the trench above newly constructed utility lines.

1.2 *SUBMITTALS*

A. As specified in Section on Submittal Procedures.

B. Samples: 24-inch strips of tape and two markers.

C. Certification that the materials used in the tape fabrication meet the requirements of this section.

D. Installation procedure if the cable is installed by plowing.

2.1 *MARKING TAPE*

A. Capable of being inductively detected electronically.

B. Construction: Metallic foil laminated between two layers of impervious plastic film not less than 3 inches wide. Total thickness of tape shall not be less than 0.005 inch (5 mil), ±10 percent manufacturing tolerances.

1. Film: Inert plastic. Each film layer shall be not less than 0.001 inch (1.0 mil) thick.

2. Foil: Not less than 0.001 inch (1.0 mil) thick.

3. Adhesive: Compatible with foil and film.

C. Imprint: 3/4-inch or larger bold black letters.

D. Legend: Identify buried utility line tape with imprint such as "Caution: Sewer Line Below". Repeat identification at approximately 24-inch intervals.


E. Background Color: APWA color code and as specified in the following table.

<table>
<thead>
<tr>
<th>Color</th>
<th>Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Red</td>
<td>Electric</td>
</tr>
<tr>
<td>High Visibility Safety Yellow</td>
<td>Gas, Oil, Steam, Dangerous Materials</td>
</tr>
<tr>
<td>Safety Alert Orange</td>
<td>Telephone, Communications, Cable Television</td>
</tr>
<tr>
<td>Safety Precaution Blue</td>
<td>Water System, Irrigation</td>
</tr>
<tr>
<td>Safety Green</td>
<td>Sanitary Sewer, Storm Sewer</td>
</tr>
<tr>
<td>Safety Brown</td>
<td>Force Mains and Effluent Lines</td>
</tr>
<tr>
<td>Purple</td>
<td>Reclaimed Water</td>
</tr>
</tbody>
</table>


2.2 SURFACE MARKERS

A. All markers shall have an identifying letter either cast or routed into marker. The Contractor has the option of any of the following. However, only one type shall be used on any one project:

B. Cast-In-Place Concrete.

1. Concrete: As specified in Section on Cast in Place Concrete.
2. Reinforcement: One No. 5 bar in center of the marker.

C. Precast Concrete: Commercially fabricated concrete marker meeting design dimensions and concrete reinforcing requirements.

D. Timber Posts: Any softwood lumber species meeting PS 20-70. Grade No. 1 or better, free of heart center, S4S as shown. Pressure treat timber posts for soil contact with waterborne preservative in accordance with AWPA C2-90.

2.3 TRACER WIRE

A. Minimum: No.10, solid, 12 AWG copper wire with Type TW insulation. Join so as to form a mechanically and electrically continuous line throughout the length of the marked pipe.

3.1 MARKING TAPE
A. Install tape in backfill directly over each buried utility line as shown on the detailed drawings.

B. Unless otherwise shown, tape shall be installed a minimum 1.5 feet below finish grade. However, in no case shall tape be placed closer than two feet above the top of the pipe.

C. Where utilities are buried in a common trench, identify each line by a separate warning tape. Bury tapes side by side directly over the applicable line.

3.2 TRACER WIRE

A. Wherever PVC or Polyethylene pipe is installed in the ground, a tracer wire shall be installed. Conductors shall be spliced in accordance with Division 26, Electrical.

1. Tracer wire shall be brought to the surface at all gate and butterfly valves, air valves, blow-offs, Fire Hydrants, Water Services, and other pipeline appurtenances

B. Tracer Wire: Attachment of the wire to the pipe shall be made with plastic tie-wraps or other approved method.

C. Contractor shall conduct a satisfactory continuity test prior to Owner acceptance.

3.3 SURFACE MARKERS

A. In addition to marking tape, install surface markers at all changes in horizontal direction and at intervals not exceeding 400 feet.

B. Tracer wire shall be wrapped around cast iron valve boxes; while ensuring wire conductors are making contact with valve box.

1. Tracer wires shall be tied together to a No. 5 rebar cast in a concrete utility line marker and terminate above grade. Allow sufficient slack in tracer wire along pipe to allow for pipe shrinkage and expansion.
STORM DRAIN PIPE AND APPERTENANCES:

1.1 WORK INCLUDED

A. Furnish, install, and test all storm drain pipe, fittings, and appurtenances as indicated on the Plans and as specified.

1.2 RELATED WORK

A. Section on Trenching, Backfilling, and Compacting
B. Section on Utility Line Marking

1.3 REFERENCES

A. City of Bakersfield Development Standards

1.4 SUBMITTAL REQUIREMENTS

A. Submittals shall be as specified in Section on Submittal Procedures
B. Shop drawings
C. Manufacturer's literature for pipe and appurtenances
D. Certificates of Compliance

2.1 GENERAL

Storm drain pipe may be constructed of either material shown below, at Contractor's option and at no additional compensation. All fittings and appurtenances shall be selected for compatibility with the pipe product chosen for installation.

2.2 POLYVINYL CHLORIDE STORM DRAIN PIPE (PVC)

A. PVC pipe four inches and larger in diameter shall conform to ASTM D 3034, SDR 35. Each length of pipe shall be marked with the manufacturers name, nominal size and ASTM designation. Pipe shall be made of PVC plastic having a cell classification of 12454B or 12364B as defined in ASTM D1784 and shall have SDR of 35 and minimum pipe stiffness of 46 PSI according to ASTM Test D2412.

B. Pipe shall include an integral bell section with a factory assembled rubber ring gasket conforming to ASTM F477. Joint shall conform to ASTM D 3212. Bells shall meet the same strength requirements as that of the pipe.
C. Fittings shall be supplied by the pipe manufacturer and shall meet the strength requirement of the pipe. Integral bells and gaskets shall conform to the requirements for joints in this section. Fittings shall be marked with nominal size, manufacturers name and ASTM designation.

2.3 MARKER TAPE FOR BURIED PIPING

A. As specified in Section 33 05 26, Utility Line Marking.

2.4 TRACER WIRE

A. As specified in Section 33 05 26, Utility Line Marking.

3.1 HANDLING AND DISTRIBUTION OF MATERIALS

A. Delivery: Handle pipe carefully to ensure delivery at the project site in sound, undamaged condition. Contractor shall replace damaged pipe at no additional expense to the Owner.

B. Storage: Do not store materials directly on the ground. Adequately support piping to prevent warping. Use protective covers where PVC pipe may be damaged by direct sunlight.

C. No more than one week's supply of material shall be distributed in advance of pipe laying operations, unless otherwise approved or required.

D. Before laying, pipe shall be inspected for cracked, broken, or defective pieces. Such pieces shall be rejected. Pipe shall be carefully lowered into the trench to prevent damage. All dirt or other foreign matter shall be removed from inside the pipe before lowering into the trench.

3.2 INSTALLATION AND ACCEPTANCE TESTS OF BURIED PIPING

A. General: Pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer's instructions and in accordance with the following references as appropriate:

   Polyvinyl Chloride Pipe - AWWA C605.

B. Reinforced concrete pipe shall be installed in accordance with the details on the Plans. Installation and acceptance tests for reinforced concrete pipe shall conform to the requirements of the City Standard Specifications.
C. Handling: The pipe shall be protected to prevent entrance of foreign materials during laying operations. When laying is not in progress, open pipe ends shall be protected with a watertight plug or other approved means to exclude water or foreign material.

D. Alignment:
Pipe shall be installed to the grades and elevations indicated and shall have a minimum cover specified on the plans from the top of the pipe to existing ground or paved surface unless otherwise indicated.

E. Joints:
Pipe shall be assembled and joined in accordance with the manufacturer's published instructions for the type of pipe and joint used. All portions of the joints shall be thoroughly cleaned before the sections of pipe are assembled. The ends of each pipe shall abut against the next pipe section in such a manner that there shall be no unevenness of any kind along the bottom half of the interior of the pipe.

F. All newly installed sections of buried piping shall be leakage tested per manufacturer's requirements.

G. Should testing disclose any visible leaks or leakage greater than that allowed, the defective joints or pipe shall be located, repaired, and retested until satisfactory.

H. All piping shall be tight and free from leaks. All pipe, fittings, pipe joints, and other materials that are found to be defective shall be removed and repaired or replaced with new and acceptable material, and the affected portion of the piping retested by and at the expense of the Contractor.

**CONCRETE DROP INLETS:**

1.1 *WORK INCLUDED*

A. The work of this section consists of furnishing, constructing and installing drop inlets and grates.

1.2 *RELATED WORK*

A. Section on Excavation

B. Section on Pipe Earthwork
1.3 **SUBMITTALS**

A. As specified in Section on Submittal Procedures.

1.4 **CONTRACTOR'S OPTION**

A. The Contractor may, with prior approval, furnish precast boxes, provided they meet the requirements of the concrete section and are designed and manufactured in accordance with ASTM C913-91. The Contractor may also furnish commercial grates and frames with prior approval. Concrete Drop Inlets shall be as manufactured by Western Concrete, Pleasanton, CA 94566, (510) 462-6802, or approved equal.

1.5 **PROJECT CONDITIONS**

A. Unless concrete is properly protected, construct structures only during periods when nighttime temperatures are above 35 degrees F.

**PART 2 PRODUCTS**

2.1 **CONCRETE**

A. As specified in Division 3.

2.2 **GRATE AND FRAME**

A. As shown. Structural steel, ASTM A36-92, hot dip galvanized after fabrication, AASHTO M111-91.

3.1 **STRUCTURE EXCAVATION AND BACKFILLING**

A. As specified in Section on Structure Excavation and Backfilling

3.2 **CONCRETE**

A. As specified in Division 3.

3.3 **INSTALLATION**

A. Inlet grates shall be centered on the concrete vault as detailed on the drawings. Grate vanes shall be positioned to collect flow from the predominant flow pattern and as directed by the Contracting Officer. Set metal frames in full mortar bed. Place pipe sections flush on the inside of the structure wall, projecting outside sufficiently for proper connection
with the next pipe section. Precast vaults shall be set in place vertically and in true alignment. All holes in sections used for handling purposes shall be thoroughly plugged with rubber plugs or mortar

B. Concrete Drop Inlets shall be installed in conformance with AGENCY Improvement Standards.

PIPE AND FITTINGS:

1.1 WORK INCLUDED

A. Furnish, install, and test all water, utility, pipe, fittings, and appurtenances as indicated and as specified.

1.2 RELATED WORK

A. Section on Cast-In-Place Concrete

B. Section on Trenching, Backfilling, and Compacting

1.3 REFERENCES

A. California Plumbing Code

B. American Water Works Association Standards

1.4 SUBMITTAL REQUIREMENTS

A. Submit shop drawings in accordance with the General Conditions.

B. Submit manufacturer’s catalog data. Show manufacturer’s model number.

C. Submit dimensions including wall thickness and materials of construction by reference standard and grade. Submit information on interior and exterior coatings as applicable.

1.5 QUALITY ASSURANCE

A. All work performed under this section shall meet all recommendations and requirements of AWWA, California Plumbing Code, NFPA 24, ASTM D2774, and all other applicable national, state, local, standards and regulations.
1.6 MATERIALS

A. All materials in contact with potable water shall be certified to ANSI/NSF Standard 61.

2.1 POLYVINYL CHLORIDE WATER PIPE (PVC)

A. General: PVC pipe 4 inches through 12 inches in diameter shall conform to AWWA C900, unless otherwise specified. PVC pipe 14 inches in diameter and larger shall conform to AWWA C905, unless otherwise specified.

B. The pipe shall be minimum PR 235 (DR 18) unless shown otherwise. Each length of pipe shall be marked with the manufacturer's name, nominal size, pressure classification, and date of manufacture.

C. Joints: Joints shall be push-on type couplings or integral socket bell PVC pipe unless otherwise shown with rubber gaskets conforming to ASTM D3139 and ASTM F 477. Integral socket bells of PVC pipe or separate couplings shall meet the same strength requirements as that of the pipe. All component parts of each joint including gaskets and coupling shall be clearly marked for use with the pipe for which they are intended.

D. Fittings: Fittings shall be of ductile iron conforming to ANSI A21.10 (AWWA C153) with push-on joint bell to fit the particular make of pipe furnished. Fittings shall have a pressure rating at least equivalent to that of the pipe used and shall be cement-mortar lined in accordance with ANSI A21 (AWWA C104).

E. Fittings: Fittings shall be of ductile iron conforming to ANSI A21.10 (AWWA C 153) for mechanical joints. Dimensional and material requirements for pipe ends, glands, bolts, nuts, and gaskets shall conform to ANSI A 21.11 (AWWA C111). Pipe smaller than 4 inches shall have screwed or grooved joints.

2.2 POLYVINYL CHLORIDE SCHEDULE PIPE

A. The material used in the manufacture of the pipe shall be domestically produced rigid polyvinyl chloride (PVC) compound, Type I Grade I, with a Cell Classification of 12454 as defined in ASTM D1784, trade name designation H707 PVC. This compound shall be gray in color as specified and shall be approved by ANSI/NSF International for use with potable water (NSF Std 61).

B. PVC pipe shall be manufactured in strict accordance to the requirements of ASTM D1785 for physical dimensions and tolerances. Each
production run of pipe manufactured in compliance to this standard, shall also meet or exceed the test requirements for materials, workmanship, burst pressure, flattening, and extrusion quality defined in ASTM D1785. All belled-end pipe shall have tapered sockets to create an interference-type fit, which meet or exceed the dimensional requirements and the minimum socket length for pressure-type sockets as defined in ASTM D2672. All PVC Schedule 80 pipe must also meet the requirements of NSF Standard 14 and CSA Standard B137.3 rigid PVC pipe for pressure applications and shall bear the mark of these Listing agencies. This pipe shall have a flame spread rating of 0-25 when tested for surface burning characteristics in accordance with CAN/ULC-S102-2-M88 or equivalent.

C. Product marking shall meet the requirements of ASTM D1785 and shall include: the manufacturer’s name (or the manufacturer’s trademark when privately labeled); the nominal pipe size; the material designation code; the pipe schedule and pressure rating in psi for water @ 73°F; the ASTM designation D1785; the independent laboratory’s seal of approval for potable water usage; and the date and time of manufacture.

D. All joints shall be solvent welded or union unless flanged connections are required for adjacent equipment.

E. All solvent cements used for PVC, except for pipes carrying sodium hypochlorite and sodium hydroxide shall conform to ASTM D-2564 and be listed by ANSI/NSF for potable use applications.

F. All solvent cements used for CPVC, except for pipes carrying sodium hypochlorite and sodium hydroxide shall conform to ASTM F493 and be listed by ANSI/NSF for potable use applications.

G. Solvent cement for pipes carrying sodium hypochlorite or sodium hydroxide shall conform to ASTM F493 and be specially formulated for use with corrosive chemicals. Solvent shall be IPS Weld-On 724 or equal.

H. Unions shall be Schedule 80, shall conform to the materials specifications for fittings, shall be socket joint, and shall utilize EPDM or Viton O-rings compatible with the chemical service.

### 2.3 FLEXIBLE COUPLINGS FOR GRAVITY PIPES

A. Transition type couplings shall be factory manufactured to ensure watertight fit and smooth flow transition at the joint. Couplings shall be made of resilient elastomeric PVC, with all stainless-steel coupling bands including screw and housing. All materials shall be rustproof and unaffected by soil conditions or normal sewer gases and shall be flexible with earth movement while maintaining seal. Poured concrete collar and similar coupling methods will not be accepted.
2.4 STAINLESS STEEL TUBING

A. Stainless steel tubing shall be made of Type 316 L stainless steel to the requirements of ASTM A 269, of minimum 1/4-inch inside diameter, or as indicated, for the test pressure required. The fittings shall be swage ferrule design of Type 316 L stainless steel, of the double acting ferrule design, providing both a primary seal and a secondary bearing force. Flare bite or compression type fittings are not acceptable.

2.5 COPPER PIPE AND TUBING

A. Copper tubing shall conform to ASTM B88. Copper tubing for water piping shall have a weight of not less than Type K. Type L copper tubing shall be permitted to be used for water piping when piping is above ground in, or on, a building or underground outside of structures

B. Fittings:

1. Use soldered joints and fittings in exposed tubing service.

2. Use soldered joints and fittings in buried service.

3. Fittings and joints 3/8” and smaller in exposed service may be of the nut-and ferrule type with flared end connections or compression joint connections.

4. Use threaded joints and fittings in buried and exposed copper and brass piping.

C. Joints from copper tubing to threaded pipe shall be made using brass adapter fittings. The joint between the copper tubing and the fitting shall be a soldered brazed flared, or pressed joint and the connection between the threaded pipe and the fitting shall be made with a standard pipe size screw joint.

D. Joints in copper tubing shall be made by the appropriate use of approved copper or copper alloy fittings. Surfaces to be joined by soldering shall be cleaned bright by manual or mechanical means. The joints shall be properly fluxed with an approved type flux and made up with approved solder. Solder and fluxes shall be manufactured to approved standards.

1. Solders and fluxes with a lead content that exceeds two-tenths (0.02) of one percent shall be prohibited in piping systems used to convey potable water.
2. Solder shall be 95-5 (95% tin, 5% antimony) conforming to ASTM B32, Grade Sb5 or silver solder conforming to AMS 4773C.

3. Soldering flux shall comply with ASTM B813.

E. Only brazing alloys having a liquid temperature above 1000°F (538°C) shall be used.

F. Nut and Ferrule Fittings: Fittings shall be brass and or the Swagelok type as manufactured by Crawford Fitting Company, utilizing a nut and dual ferrule design to connect to tubing. End connections shall be of the union type.

G. Unions shall be the same size as the pipe or tube, three part, with copper flare end connections. Unions shall be bronze, ASTM B61 or B62. Unions shall be Mueller H-15400, Jones J-1528, or equal.

H. Provide an insulating union at the point of transition from copper tubing or piping to ferrous piping.

I. Buried tubing shall be polyethylene coated, tape wrapped, or encased in a PVC sleeve.

2.6 CHEMICAL PIPING AND TUBING

A. Unless otherwise noted on the drawings, chemical piping shall be Schedule 80 PVC or CPVC.

B. Where tubing inside of EPVC is called out on the drawings, chemical tubing and conduit shall be as follows:

1. EPVC shall consist of Schedule 80 PVC conduit or pipe utilizing long radius sweep elbows.

2. Chemical dosing tubing shall consist of FDA compliant PTFE tubing with a minimum working pressure of 90 psi at 150°F. HDPE, PVC, or PVDF tubing may be substituted provided that they meet the minimum working pressure requirement and are certified by the manufacturer to be suitable for the chemical service with an “excellent” chemical compatibility rating.

3. Sample tubing shall consist of odorless, tasteless, flexible black polyethylene tubing. Minimum operating pressure shall be 125 psi up to ½-inch in size and shall be ¼ of the burst pressure of the tubing. Tubing shall comply with ASTM D1248, Type I, Class A, Category 4, Grade E and shall be certified to ANSI/NSF Standard 61.
4. Fittings for tubing shall be compression type fittings rated at 150 psi minimum and constructed of a material compatible with the chemical service.

2.7 GROOVED COUPLINGS

A. Groove dimensions shall conform to AWWA C606.

B. Grooved couplings for ductile iron shall be Victaulic Style 31;

C. Flexible grooved couplings for steel pipe shall be Victaulic Style 77 or equal; rigid grooved couplings for steel pipe shall be Victaulic Style 07 or equal. Couplings shall be rigid unless otherwise noted on the drawings.

D. Grooved - Flanged adapters shall be Victaulic Style 341 for ductile iron pipe and Style 741 for steel pipe or equal.

E. Grooved coupling for high density polyethylene pipe shall be Victaulic Style 995 or 997 or equal.

2.8 FLANGED JOINTS

A. Flange shall conform to ANSI B16.5, Class 150.

B. All steel hardware installed underground shall be coated with a rust preventative, wrapped with 4 mil polyethylene sheeting, and secured with PVC tape.

C. Gaskets shall be meet the pressure requirements of the adjoining flanges and shall conform to AWWA C-207. Gaskets for flat faced flanges shall be 1/8-inch thick.

D. Gaskets for metallic pipe and non-potable 150 psi or less services shall be acrylic, or aramid fiber bound with nitrile; Garlock Blue-Gard 3000 or equal. EPDM rubber gaskets, Garlock 98206 or equal, are also acceptable.

E. Gaskets for metallic pipe and potable water service shall be NSF/ANSI-61 certified EPDM rubber, Garlock 98206 or equal.

F. Gaskets for non-metallic flat faced flanges shall be constructed of a fluororubber material with a hardness of 70 durometer designed specifically for lower seating stress. Gaskets shall be certified to NSF/ANSI-61 for potable water service. Gaskets shall be Garlock Style XP or equal.
2.9  FLEXIBLE SLEEVE COUPLINGS

A.  Flexible sleeve couplings shall be one of the following, or Engineer approved equivalent:


2.  Smith Blair, Inc., Series 411 or Wide-Range 461

3.  Romac Industries, Inc., Style 400 for 12” and larger pipe or XR501 Extended Range Coupling, 4” thru 12” pipe size.

B.  Center sleeves shall comply with the following

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<thead>
<tr>
<th>Nominal Pipe Diameter</th>
<th>Minimum Sleeve Length</th>
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<tr>
<td>6 inch and smaller</td>
<td>Manufacturer’s Standard</td>
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<td>7 inch</td>
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<tr>
<td>14 inch and larger</td>
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2.10  FLEXIBLE SPOOL-TYPE EXPANSION COUPLINGS

A.  Flexible rubber coupling shall be flexible joints, which includes a tube, body cover and flanges. The tube shall be a leak proof liner and the body shall consist of fabric and rubber compound, reinforced with steel wire or rings for strength. Flexible rubber coupling shall be either a single arch or double arch construction as indicated in the Plans. Couplings shall have control rods to limit extension and flanges shall have backing rings. Couplings used for services with pressures greater than 75 psi shall have stainless steel flanges – rubber flanges with backing rings shall not be acceptable. Flexible couplings shall have minimum pressure ratings of 100 psi; couplings installed on suction of pumps shall have a minimum vacuum (pressure) rating of 30 inches Hg column.

1.  Flexible coupling shall have Buna N liner and cover and shall be manufactured by Proco, Red Valve Company Inc., Metraflex Company or equal.

2.11  DOUBLE-SOCKET EXPANSION JOINT

A.  Flexible expansion joints shall be manufactured of ductile iron conforming to the material requirements of ASTM A536 and ANSI/AWWA C153/A21.53.

B.  Each flexible expansion joint shall be pressure tested prior to shipment against its own restraint to a minimum of 250 PSI. A minimum 2:1 safety factor, determined from the published pressure rating, shall apply.
C. Each flexible expansion joint shall consist of an expansion joint designed and cast as an integral part of a ball and socket type flexible joint, having a minimum per ball deflection of: 25º, 4” - 8”; 20º, 10” - 12”; 15º, 14+” and 8-inches minimum expansion. The flexible expansion fitting shall not expand or exert an axial imparting thrust under internal water pressure. The flexible expansion fitting shall not increase or decrease the internal water volume as the unit expands or contracts.

D. All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C213. Sealing gaskets shall be constructed of EPDM. The coating and gaskets shall meet ANSI/NSF-61.

E. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16.

F. Joints shall be The Force Balanced FLEX-TEND as manufactured by EBAA Iron, or equal.

2.12 MARKER TAPE FOR BURIED PIPING

NOT USED

2.13 TRACER WIRE

A. Install No. 10 solid-core copper tracer wire.

2.14 CONCRETE FOR THRUST BLOCKS

A. As specified in Section 03 30 01 – Cast-In-Place Concrete. Thrust blocks shall be used only where specifically permitted on the drawings or with pre-approval from the Engineer.

2.15 JOINT RESTRAINT COUPLINGS

A. Mechanical joint restraint coupling shall be of the type that utilizes the follower gland and shall consist of several individual lug bolts with gripping mechanism that prevents the joints from pulling apart. Glands shall be ductile iron conforming to ASTM A536-80, and dimensions shall be compatible to be used with standard mechanical joint fittings for ductile rim pipe. The mechanical restraint joint shall have a minimum working pressure rating equal to that of the pipe with a safety factor of not less than 2. Restained joints shall have twist off nuts to insure proper installation of restraining grip mechanism. Mechanical joint restrained
coupling shall be EBAA, Iron, Inc. MEGALUG; with Mega-Bond coating; or approved equal. Coating of gland follower body shall be electrostatically applied and heat cured polyester based powder. Wedge assemblies and bolts shall be coated with heat cured fluoropolymer coatings. Restraints shall be designed for the specific type of pipe to be restrained.

B. Restrained joint fittings shall meet Uni-B-13 for PVC and be FM and UL approved through 12-inch for both ductile iron and PVC.

C. Restrained joint fittings for high density polyethylene pipe shall be Victaulic 995 or 997 style coupling.

2.16 FASTENERS

A. All fasteners shall include washers under both bolt head and nut unless the use of washers is incompatible with the fitting design.

B. Unless otherwise noted, all bolts, tie rods, and T-bolts used to secure flanges, fittings, and couplings located underground or submerged in liquid shall be Type 304 or 316 stainless steel per ASTM A320 or ASTM A193. Nuts shall be 304 or 316 stainless steel per ASTM A194 and washers shall be ASTM F436 Type 3.

C. Unless otherwise noted, all bolts, tie rods, and T-bolts used to secure flanges, fittings, and couplings located indoors, above grade, and in vaults shall be carbon steel conforming to ASTM A307, Grade B with ASTM A563A nuts and ASTM F436 washers. Bolts, nuts, and washers shall be hot dipped galvanized in accordance with ASTM F2329. Stainless steel meeting the requirements of Paragraph B shall also be acceptable.

2.17 INSULATING FLANGE SETS

A. Insulating flange sets shall be provided where indicated on the plans and shall consist of insulating gaskets, insulating sleeves and washers and a steel washer. Insulating sleeves and washers shall be one piece when flange bolt diameter is 1-1/2-inch or smaller and shall be made of acetal resin. For bolt diameters larger than 1-1/2-inch, insulating sleeves and washers shall be 2-piece and shall be made of polyethylene or phenolic. Steel washers shall comply with ASTM A 325. Insulating gaskets shall be full-face.

3.1 HANDLING AND DISTRIBUTION OF MATERIALS

A. Delivery: Handle pipe carefully to ensure delivery at the project site in sound, undamaged condition. Contractor shall replace damaged pipe at no additional expense to the Owner.
B. Storage: Do not store materials directly on the ground. Adequately support piping to prevent warping. Use protective covers where pipe may be damaged by direct sunlight.

C. No more than one week's supply of material shall be distributed in advance of pipe laying operations, unless otherwise approved or required.

D. Before laying, pipe shall be inspected for cracked, broken, or defective pieces. Such pieces shall be rejected. Pipe shall be carefully lowered into the trench to prevent damage. All dirt or other foreign matter shall be removed from inside the pipe before lowering into the trench.

3.2 COATING

A. Unless otherwise indicated in Part 2, all pipe and fittings shall be coated in accordance with specification

3.3 INSTALLATION OF UNDERDRAINS

A. Perforated pipes shall be laid with the perforations down.

3.4 INSTALLATION OF BURIED PRESSURE PIPING

A. General: Pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer's instructions and in accordance with the following references as appropriate:

1. Ductile Iron Pipe - AWWA C600

2. Polyvinyl Chloride Pipe and HDPE pipe - AWWA C605

3. Steel Pipe – AWWA C604

B. Handling: The pipe shall be protected to prevent entrance of foreign materials during laying operations. When laying is not in progress, open pipe ends shall be protected with a watertight plug or other approved means to exclude water or foreign material.

C. Alignment:

1. Mains shall be installed to the grades and elevations indicated and shall have a minimum cover of 30-inches from the top of the pipe to existing ground or paved surface unless otherwise indicated.
2. The allowable angle of deflection at any joint shall not exceed the amount recommended by the pipe manufacturer for the particular pipe size used. Deviation of any pipe section from the line and grade indicated shall not exceed 1/2-inch.

D. Joints:

1. Pipe shall be assembled and joined in accordance with the manufacturer's published instructions for the type of pipe and joint used. All portions of the joints shall be thoroughly cleaned before the sections of pipe are assembled. The ends of each pipe shall abut against the next pipe section in such a manner that there shall be no unevenness of any kind along the bottom half of the interior of the pipe. Where mechanical joints are used, the pipe shall be marked in such a manner that it can be determined after installation that the pipe is properly seated.

2. Where flexible couplings are used as expansion joints, the ends of the pipes shall be separated 1-inch to allow for expansion. The welded seam at the end of each coupled steel pipe shall be ground smooth for approximately 12-inches. Couplings shall be centered on pipe ends. Runs of pipe containing flexible couplings shall be properly blocked, anchored or tied to the structure to prevent joints from separating.

3. Mechanical restrained joints shall be installed in accordance with joint manufacturer's instructions and recommendation.

E. Installation of Marker Tape: Install tape in backfill directly over each pipeline, 24 inches over top of pipe, unless shown otherwise on the Plans. Where utilities are buried in a common trench, identify each line by a separate marker tape. Place tapes directly over the applicable line.

3.5 THRUST BLOCKS OR MECHANICAL RESTRAINED JOINTS

A. Thrust blocks shall be used only where specifically allowed on the drawings or with prior approval by the Engineer.

B. Place concrete thrust blocks at all tees, elbows, plugs, and other locations where unbalanced forces exist in underground pipe in accordance with details shown. Place blocks between undisturbed ground and fitting to be anchored. Place blocking so that pipe and fittings will be accessible for repairs. Thrust blocks shall be of such size as to give bearing against undisturbed vertical earth banks sufficient to absorb the thrust from line pressure, allowing a maximum earth bearing pressure of 500 pounds per square foot per foot of depth below natural grade or as shown.
C. Restrained joint fittings may be used in-lieu of thrust blocks, at the discretion of the Engineer. Contractor shall submit shop drawings showing methods of joint restraint for each type of restrained joint fitting to be used including the length of pipe having restrained push-on joints on all pipes which connect to the restrained fitting.

D. When it is necessary to restrain push-on joints adjacent to restrained fittings, a harness restraint device shall be used. All harnesses shall have a pressure rating equal to that of the pipe on which it is used. Harness assemblies including tie bolts conform to ASTM A536-80.

3.6 INSTALLATION OF EXPOSED PIPING

A. General - Pipe shall be installed as specified, as indicated on the Plans or, in the absence of detail piping arrangement, in a manner acceptable to the Engineer.

B. Pipe shall be cut from measurements taken at the site and not from the Plans. All necessary provisions shall be taken in laying out piping to provide throughout for expansion and contraction. Piping shall not obstruct openings or passageways. Pipes shall be held free of contact with building construction so as not to transmit noise resulting from expansion.

C. The inside of all pipe, valves, and fittings shall be smooth, clean, and free from blisters, loose mill scale, sand, dirt, and other foreign matter when erected. The interior of all lines shall be thoroughly cleaned, to the satisfaction of the Engineer, before being placed in service.

D. Stuffing box leakage from water sealed pumps shall be contained and not allowed to into storm drains.

E. Taps for pressure gauge connections on piping and equipment shall be provided with a nipple and a ball type shutoff valve. Drilling and tapping of pipe walls for installation of pressure gauges or switches will not be permitted.

F. A union shall be provided within 2 feet of each end of threaded end valves unless there are other connections that facilitate easy removal of the valve. Unions shall also be provided in piping at locations adjacent to devices or equipment that may require removal in the future and at locations required by the Plans or other sections of the Specifications.

G. Provide unions on exposed piping and tubing 3-inches and smaller as follows:

1. At every change in direction (horizontal and vertical.
2. Downstream of valves, 6 to 12 inches.

3. As shown on plans.

H. In all piping except air piping, insulating fittings shall be provided to prevent contact of dissimilar metals.

I. Pipe Joints - Pipe joints shall be carefully and neatly made in accordance with the requirements that follow.

1. Threaded - Pipe threads shall conform to ANSI/ASME B1.20.1, NPT, and shall be full and cleanly cut with sharp dies. Not more than three threads at each pipe connection shall remain exposed after installation. Ends of pipe shall be reamed, after threading and before assembly, to remove all burrs.

   Threaded joints in plastic piping shall be made up with Teflon thread tape applied to all male threads. Threaded joints in stainless steel piping shall be made up with Teflon thread sealer and Teflon thread tape applied to all male threads. At the option of the Contractor, threaded joints in other piping may be made up with Teflon thread tape, thread sealer, or a suitable joint compound. Thread tape and joint compound or sealers shall not be used in threaded joints that are to be seal welded.

   Threaded joints in steel piping for chlorine service shall be made up with Teflon thread tape or paste applied to all male threads.

2. Compression - Ends of tubing shall be cut square and all burrs shall be removed. The tubing end shall be fully inserted into the compression fitting and the nut shall be tightened not less than 1-1/4 turns and not more than 1-1/2 turns past finger tight, or as recommended by the fitting manufacturer, to produce a leak tight, torque-free connection.

3. Flared - Ends of annealed copper tubing shall be cut square and all burrs shall be removed prior to flaring. Ends shall be uniformly flared without scratches or grooves. Fittings shall be tightened as required to produce leak tight connections.

4. Soldered and Brazed - Where solder fittings are specified for lines smaller than 2 inches, joints may be soldered or brazed at the option of the Contractor. Joints in 2 inch and larger copper tubing shall be brazed.

5. Flanged - Flange bolts shall be tightened sufficiently to slightly
compress the gasket and effect a seal, but not so tight as to fracture or distort the flanges. A plain washer shall be installed under the head and nut of bolts connecting plastic pipe flanges. Anti-seize thread lubricant shall be applied to the threaded portion of all stainless steel bolts during assembly. Connecting flanges shall have similar facings, i.e., flat or raised face.


7. Grooved Couplings - Grooves for grooved couplings shall be cut with a specially designed grooving tool. Grooves cut in steel pipe shall conform to flexible grooving dimensions as set forth in AWWA C606 and shall be clean and sharp without burrs or check marks.

3.7 ACCEPTANCE TESTS AND INSPECTION FOR GRAVITY PIPING

A. General.

1. All testing and inspection shall be performed after final backfill and compaction operations are complete. If the Contractor so desires, he may pretest the lines at his own expense, but final testing must be performed after compaction requirements have been approved.

2. If any of the tests or inspections covered in this section indicates that sewers require repair, then after repairs are complete, all testing and inspection shall be performed again. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project.

3. Prior to testing, all lines shall be thoroughly cleaned by flushing, and shall have passed a Wayne ball of appropriate size. Contractor is to submit to the Engineer a detailed procedure on protecting the existing sewer system from contaminants during the flushing operation.

B. Mandrel

1. All sections of completed gravity pipe main lines shall be tested to assure that no potential obstructions are present in the lines. A rigid mandrel with a circular cross section having a diameter not less than 95% of the specified pipe diameter shall pass through the pipe without resistance.
C. Low-Pressure Air Test

1. Supply air to the test section slowly. A constant pressure of 3.5 psig shall be reached and maintain internal pressure of at least 3.0 psig for at least five (5) minutes.

2. After the stabilization period, disconnect the air supply. A pressure loss of 0.5 psig is used to compute the allowable pressure loss using the following formula.

3. The minimum allowable time in minutes for such a pressure drop is determined from the formula $T_{\text{min}} = 0.000183D^2L$, where:

   a. $D =$ Nominal inside diameter of pipe (inches)

   b. $L =$ Length of pipe test section (feet)

4. Regardless of the formula, the minimum time allowed for pressure drop shall be eight (8) minutes.

5. The pressure gage for monitoring the air pressure shall have a minimum division of 0.10 psi increments.

6. A valid test is when the air pressure is released from the opposite end of the inlet air entry connection with an air release apparatus outlet connection.

7. Adjustment of Pressure for Groundwater. Should the pipe section being tested lie below the local groundwater table, the test pressures shall be raised in proportion to the depth of the centerline of the pipe below the water table. Additional pressure (beyond the 3.5 psig specified above) shall be added at the rate of 0.433 psig per foot of depth below groundwater.

8. Within 24 hours prior to testing, all lines shall be thoroughly flushed with water to assist camera in the identification of low areas.

3.8 ACCEPTANCE TESTS FOR BURIED PRESSURE PIPING

A. General.

1. All testing and inspection shall be performed after final backfill and compaction operations are complete. If the Contractor so desires, he may pretest the lines at his own expense, but final
testing must be performed after compaction requirements have been approved.

B. In general, tests shall be conducted in accordance with AWWA C600 and C651 except as otherwise herein specified.

C. All newly installed sections of buried pressure piping shall be pressure and leakage tested as described herein.

1. For buried pressure pipelines, tests shall be made on two or more valved sections not to exceed 2,500 feet in length. The Contractor shall furnish all necessary equipment, material and labor required.

2. Tests shall be made after the trench has been backfilled and compacted, but not until at least 5 days have elapsed since any thrust blocks in the section have been poured.

3. The pipe shall be slowly filled with water and ensuring all air expelled from section being tested. The line shall stand full of water for at least twenty-four hours prior to testing to allow all air to escape. A test pressure equal to 1.5 times the design pressure, of the pipe measured at the point of lowest elevation pressure, or 100 psi, whichever is greater, shall be applied.

4. The test pressure in the line shall be maintained for a period of 2 hours. Test pressure shall be maintained within 5 psi during the test period. Conduct a leakage test concurrently with the pressure test. Leakage is defined as the volume of water that must be supplied into the newly laid pipeline to maintain pressure within +/- 5 psi of the test pressure after it is filled and purged of air. The water required to maintain test pressure shall be measured by means of a graduated barrel, drum, or similar device at the pump suction or through a meter.

Allowable leakage at the specified test pressure shall not exceed the amounts allowed by AWWA C600, \( L = \frac{SD\sqrt{P}}{148,000} \)

Where:

- \( L \) = Testing allowance in gallon per hour.
- \( S \) = Length of pipe tested in feet.
- \( D \) = Nominal diameter of the pipe in inches.
- \( P \) = Average test pressure during the hydrostatic test, in pounds per sq. inch.
Hydrostatic testing allowance per 1,000 ft. of pipeline in gph.

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5. Should testing disclose any visible leaks or leakage greater than that allowed, the defective joints or pipe shall be located, repaired, and re-tested until satisfactory. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project.

3.9 **ACCEPTANCE TEST FOR EXPOSED PIPING**

A. Pipe to be Tested - All new installed piping sections shall be pressure and leakage tested as specified herein.

B. Pressure Testing - After the section of line to be tested has been filled with water or other test media, the test pressure shall be applied and maintained without interruption for 2 hours plus any additional time required for the Engineer to examine all piping undergoing the test and for the Contractor to locate all defective joints and materials.

1. Test medium shall be potable water for potable water piping; all other piping may be tested using plant water subject to Engineer’s approval.

2. Pipe system shall be tested at 1-1/2 times the operating pressure, or 100 psi, whichever is greater, using the appropriate test fluid medium.

3. All piping shall be tight and free from leaks. All pipe, fittings, valves, pipe joints, and other materials that are found to be defective shall be removed and repaired or replaced with new and
acceptable material, and the affected portion of the piping be retested until satisfactory. The cost of any retests, including time for the Engineer, shall be borne by the Contractor at no additional cost to the project.

Compressed air or gas under pressure shall not be used to test plastic piping unless specifically recommended by the pipe manufacturer.

Leakage may be determined by loss of pressure, soap solution, chemical indicator, or other positive and accurate method acceptable to the Engineer. All fixtures, devices, or other accessories which are to be connected to the lines and which would be damaged if subjected to the specified test pressure shall be disconnected and ends of the branch lines plugged or capped as required during the testing procedures.

HEAVY DUTY THREE BRUSH COMBO ROLLOVER WASH SYSTEM:

Manufacturer’s Reference:
Specifications and drawings are based on a Heavy Duty 3 brush combination rollover with overlapping side brushes.

The system shall be produced by a manufacturer of established reputation with a minimum of five (5) years experience supplying the specific equipment specified herein.

The brush unit, pumping stations and all electrical controls shall be designed, assembled and supplied by one manufacturer.

Lists of rollover wash system installations made by the bidder shall be provided. This list shall include such rollover vehicle wash installations made by the bidder in the last five (5) years.

The manufacturer shall provide the name of the contact person at each location who is familiar with the operation and maintenance of the wash system.

Based on the information supplied and discussions with contact persons named, the owner will determine the acceptability of the proposed supplier and the equipment.
**General Description:**

This heavy-duty model is a three-brush combination rollover wash capable of washing a high volume of various sizes and styles of vehicles.

The machine shall control the wash process to provide a consistent wash result without relying on the judgment of individual drivers.

This system is capable of washing the front and rear of the vehicles several times on a single pass and includes a special mirror protection program. The machine shall fully control the degree of brush pressure delivered to the vehicle and automatically adjust as required.

The wash functions of this system shall be operated automatically.

The system shall be delivered complete with all control systems, metering devices, drive motors, and brush assemblies.

**Vehicle Wash Operation:**

Upon entering the wash area, vehicles will trigger the chassis and wheel wash system and the undercarriage wash will commence. The vehicles will continue through the bay until the rear has cleared the entrance; automatically shutting off the chassis and wheel wash.

Vehicles will continue forward and will be signaled to STOP by a red light, just before entering the gantry. At the gantry, the driver will select the appropriate wash program. The first pass of the machine will apply a pre-soak / chemical agent over the entire length, front and back of the vehicle.

The front area will be cleaned by a side-to-side, overlapping motion or the roof brush may be utilized; depending on selected wash program. Once the front cleaning function is complete, the brushes will withdraw and move automatically around the mirrors "Mirror Protection Program".

The machine will then begin washing the sides and the roof of the vehicle. Once the gantry arrives at the rear of the vehicle, the side brushes shall move
toward the center of the wash bay and into the back of the vehicle, cleaning with a side-to-side and overlapping motion or, the roof brush may be utilized; depending on selected wash program.

Once the rear has been cleaned, the machine will begin a fresh water rinse sequence. Once the rinse has completed, the R/O spot free rinse water will be applied. Upon completion, the driver will be signaled to EXIT the wash by a green light and the dyer/blower system will activate to remove any excess water from the vehicle’s surface.

Alternate program choices are available to accommodate differing styles of vehicles within the fleet and varying weather conditions. The machine must be capable of moving side brushes side to side to overlap the front and rear of vehicles being washed.

**Features/Performance/Construction**

**Brush Machine Housing:**
All frame structures and steel components shall be hot dipped galvanized, aluminum or stainless steel. The frame structure of the gantry is to be enclosed with painted galvanized sheet metal or other rust proof sheet metals. All gearboxes and motors are to be encased inside the machine for the highest quality of protection against water. Rust proof floor rails shall be provided with derailing protection system.

**Brushes:**
The system shall be equipped with 2 vertical side brushes and 1 horizontal roof brush. The side brushes 1 and 2 shall be suspended and full length, capable of washing the vehicle’s front if desired, as well as, the rear of the vehicle multiple times with an overlapping movement. The brush pressure shall be controlled to provide a constant pressure on the vehicles surface.

Should brush pressure become too high due to malfunction or driver error, the system shall automatically shut down to prevent damage. The cause of the system malfunction shall be indicated control panel to assist in troubleshooting the error. Reactivation of the system shall be achieved by resetting the alarm/breaker switch.
The brush density design shall provide a superior wash results to differing styles of vehicles in the fleet. Brush bristles shall be polyethylene material that is "X" grooved to facilitate water and detergent delivery. The tips shall be flagged to provide soft touch to prevent scratching to glass and paint.

Brushes shall have a provision of water and detergent delivery. The mixture of detergent to brushes shall be adjustable from the floor level allowing for adaptation to wash conditions.

**Brush Motors:**

Brushes are to be driven by energy efficient and durable electrical motors.

**Final Rinse Arch:**

The final rinse spray arch shall provide a complete rinse utilizing the least amount of water necessary to full rinse the vehicle clean.

**Pre-Soak / Detergent Arch:**

The pre-soak arch shall deliver an adjustable pre-soak solution without product waste and provide full vehicle coverage including wheels.

**Automatic Detergent Application System:**

Automated mixing of concentrated detergent solutions and water. The chemical metering system shall be capable to adjust mixtures in the ratio range of 1:1 to 100:1. All adjustment controls are to be at the floor level.

The metering system is to include a holding tank with by-pass circulation to prevent chemical separation.

The chemical arch shall deliver a sufficient amount of detergent application to the entire vehicle.

**Water Softener:**

Installation is to include a commercial services water softener capable of supplying soft water with excellent abilities of hardness removal.
**Automatic High Pressure System:**
To be used as a "Touchless" high-pressure in combination with or without brushes.

The high pressure arch is to utilize water delivered by a pump that is properly rated for high pressure and volume for the vehicle wash system. A sufficient amount of water storage shall be provided to supply the high pressure pump during the vehicle wash cycles. An automatic low level pump shut off switch, automatic high level and filling switch shall be provided. The tank contains a solenoid valve to activate fresh water filling in event of failure or other malfunction of the water recycling system.

**Tire Guide Rails:**
The tire guide rails shall be flared at the entrance to facilitate entrance into the wash. The guide rails shall be constructed of tubular steel pipe large enough to contain and guide the vehicles into the vehicle wash. Rail height is not to exceed 6 inches. All sections shall be smoothly finished to avoid damage to tires. Rails are to be anchored to the floor with r non-corrosive concrete lag bolts large enough to prevent the rails from becoming dislodged.

**Traffic Light:**
The driver will be directed throughout the wash process with a LED-traffic light (Red/Green).

Lights will interact and be a function of the control system. Traffic lights will be contained in a watertight, stainless steel enclosure

**Water Recycling System:**
The water recycling shall purify water to a particle size of 10 microns. All reject water shall be discharged into the system.

The system is to include a water reservoir system with a holding tank for supply of wash water. The tank is to have an automatic refilling feature via magnetic valve and level regulation. A float system and solenoid valve is to be included to refill with fresh water in event of malfunction preventing the pumps from running dry. Cycling time and operation is to be fully automatic and programmable to meet the transit agencies needs in consideration of wash frequency and seasonal adjustments.
The water recycling system is to include a chemical free process to eliminate bacterial/organic growth and adjustment of Ph. The need for chemical additives will not be accepted.

**Dryer / Blower System:**

The vehicle wash system shall be equipped with a blower system that will sufficiently dry the vehicle to reduce water carry off and window spotting. A rinse aid / wax pump must be included to inject an agent into the final rinse water to cause beading.

The blower mounts and structure must be rust proof and supported to reduce the structural frame from flexing.

The dryer system must be an energy efficient design to reduce energy consumption and reduce the District’s operational costs.

**Controls:**

The system shall be equipped with self-diagnosing software that indicates any errors, malfunctions, or other stoppages. The system is to include a counter that reveals the number of washes performed, both collectively and in various programs chosen. The system is to contain the capability to perform numerous unique wash programs for differing wash choices.

There shall be a total of 4 emergency stop buttons, located on each corner of the machine.

**Warranty:**

The equipment warranty will cover 1 year commencing upon the date of acceptance by the District. This warranty will cover the repair or replacement of equipment or material that causes any operational disturbances due to design fault, defectiveness in manufacture, or erection, occurring within the stated 1-year period.
Drawings/ Owner Manuals and Training:

The supplier shall provide as-built drawings of the system including electrical and plumbing drawings from client supplied connections in the wash bay. The supplier will provide up to 3 owner’s manuals and on site training of up to 16 hours.
GOLDEN EMPIRE TRANSIT DISTRICT
Bus Wash Facility
Request for Proposals #G090

PART I
COMMERCIAL TERMS AND CONDITIONS

Sealed Bids are requested for the Specifications enclosed.

1. CONTRACT DOCUMENTS
   a. All terms and conditions included in this solicitation will be incorporated into any resultant contract.
   
   b. It is the intent of the District to award a firm fixed price contract for this procurement.
   
   c. The District is exempt from Federal Excise and Transportation Taxes. The District will furnish necessary exemption certificate upon request. Any sales tax, use tax, imposts, revenues, excise or other taxes, which are now or which may hereafter be imposed by Congress, by a state or any political subdivision hereof and applicable to the sale or the material delivered as a result of bidder's proposal and which, by the terms of the tax law, must be passed directly to GET and will be paid by GET.

2. FORM OF BIDS
   Bids submitted on any other form will be considered non-responsive and WILL BE REJECTED. The only acceptable method of modifying a bid is by letter, if it is received by the person assigned to open bids prior to the time set for opening of bids.

3. RECEIPT OF BIDS
   a. Sealed bids, an original and one (1) copy will be received by:
      
      Golden Empire Transit District
      
      1830 Golden State Avenue
      
      Bakersfield, CA 93301
      
      The bid opening will occur at the time and date specified in the announcement.
b. The District reserves the right to postpone bid opening for its own convenience, to reject any or all bids, and to cancel the requirements at any time prior to bid opening and return all bids unopened.

4. DISCREPANCIES

If a Contractor becomes aware of any discrepancy, ambiguity, error or omission, it shall be reported immediately to the District Staff, who will determine the necessity for clarification.

5. APPEAL PROCEDURES

Requests for approved equals, clarifications of specifications, and protest of specifications must be received by the District in writing 10 days before bid opening. Requests must be addressed as listed in Item 3 and be clearly marked on the outside of the envelope: "NOT A BID". Any request for an approved equal or protest of the specifications must be fully supported with technical data, test results, or other pertinent information as evident that the substitute offered is equal to or better than the specification requirements. The burden of proof as to the equality, substitutability, and the compatibility of proposed alternates or equals shall be upon the Contractor, who shall furnish all necessary information at no cost to the District. The District shall be the sole judge as to the quality, substitutability and compatibility of the proposed alternates or equals.

6. ADDENDA

a. Clarification or any other notice of a change in the Bidding Documents will be issued only by the District Manager and only in the form of written addenda mailed or otherwise delivered to the address of record of each Bidder. Each addendum will be numbered and dated. Under extreme circumstances, an addendum may be in the form of a telegraph. Oral statements or any instructions in any form, other than addenda as described above, shall have no consideration.

b. Each addendum received during the bidding shall be acknowledged in the designated space on the “Acknowledgment of Addenda” form with the information therein requested. If none are received, the words "no addenda received" shall be written in the said space.

7. RECEIVING BIDS

Bids received will be kept unopened until the time fixed for the bid opening. The person whose duty it is to open the bids will determine when the time stated above has arrived and no bid received thereafter will be considered.
8. WITHDRAWAL OF BIDS

Bids may be withdrawn only by signature of the Bidder, provided the request is received by the person whose duty it is to open bids prior to the time fixed for bid opening. Each bid opened will be considered to be a valid offer, and may not be withdrawn for a period of ninety (90) calendar days following opening of bids, unless the Bidder is given written notice that the bid is unacceptable.

9. EVALUATION OF BIDS

Bids will be evaluated by the District’s staff taking into consideration the relative importance of price, qualifications, experience, references, support, service, and other evaluation factors as stated in the specifications. Receipt of any bid shall under no circumstance obligate the District to accept the best price offering.

10. AWARD OR REJECTION OF BID

a. Award of the contract shall be made to the Bidder, whose bid is determined to be the best evaluated offer resulting from negotiation, taking into consideration the relative importance of price, qualifications, experience, references, support, service, and other evaluation factors as stated in the specifications.

b. Discount for prompt payment of less than fifteen (15) days offered by the Contractor will not be used in the evaluation or award process.

c. The District reserves the right to REJECT ANY OR ALL bids or any item or part thereof, or to waive any informality in bids when it is in the best interest of the District to do so.

d. The District also reserves the right to award its total requirements to one Contractor or to apportion those requirements among several Contractors, as the District may deem it to be in its best interest.

11. PRE-CONTRACTUAL EXPENSES

Bidders are responsible for all pre-contractual expenses. Pre-contractual expenses are defined as expenses incurred by the Bidder in 1) preparing the bid in response to this invitation; 2)
submitting that bid to the District; 3) negotiating with the District any matter related to this bid; or 4) any other expenses incurred by Bidder prior to date of award.

12. PAYMENT

a. Payment Schedule and Invoicing

1. Payment for equipment, material, and services shall be made 30 days after receipt of invoice.

b. Proper and complete billing (including support) is received by District.

c. Acceptance by the District of the equipment, materials and / or services in accordance with the Specifications / Scope of Work.

d. Contractual agreements set forth between the District and the Contractor.

e. Prime Contractor and Subcontractor Payments (if applicable)

Prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 10 days from receipt of each payment the prime contractor receives from the District. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractor’s work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the District.

13. DELAYS

a. Unavoidable Delays

If services under the contract should be unavoidably delayed, the District's CEO shall extend the time for completion of the contract for the determined number of days of excusable delay. A delay is unavoidable only if the delay was not reasonably expected to occur in connection with or during the Contractor's performance, and was not caused directly or substantially by acts, omissions, negligence or mistakes of the Contractor, the Contractors subs, or their agents, and was substantial and in fact caused the Contractor to miss delivery dates, and could not adequately have been guarded against by contractual or legal means. Delays beyond control of the District or caused by the District will be sufficient justification for delay of services and Contractor will be allowed a day for day extension.
b. Notification of Delays

The Contractor shall notify the Maintenance Manager as soon as the Contractor has, or Should have, knowledge that an event has occurred which will delay delivery or installation. Within five (5) calendar days, the Contractor shall confirm such notice in writing, furnishing as much detail as available.

c. Request for Extension

The Contractor agrees to supply, as soon as such data are available, any reasonable proofs that are required by the District's CEO to make a decision on any request for extension. The District's CEO shall examine the request and any documents supplied by the Contractor and shall determine if the Contractor is entitled to an extension and the duration of such extension. The District's CEO shall notify the Contractor of his decision in writing. It is expressly understood and agreed that the Contractor shall not be entitled to damages or compensation and shall not be reimbursed for losses on account of delays resulting from any cause under this provision.

14. BOND REQUIREMENTS (*Construction or Rolling Stock Contracts Only*)

A. Bid Bond:

1. Bidders shall furnish a Bid Bond with their Bidder’s Proposal in the amount of 10% of the bid amount.

B. Performance Bond

1. The penal amount of performance bonds shall be 100 percent of the original contract price, unless the District determines that a lesser amount would be adequate for the protection of the District.

2. The District may require additional performance bond protection when a contract price is increased. The increase in protection shall generally equal 100 percent of the increase in contract price. The District may secure additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

3. The form of performance payable to Golden Empire Transit District shall be the same as the bid bond.
C. Payment Bond

1. The penal amount of the payment bonds shall equal 50 percent of the contract price, 40 percent if more than 1 million dollars but less than 5 million dollars and $2.5 million if the contract price is more than $5 million dollars.

2. The form of payment bond payable to Golden Empire Transit District shall be the same as the bid bond.

15. CHANGE ORDERS

a. Contractor Changes

Any proposed change in this contract shall be submitted to the District's CEO for prior written approval.

b. District Changes

1. No change in this contract shall be made unless the District's CEO issues his prior written approval thereto. Oral change orders are not permitted. The Contractor shall be liable for all costs resulting from, and/or for satisfactorily correcting any specification change not properly ordered by written modification to the contract and signed by the District's CEO.

2. Contractor is expected to proceed with change and if District is responsible for a delay in delivery of services, a day for day extension to the delivery of services will be allowed.

3. Within seven (7) calendar days after receipt of the written change order to modify the contract, the Contractor shall submit to the District a detailed price and schedule proposal for the work to be performed. This proposal shall be accepted or modified by negotiations between the Contractor and the District. At the time a detailed modification shall be executed in writing by both parties. Disagreements that cannot be resolved with negotiations shall be resolved in accordance with the contract disputes clause. Regardless of any disputes, the Contractor shall proceed with the work ordered.

16. INSURANCE

a. During the performance hereunder and at Contractor's sole expense, Contractor shall procure and maintain the following insurance and shall not of its own initiative cause such insurance to be cancelled or materially changed during the course of herein contract for bid.
1. Workers' Compensation Insurance with the limits established and required by the State of California;

2. Employers' Liability Insurance with the limits set forth below;

3. Comprehensive General Liability, Product/Completed Operations Liability, Contractual Liability, Independent Contractors Liability, and Automobile Insurance with at least the following limits of liability:
   a. Primary Bodily Injury Liability limits of $1,000,000 per occurrence.
   b. Primary Property Damage Liability limits of $1,000,000 per occurrence.
   c. Prior to the District's issuance of a contract, the Contractor must furnish to the District a Certificate of Insurance which shall certify the Contractor's insurance policy adequately covers the above listed requirements. Documents may be delivered or mailed to said office. Language on the certificate shall confirm the following:
      1. The District is designated as an additional insured on the Comprehensive Liability and Automobile Liability Insurance described hereinabove.
      2. The coverage shall be primary as to any other insurance with respect to performance hereunder.
      3. Thirty (30) day’s written notice of cancellation or material change to District.

17. LIQUIDATED DAMAGES

The District and bidder recognize that liquidated damages requirements are appropriate if parties of a contract are unable perform services within the stated timeframe agreed by both parties. Therefore, the District will impose a charge of $200.00 per day, each day after scheduled completion date.
1. **PROHIBITED INTERESTS:**

   a. **Prohibited Interest:**

      The parties hereto covenant and agree that, to their knowledge, no board member, officer, or employee of the District, during his tenure or for one (1) year thereafter has any interest, whether contractual, non-contractual, financial or otherwise, in this transaction, or in the business of the contracting party other than the District, and that, if any such interest comes to the knowledge of either party at any time, a full and complete disclosure of all such information will be made in writing to the other parties, even if such interest would not be considered a conflict of interest under Article 4 of Chapter 1 of Division 4 of Title 1 (commencing with Section 1090) or Division 4.5 of Title 1 (commencing with Section 3600) of the Government Code of the State of California.

   b. **Interest of Members of or Delegates to Congress:**

      No member of or delegate to the Congress of the United States shall be admitted to any share of or part of this contract or to any benefit arising there from.

2. **LOBBYING CERTIFICATION:**


3. **CIVIL RIGHTS:**

   The following requirements apply to the underlying contract.
(1) **NONDISCRIMINATION CERTIFICATION.** In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. 2000(d), section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. 12132, and Federal transit law at 49 U.S.C. 5332, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, the Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

(2) **Equal Employment Opportunity.** The following equal employment opportunity requirements apply to the underlying contract:

(a) **Race, Color, Creed, National Origin, Sex.** In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. 2000e, and Federal transit laws at 49 U.S.C. 5332, the Contractor agrees to comply with all applicable equal employment requirements of U.S. Department of Labor (DOL) regulations, “Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor,” 41 C.F.R. parts 60 et seq.,(which implement Executive Order No. 11246, “Equal Employment Opportunity”, as amended by Executive Order No. 11375,” Amending Executive Order 11246 Relating to Equal Employment Opportunity, 42 U.S.C. 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect construction activities undertaken in the course of the Project. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination: rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the contractor agrees to comply with any implementing requirements FTA may issue.

(b) **Age.** In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. 623 and Federal transit law at 49 U.S.C. 5332, the contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the contractor agrees to comply with any implementing requirements FTA may issue.

(c) **Disabilities.** In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. 12112, the contractor agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, “regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act, “29 C.F.R. Part 1630, pertaining to employment of persons with disabilities. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.
(d) Veterans Employment

As provided by 49 U.S.C 5325(k)

To the extent practicable, Contractor agrees that it:

1. Will give hiring preference to veterans (as defined in 5 U.S.C. 2108), who have the skills and abilities required to perform construction work required under a third party contract in connection with a capital project supported with funds made available or appropriated for 49 U.S.C. chapter 53, and

2. Will not require an employer to give a preference to any veteran over an equally qualified applicant who is a member of any racial or ethnic minority, female, an individual with disability, or a former employee, and

Contractor also assures that its sub-contractor will:

1. Will give hiring preference to veterans (as defined in 5 U.S.C. 2108), who have the skills and abilities required to perform construction work required under a third party contract in connection with a capital project supported with funds made available or appropriated for 49 U.S.C. chapter 53, and

2. Will not require an employer to give a preference to any veteran over an equally qualified applicant who is a member of any racial or ethnic minority, female, an individual with disability, or a former employee.

(3) The Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

4. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT:

A. Overtime Requirements.

No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any work week in which he or she is employed on such work to work in excess of forty hours in such work week unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such work week.

B. Violation; Liability for Unpaid Wages; Liquidated Damages.

In the event of any violation of the requirements of 29 C.F.R., 5.5(b)(1), the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such district or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of 29 C.F.R., 5.5(b)(1) in the sum of $10 for each calendar day on which such individual was
required or permitted to work in excess of the standard work week of forty hours without payment of the overtime wages required by 29 C.F.R., 5.5(b)(1).

C. Withholding for Unpaid Wages and Liquidated Damages.

The District shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.

D. Subcontracts.

The Contractor or subcontractor shall insert in any subcontract the clauses set forth in this section and also a clause requiring the subcontractor to include these clauses in any lower tier subcontracts. The Prime contractor shall be responsible for compliance by any subcontractor to lower tier subcontractor with the clauses set forth in this section.

5. NONCONSTRUCTION CONTRACTS:

A. The Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completions of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

B. Contract Work Hours and Safety Standards Act.

The Contractor agrees to comply with section 107 of the Contract Work Hours and Safety Standards Act, 40 U.S.C. section 333, and applicable DOL regulations, “Safety and Health Regulations for Construction” 29 C.F.R. Part 1926. Among other things, the Contractor
agrees that it will not require any laborer or mechanic to work in unsanitary, hazardous, or dangerous surroundings or working conditions.

C. **Subcontracts.**

The Contractor also agrees to include the requirements of this section in each subcontract. The term subcontract under this section is considered to refer to a person who agrees to perform any part of the labor or material requirements of a contract for construction, alteration or repair. A person who undertakes to perform a portion of a contract involving the furnishing of supplies or materials will be considered a subcontractor” under this section if the work in question involves the performance of construction work and is to be performed: (1) directly on or near the construction site, or (2) by the employer for the specific project on a customized basis. Thus, a supplier of materials which will become an integral part of the construction is a “subcontractor” if the supplier fabricates or assembles the goods or materials in question specifically for the construction project and the work involved may be said to be a construction activity. If the goods or materials in question are ordinarily sold to other customers from regular inventory, the supplier is not a “subcontractor”. The requirements of this section do not apply to contracts or subcontracts for the purchase of supplies or material or articles normally available on the open market.

6. **SEISMIC SAFETY:**

The Contractor agrees that any new building or addition to an existing building and constructed in accordance with the standards for Seismic Safety required in the Department of Transportation Seismic Safety Regulations 49CFR Part 41 and will certify to compliance to the extent required by the regulation. The contractor also agrees to ensure that all work performed under this contract including work performed by a subcontractor is in compliance with the standards required by the Seismic Safety Regulations and the certification of compliance issued on the project.

7. **DISADVANTAGE BUSINESS ENTERPRISE:**

Golden Empire Transit District shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any DOT assisted contract or in the administration of its DBE program or the requirements of 49 CFR part 26. The recipient shall take all necessary and reasonable steps under 49 CFR part 26 to ensure nondiscrimination in the award and administration of DOT assisted contracts. The recipient’s DBE program, as required by 49 CFR part 26 and as approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the Golden Empire Transit District of its failure to carry out its approved program, the Department may impose sanctions as provided for under part 26 and may in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 et seq.).

The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49
8. LIABILITIES AGAINST PROCURING AGENCY:

The Contractor shall indemnify, keep and save harmless the District, its agents, officials, and employees against all injuries, deaths, losses, damages, claims, suits, liabilities, judgements, costs, and expenses, which may accrue against the District arising out of or resulting from the Contractor's acts or omissions, including acts or omissions of its employees, servants and agents.

9. OMISSION:

Notwithstanding the provision of drawings, technical specifications, or other data by the District, the Contractor shall have the responsibility of supplying all drawings and details required to make the project complete and ready for service even though such details may not be specifically mentioned in the drawings and specifications.

10. PRIORITY:

In the event of any deviation between the description of the equipment in the Technical Specifications and other parts of this document, Contractor shall submit an RFI to the District for clarification and direction.

11. PRICE ADJUSTMENT FOR REGULATORY CHANGE:

If price adjustment is indicated, either upward or downward, it shall be negotiated between the District and the Contractor for changes that are mandatory as a result of legislation or regulations that are promulgated and become effective between the date of bid opening and the date of manufacture. Such price adjustment may be audited where required.

12. REPAIRS AFTER NONACCEPTANCE:

a. The District may require the Contractor, or its designated representative to perform the repairs after nonacceptance or the work may be done by the District's personnel with reimbursement by the Contractor.

b. Repairs by Contractor

1. If the District requires the Contractor to perform repairs after nonacceptance of the equipment, the Contractor's representative must begin work within five (5) working days after receiving written notification from the District of failure of acceptance tests. The District shall make the equipment available to complete repairs timely with the Contractor repair schedule.
2. The Contractor shall provide, at its own expense, all spare parts, tools, and space required to complete the repairs.

c. **Repairs by District**

1. **Parts Used:** If the District decides to perform the repairs after nonacceptance of the equipment, it shall correct or repair the defect and any related defects using Contractor-specified parts available from its own stock or those supplied by the Contractor specifically for this repair. Reports of all repairs covered by this procedure shall be submitted by the District to the Contractor for reimbursement or replacement of parts. The Contractor shall provide forms for these parts.

2. **Contractor Supplied Parts:** If the Contractor supplies parts for repairs being performed by the District after nonacceptance of the equipment, these parts shall be shipped prepaid to the District from any source selected by the Contractor within 10 working days after receipt of the request for said parts.

3. **Return of Defective Components:** The Contractor may request that parts covered by this provision be returned to the manufacturing plant. The total cost for this action shall be paid by the Contractor.

4. **Reimbursement for Labor:** The District shall be reimbursed by the Contractor for labor. The amount shall be determined by multiplying the number of man-hours actually required to correct the defect by a per hour, per technician straight wage rate of $85.00 per hour.

5. **Reimbursement for Parts:** The District shall be reimbursed by the Contractor for defective parts that must be replaced to correct the defect. The reimbursement shall include taxes where applicable and 25 percent handling costs.

13. **TERMINATION OF CONTRACT:**

a. The procurement under this **CONTRACT** may be terminated by the District in accordance with this clause in whole, or from time to time in part, whenever the District shall determine that such termination is in its best interest. Any such termination shall be effected by delivery to the Contractor of a notice of termination specifying the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective.

2. After receipt of a notice of termination, and except as otherwise directed by the District, the Contractor shall:

   a. Stop work under the contract on the date and to the extent specified in the notice of termination;
b. Place no further orders or subcontracts for materials, services, or facilities, except as may be necessary for completion of such portion of the work under the contract as is not terminated;

c. Terminate all orders and subcontracts as to the extent that they relate to the performance of work terminated by the notice of termination;

d. Assign to the District, in the manner, at the time, and to the extent directed by the District, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the District shall have the right, in its discretion to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

e. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontract, with the approval and ratification of the District, to the extent that may be required, which approval or ratification shall be final for all the purposes of this clause;

f. Transfer title to the District and deliver in the manner, at the time, and to the extent, if any, directed by the District, the fabricated or unfabricated parts, works in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the work terminated, and the completed or partially completed plans, drawings, information and other property which, if the contract had been completed, would have been required to be furnished to the District;

g. Use its best efforts to sell, in the manner, at the times, to the extent, and at the price(s) directed or authorized by the District, any property of the types referred to above, provided, however, that the Contractor shall not be required to extend credit to any purchaser, and may acquire any such property under the conditions prescribed by and at a price(s) approved by the District, and provided further, that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the District to the Contractor under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the District may direct;

h. Completed performance of such part of the work as shall not have been terminated by the notice of termination; and

i. Take such action as may be necessary, or as the District may direct, for the protection or preservation of the property related to this contract which is in the possession of the Contractor and in which the District has or may acquire an interest.

b. **Termination for Default**

1. The District may, by written notice of default to the Contractor, terminate the whole or any part of this contract, if the Contractor fails to make delivery of the equipment or to
perform the services within the time specified herein or any extension thereof; or if the Contractor fails to perform any of the other provisions of the contract, or so fails to make progress as to endanger performance of this contract in accordance with its terms, and in either of these two circumstances does not cure such failure within a period of 10 days (or such longer period as the District may authorize in writing) after receipt of notice from the District specifying such failure.

2. If the contract is terminated in whole or in part for default, the District may procure, upon such terms and in such manner as the district may deem appropriate, supplies or services similar to those so terminated. The Contractor shall be liable to the District for any excess costs for such similar supplies or services, and shall continue the performance of this contract to the extent not terminated under the provisions of this clause.

3. Except with respect to defaults of subcontractors, the Contractor shall not be liable for any excess costs if the failure to perform the contract arises out of causes beyond the control and without the fault or negligence of the Contractor. If the failure to perform is caused by the default of a subcontractor, and if such default arises out of causes beyond the control of both the Contractor and the subcontractor and without the fault or negligence of either of them, the Contractor shall not be liable for any excess costs for failure to perform, unless the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the Contractor to meet the required delivery schedule.

4. Payment for completed equipment delivered to and accepted by the district shall be at the contract price. The District may withhold from amounts otherwise due the Contractor for such completed equipment such sum as the District determines to be necessary to protect the District against loss because of outstanding liens or claims of former lien holders.

5. If, after notice of termination of this contract under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the default was excusable under the provisions of this clause, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to termination for convenience of the District.

6. The rights and remedies of the District provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

14. BREACH OF CONTRACT AND DISPUTE RESOLUTION:
a. Disputes arising in the performance of this Contract which are not resolved by agreement of the parties shall be decided in writing by the authorized representative of District’s Chief Executive Officer. This decision shall be final and conclusive unless within ten (10) days from the date of receipt of its copy, the Contractor mails or otherwise furnishes a written appeal to the District’s Chief Executive Officer. In connection with any such appeal, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its position. The decision of the District’s Chief Executive Officer shall be binding upon the Contractor and the Contractor shall abide by the decision.

b. **Performance during dispute.** Unless otherwise directed by Golden Empire Transit District, Contractor shall continue performance under this Contract while matters in dispute are being resolved.

c. **Claims for damages.** Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the party or of any of his employees, agents or others for whose acts he is legally liable, a claim for damages therefore shall be made in writing to such other party within a reasonable time after the first observance of such injury of damage.

d. **Remedies.** Unless this contract provides otherwise, all claims, counterclaims, disputes and other matters in question between the District and the Contractor arising out of or relating to this agreement or its breach will be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within the State in which the District is located.

e. **Rights and Remedies.** The duties and obligations imposed by the Contract Documents and the rights and remedies available there under shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by the District, Stantec or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach there under, except as may be specifically agreed in writing.

15. **CARGO PREFERENCE--USE OF UNITED STATES-FLAG VESSELS:**

   **As required by 46 C.F.R. Part 381, the Contractor agrees--**

   a. To use privately owned United States–Flag Commercial Vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners and tankers) involved, whenever shipping any equipment, materials, or commodities pursuant to
this contract to the extent such vessels are available at fair and reasonable rates for United States--Flag Commercial Vessels.

b. To furnish within 20 working days following the date of loading for shipments originating within the United States, or within 30 working days following the date of loading for shipment originating outside the United States, a legible copy of a rated, "On-Board" commercial ocean bill-of-lading in English for each shipment of cargo described in the preceding paragraph (A) above to the FTA (through the prime Contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, D.C., 20590, marked with appropriate identification of the project.

c. To include these requirements in all subcontracts issued pursuant to this contract when the subcontract may involve the transport of equipment, material or commodities by ocean vessel.

16. **ACCESS TO RECORDS AND REPORTS:**

The following access to records requirements apply to this Contract:

a. Where any Purchaser which is the FTA Recipient or a subgrantee of the FTA Recipient in accordance with 49 U.S.C. 5325 (a) enters into a contract for a capital project or improvement (defined at 49 U.S.C. 5302 (a)1) through other than competitive bidding, the Contractor shall make available records related to the contract to the Purchaser, the Secretary of Transportation and the Comptroller General or any authorized officer or employee of any of them for the purposes of conducting an audit and inspection.

b. The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

c. The Contractor agrees to maintain all books, records, accounts and reports required under this contract for a period of not less than three years after the date of termination or expiration of this contract, in which case Contractor agrees to maintain same until the Purchaser, the FTA Administrator, the Comptroller General or any duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. Reference 49 CFR 18.39(I) (11).

17. **FEDERAL CHANGES:**

Contractor shall at all times comply with all applicable FTA regulations. Policies, procedures and directives, including without limitation those listed directly or by reference in the Agreement (Form FTA MA (2) dated October, 1995) between Purchaser and FTA, as they may be amended or promulgated from time to time during the term of this contract. Contractor’s failure to so comply shall constitute a material breach of this contract.

18. **GOVERNMENT OBLIGATION TO THIRD PARTIES:**
a. The Purchaser and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Purchaser, Contractor or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

b. The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

19. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS:

a. The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. 3801 et seq. and U.S. DOT regulations, “Program Fraud Civil Remedies,” 49 C.F.R. Part 31, apply to its actions pertaining to this project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition, to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

b. The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. 5307, the Government reserves the right to impose the penalties of 18 U.S.C. 1001 and 49 U.S.C. 5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate.

c. The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

20. GOVERNMENT WIDE DEBARRMENT AND SUSPENSION CERTIFICATION:

In conjunction with the Office of Management and Budget and other affected Federal agencies, DOT published an update to 49 CFR Part 29 on November 26, 2003. This government-wide regulation implements Executive Order 12549, Debarment and
The provisions of Part 29 apply to all grantee contracts and subcontracts at any level expected to equal or exceed $25,000 as well as any contract or subcontract (at any level) for Federally required auditing services. 49 CFR 29.220(b). This represents a change from prior practice in that the dollar threshold for application of these rules has been lowered from $100,000 to $25,000. These are contracts and subcontracts referred to in the regulation as “covered transactions.”

Grantees, contractors, and subcontractors (at any level) that enter into covered transactions are required to verify that the entity (as well as its principals and affiliates) they propose to contract or subcontract with is not excluded or disqualified. They do this by (a) Checking the Excluded Parties List System, (b) Collecting a certification from that person, or (c) Adding a clause or condition to the contract or subcontract. This represents a change from prior practice in that certification is still acceptable but is no longer required. 49 CFR 29.300.

Grantees, contractors, and subcontractors who enter into covered transactions also must require the entities they contract with to comply with 49 CFR 29, subpart C and include this requirement in their own subsequent covered transactions (i.e., the requirement flows down to subcontracts at all levels).

21. **PRIVACY ACT:**

a. The Contractor agrees to comply with and assures the compliance of its employees with, the information restrictions and other applicable requirements of the Privacy Act of 1974, 5 U.S.C. 552a. Among other things, the Contractor or its employees agrees to obtain the express consent of the Federal Government before the Contractor or its employees operate a system of records on behalf of the Federal Government. The Contractor understands that the requirements of the Privacy Act, including the civil and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to comply with the terms of the Privacy Act may result in termination of the underlying contract.

b. The Contractor also agrees to include these requirements in each subcontract to administer any system of records on behalf of the Federal Government financed in whole or in part with Federal assistance provided by the FTA.

22. **FEDERAL TRANSIT ADMINISTRATION (FTA) TERMS:**

The preceding provisions include, in part, certain Standard Terms and Conditions required by the Department of Transportation, DOT, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1D are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act,
fail to perform any act, or refuse to comply with any District’s requests which would cause the District to be in violation of the FTA terms and conditions.

23. **ENERGY CONSERVATION:**

The contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state conservation plan issued in compliance with the Energy Policy and Conservation Act.

24. **CLEAN WATER:**

a. The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, As amended, 33 U.S.C. 1251 et seq. The contractor agrees to report each violation to the purchaser and understands and agrees that the purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA regional office.

b. The contractor also agrees to include there requirements in each subcontract exceeding $100,000.00 financed in whole or in part with Federal assistance provided by FTA.

25. **CLEAN AIR:**

a. The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et seq. The contractor agrees to report each violation to the purchaser and understands and agrees that the purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA regional office.

b. The contractor also agrees to include there requirements in each subcontract exceeding $100,000.00 financed in whole or in part with Federal assistance provided by FTA.

26. **RECYCLED PRODUCTS:**

The contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including by not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

27. **STATE AND LOCAL DISCLAIMER:**

The use of many of the suggested clauses is not governed by Federal law, but is significantly affected by State law. The language of the suggested clauses may need to be modified depending on state law, and that before the suggested clauses are used in the grantees procurement documents, the grantees should consult with their local attorney.

28. **FLY AMERICA:**
The Contractor agrees to comply with 49 U.S.C. 40118 (the “Fly America” Act) in accordance with the General Services Administration’s regulations at 41 CFR Part 301-10, which provide that recipients and sub-recipients of Federal funds and their contractors are required to use U.S. Flag air carriers for U.S. Government financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit if a foreign carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

29. COPELAND ANTI-KICK ACT:

1. Minimum wages. All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph (1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

2. (A)The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the
contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

1. Except with respect to helpers as defined as 29 CFR 5.2(n)(4), the work to be performed by the classification requested is not performed by a classification in the wage determination; and

2. The classification is utilized in the area by the construction industry; and

3. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

4. With respect to helpers as defined in 29 CFR 5.2(n)(4), such a classification prevails in the area in which the work is performed.

a. If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

b. In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

c. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

3. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
4. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

5. The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

   1. The work to be performed by the classification requested is not performed by a classification in the wage determination; and

   2. The classification is utilized in the area by the construction industry; and

   3. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

B. If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

C. In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

D. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(v) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
2. **Withholding.** Golden Empire Transit District shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the District may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. **Payrolls and basic records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

II. **(A)The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to Golden Empire Transit District for transmission to the Federal Transit Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.**
B. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

1. That the payroll for the payroll period contains the information required to be maintained under section 5.5(a)(3)(i) of Regulations, 29 CFR part 5 and that such information is correct and complete;

2. That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

3. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

C. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

D. The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

III. The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Federal Transit Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

    (i) Apprentices
will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division of the U.S. Department of Labor determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii)Trainees

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less
than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity

The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

5. Compliance with Copeland Act requirements

The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts

The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the Federal Transit Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment

A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
8. **Compliance with Davis-Bacon and Related Act requirements**

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. **Disputes concerning labor standards**

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. **Certification of eligibility**

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).


31. **NO GOVERNMENT OBLIGATION TO THIRD PARTIES:**

1. The Purchaser and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Purchaser, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

2. The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

32. **PATENT RIGHTS, RIGHT IN DATA, AND COPYRIGHT:**
Patent and rights in data requirements for federally assisted projects ONLY apply to research projects in which FTA finances the purpose of the grant is to finance the development of a product or information. These patent and data rights requirements do not apply to capital projects or operating projects, even though a small portion of the sales price may cover the cost of product development or writing the user's manual.

A. **Rights in Data.** This following requirement apply to each contract involving experimental, developmental or research work:

1. The term "subject data" used in this clause means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under the contract. The term includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to: computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "subject data" does not include financial reports, cost analyses, and similar information incidental to contract administration.

2. The following restrictions apply to all subject data first produced in the performance of the contract to which this Attachment has been added:

   1. Except for its own internal use, the Purchaser or Contractor may not publish or reproduce subject data in whole or in part, or in any manner or form, nor may the Purchaser or Contractor authorize others to do so, without the written consent of the Federal Government, until such time as the Federal Government may have either released or approved the release of such data to the public; this restriction on publication, however, does not apply to any contract with an academic institution.

   2. In accordance with 49 C.F.R. § 18.34 and 49 C.F.R. § 19.36, the Federal Government reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for "Federal Government purposes," any subject data or copyright described in subsections (2)(b)1 and (2)(b)2 of this clause below. As used in the previous sentence, "for Federal Government purposes," means use only for the direct purposes of the Federal Government. Without the copyright owner's consent, the Federal Government may not extend its Federal license to any other party.

3. Any subject data developed under that contract, whether or not a copyright has been obtained; and

4. Any rights of copyright purchased by the Purchaser or Contractor using Federal assistance in whole or in part provided by FTA.

5. When FTA awards Federal assistance for experimental, developmental, or research work, it is FTA's general intention to increase transportation knowledge available to the public, rather than
to restrict the benefits resulting from the work to participants in that work. Therefore, unless FTA determines otherwise, the Purchaser and the Contractor performing experimental, developmental, or research work required by the underlying contract to which this Attachment is added agrees to permit FTA to make available to the public, either FTA's license in the copyright to any subject data developed in the course of that contract, or a copy of the subject data first produced under the contract for which a copyright has not been obtained. If the experimental, developmental, or research work, which is the subject of the underlying contract, is not completed for any reason whatsoever, all data developed under that contract shall become subject data as defined in subsection (a) of this clause and shall be delivered as the Federal Government may direct. This subsection (c), however, does not apply to adaptations of automatic data processing equipment or programs for the Purchaser or Contractor's use whose costs are financed in whole or in part with Federal assistance provided by FTA for transportation capital projects.

4. Unless prohibited by state law, upon request by the Federal Government, the Purchaser and the Contractor agree to indemnify, save, and hold harmless the Federal Government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by the Purchaser or Contractor of proprietary rights, copyrights, or right of privacy, arising out of the publication, translation, reproduction, delivery, use, or disposition of any data furnished under that contract. Neither the Purchaser nor the Contractor shall be required to indemnify the Federal Government for any such liability arising out of the wrongful act of any employee, official, or agents of the Federal Government.

5. Nothing contained in this clause on rights in data shall imply a license to the Federal Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Federal Government under any patent.

6. Data developed by the Purchaser or Contractor and financed entirely without using Federal assistance provided by the Federal Government that has been incorporated into work required by the underlying contract to which this Attachment has been added is exempt from the requirements of subsections (b), (c), and (d) of this clause, provided that the Purchaser or Contractor identifies that data in writing at the time of delivery of the contract work.

7. Unless FTA determines otherwise, the Contractor agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

3. Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor's status (i.e., a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual, etc.), the Purchaser and the Contractor agree to take the necessary actions to provide, through FTA, those rights in that invention due the Federal Government as described in
4. The Contractor also agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

B. Patent Rights. This following requirement apply to each contract involving experimental, developmental, or research work:

1. General - If any invention, improvement, or discovery is conceived or first actually reduced to practice in the course of or under the contract to which this Attachment has been added, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, the Purchaser and Contractor agree to take actions necessary to provide immediate notice and a detailed report to the party at a higher tier until FTA is ultimately notified.

2. Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor's status (a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual), the Purchaser and the Contractor agree to take the necessary actions to provide, through FTA, those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. Part 401.

3. The Contractor also agrees to include the requirements of this clause in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

33. PRE-AWARD AND POST DELIVERY AUDIT REQUIREMENTS:

1. Buy America Requirements: The Contractor shall complete and submit a declaration certifying either compliance or noncompliance with Buy America. If the Bidder/Offeror certifies compliance with Buy America, it shall submit documentation which lists 1) component and subcomponent parts of the rolling stock to be purchased identified by manufacturer of the parts, their country of origin and costs; and 2) the location of the final assembly point for the rolling stock, including a description of the activities that will take place at the final assembly point and the cost of final assembly.
2. Solicitation Specification Requirements: The Contractor shall submit evidence that it will be capable of meeting the bid specifications.

3. Federal Motor Vehicle Safety Standards (FMVSS): The Contractor shall submit 1) manufacturer's FMVSS self-certification sticker information that the vehicle complies with relevant FMVSS or 2) manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

BUY AMERICA CERTIFICATE OF COMPLIANCE WITH FTA REQUIREMENTS FOR BUSES, OTHER ROLLING STOCK, OR ASSOCIATED EQUIPMENT

(To be submitted with a bid or offer exceeding the small purchase threshold for Federal assistance programs, currently set at $100,000.)

Certificate of Compliance

The bidder hereby certifies that it will comply with the requirements of 49 U.S.C. Section 5323(j) (2) (C), Section 165(b) (3) of the Surface Transportation Assistance Act of 1982, as amended, and the regulations of 49 C.F.R. 661.11:
REQUIRED FORMS
GOLDEN EMPIRE TRANSIT DISTRICT
Bus Wash Facility
Request for Proposals #G090
RETURN THIS FORM WITH YOUR BID

**Bid Form**

Golden Empire Transit District (Award of the contract shall be made to the responsible Contractor, whose proposal is determined to be the best evaluated offer resulting from negotiation, taking into consideration the relative importance of price, qualifications, product quality, experience, references support, service, and other evaluation factors. Receipt of any bid shall under no circumstance obligate the District to accept the best price offering.

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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<tr>
<td>Mobilization/Demobilization, Bonds, Insurance, and Permits</td>
<td>$___________</td>
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<tr>
<td>Worker Protection</td>
<td>$___________</td>
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<tr>
<td>Demolish and Remove Existing Facilities</td>
<td>$___________</td>
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<tr>
<td>Install Pre-Cast Overflow Tanks</td>
<td>$___________</td>
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<tr>
<td>Construct Foundations and Flatwork</td>
<td>$___________</td>
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<tr>
<td>Install Bus Wash System Equipment</td>
<td>$___________</td>
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<tr>
<td>Install Pre-Fabricated Metal Building</td>
<td>$___________</td>
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<tr>
<td>Electrical System Upgrades</td>
<td>$___________</td>
</tr>
<tr>
<td>Total Bid Price</td>
<td>$___________</td>
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</tbody>
</table>

NAME OF BIDDER: _____________________________________________________________

CORPORATE OR COMPANY NAME: ________________________________________________

ADDRESS: __________________________________________________________________

TELEPHONE: __________________________________________________________________

FAX: _______________________________________________________________________

DATE: ______________________________________________________________________

SIGNATURE: __________________________________________________________________
ACKNOWLEDGMENT OF ADDENDA
The following form shall be completed and included in the Bid.

Failure to acknowledge receipt of all addenda may cause the proposal to be considered nonresponsive to the solicitation. Acknowledged receipt of each addendum must be clearly established and included with the Offer.

ACKNOWLEDGMENT OF ADDENDA

The undersigned acknowledges receipt of the following addenda to the documents:

<table>
<thead>
<tr>
<th>Addendum No.</th>
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Offeror:  

Name

Street Address

City, State, Zip

Signature of Authorized Signer

Title

Phone
RETURN THIS FORM WITH YOUR BID

CERTIFICATE OF NONDISCRIMINATION

Respondent hereby certifies under penalty of perjury under the laws of the State of California, that it does not unlawfully discriminate against any employee or applicant for employment with regard to race, color, religion, sex or national origin, ancestry, physical handicap, medical condition, marital status, or age; that it is in compliance with all applicable federal, state, and local directives and executive orders regarding nondiscrimination in employment; and that it agrees to pursue positively and aggressively the principle of equal opportunity in employment. Respondent and its sub-consultants shall employ with the provisions of the Fair Employment and Housing Act (Gov. Code Section 12900 et seq.) and the applicable regulations promulgated thereunder Cal. Admin. Code, Title 2, Sec 7285.0 et seq.).

Respondent agrees specifically:

* To establish or observe employment policies which actively promote opportunities for minority persons and women at all job levels.

* To communicate this policy to all persons concerned, including all company employees, outside recruiting services, especially those serving minority communities and women, and to the minority communities and women at large.

* To state in all solicitations or advertisements for employees that the Proposer will consider all qualified applicants for employment without regard race, color, religion, age, sex or national origin.

Please include any additional information available regarding equal opportunity employment programs now in effect within you company, e.g. an Affirmative Plan and/or Policy statement.

CERTIFIED BY:

__________________________________________
SIGNATURE

__________________________________________
NAME & TITLE
RETURN THIS FORM WITH YOUR BID

BUY AMERICA CERTIFICATE

Equipment, Materials and Services

Certification requirement for procurement of construction materials and associated equipment

The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 CFR Part 661, which provide that Federal funds may not be obligated unless steel, iron, or manufactured products used in FTA funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 CFR 661.7, and include microcomputer equipment, software, and small purchases (currently less than $100,000) made with capital, operating or planning funds.

A bidder or offeror must submit to the FTA recipient the appropriate Buy America certification (below) with all bids on FTA funded contracts, except those subject to a general waiver. Bids or offers that are not accompanied by a completed Buy America certification must be rejected as nonresponsive. This requirement does not apply on lower tier subcontractors.


The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j) (1) and the applicable regulations in 49 CFR Part 661.

Date

Signature

Company Name

Title
RETURN THIS FORM WITH YOUR BID

CERTIFICATION OF PRIMARY PARTICIPANT REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS

The Primary Participant (applicant for an FTA grant or cooperative agreement, or potential contractor for a third party contract), ______________________________________certifies to the best of its knowledge and belief that it and its principles:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from covered transactions by an Federal debarment or agency.

2. Have not within a three year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or Local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

3. Are not presently indicated for or otherwise criminally or civilly charged by a governmental entity (Federal, State or Local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and

4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or Local) terminated for default.

(If the primary participant (applicant for an FTA grant, or cooperative agreement, or potential third party contractor) is unable to certify to any of the statements in this certification, the participant shall attach an explanation to this certification.)

THE PRIMARY PARTICIPANT (APPLICANT FOR AN FTA GRANT OR COOPERATIVE AGREEMENT, OR POTENTIAL CONTRACTOR FOR A MAJOR THIRD PARTY CONTRACT),_________________________________, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OR THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTION 3801 ET SEQ. ARE APPLICABLE THERE TO.

_____________________________ Signature of the Bidder or Offeror’s Authorized Official

_____________________________ Name and Title of the Bidder or Offeror’s Authorized Official

_____________________________ Date
RETURN THIS FORM WITH YOUR BID

Disadvantaged Business Enterprise

______________________________________ hereby certifies that all reasonable efforts have been made to secure maximum disadvantaged business enterprise (DBE) participation in this contract. *

BY: _________________________________
   Authorized Official

_________________________________
   Title

Please include on a separate sheet the names, addresses of all DBEs contacted or that will participate in the contract, the scope of work, dollar amount of for each participating DBE. Also describe all efforts which have been made to secure maximum DBE participation.

*All participating DBEs must complete the DBE affidavit, attached.
RETURN THIS FORM WITH YOUR BID

AFFIDAVIT OF DISADVANTAGED BUSINESS ENTERPRISE

I hereby declare and affirm that I am a qualifying DBE as describe in 49 CFR part 26 and that I will provide information to document this fact. *N/A if not a qualifying DBE

I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE FOREGOING STATEMENTS ARE TRUE AND CORRECT, AND THAT I AM AUTHORIZED, ON BEHALF OF THE ABOVE FIRM, TO MAKE THIS AFFIDAVIT.

BY:_______________________________________

Title:_____________________________________

Date:_______________________________
RETURN THIS FORM WITH YOUR BID

NON-COLLUSION AFFIDAVIT

This affidavit is to be filled out and executed by the Proposer; if a corporation makes the bid, then by its properly executed agent. The name of the individual swearing to the affidavit should appear on the line marked “Name of Affiant.” The affiant’s capacity, when a partner or officer of a corporation, should be inserted on the line marked “Capacity.” The representative of the Proposer should sign his or her individual name at the end, not a partnership or corporation name, and swear to this affidavit before a notary public, who must attach his or her seal.

State of ____________________________, County of ____________________________

I, __________________________________, being first duly sworn, do hereby state that

(Name of Affiant)

I am ________________________________________ of ______________________________________________________

(Capacity)                                                                  (Name of Firm, Partnership or Corporation)

whose business is ___________________________________________________________________________________

and who resides at ___________________________________________________________________________________

and that _____________________________________________________________________________________________

(Give names of all persons, firms, or corporations interested in the bid)

is/are the only person(s) with me in the profits of the herein contained Contract; that the
Contract is made without any connection or interest in the profits thereof with any persons
making any bid or Proposal for said Work; that the said Contract is on my part, in all respects,
fair and without collusion or fraud, and also that no members of the Board of Trustees, head of
any department or bureau, or employee therein, or any employee of the Authority, is directly
or indirectly interested therein.

_____________________________ __________________________
Signature of Affiant  Date

Sworn to before me this ________ day of ____________________, 20____.

_____________________________ __________________________
Notary public  My commission expires  Seal
RETURN THIS FORM WITH YOUR PROPOSAL

LOBBYING CERTIFICATION

The Bidder or Offeror certifies, to the best its knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of a Federal department or agency, a Member of the U.S. Congress, an officer or employee of the U.S. Congress, or an employee of a Member of the U.S. Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification thereof.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instruction, as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96).

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.


_____________________________ Signature of the Bidder or Offeror’s Authorized Official

_____________________________ Name and Title of the Bidder or Offeror’s Authorized Official

_____________________________ Date
## REFERENCES

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<td>Contact Person Name:</td>
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Types of Supplies/Services Provided and Dates Provided/Contracted:

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Types of Supplies/Services Provided and Dates Provided/Contracted:
1. Call before you dig.
2. Contact the utility companies before you begin digging.
3. Use only qualified contractors for construction work.
4. Ensure that excavations are properly supervised.
5. Use proper safety equipment and procedures.
6. Follow all regulations and guidelines for construction work.
7. Notify the appropriate authorities of any hazards.
8. Maintain a safe distance from utility lines.
9. Do not attempt to repair or tamper with utility lines.
10. Keep children and pets away from the work area.
11. Follow all safety signs and instructions.
12. Use proper tools and equipment.
13. Avoid cutting or damaging utility lines.

WARNING
POWER LINES
OVERHEAD

WARNING
POWER LINES
OVERHEAD
Know what's below. Call before you dig.

WARNING
POWER LINES
OVERHEAD
BUILDING LAYOUT