Existing Data and Studies

For

Proposition 1E

Stormwater Flood Management Grant Application

Haster Retarding Basin and Pump Station

1. Project Specifications (70% complete)
2. Project Construction Plans (70% complete)
3. Preliminary Design Report (minus appendices)
4. Portions of U.S. Army Corps of Engineers Draft Feasibility Study for Westminster Watershed

PLANS AND SPECIAL PROVISIONS

FOR THE

CONSTRUCTION OF

HASTER RETARDING BASIN AND PUMP STATION

SEPTEMBER 2011

FUNDED BY

ORANGE COUNTY FLOOD CONTROL DISTRICT

ADMINISTERED BY

COUNTY OF ORANGE
OC PUBLIC WORKS

SANTA ANA, CALIFORNIA

JESS CARBAJAL, DIRECTOR

W. O. EF03554

Prepared under the supervision of:

_____
James Volz, Senior Civil Engineer
OC Public Works

Recommended by:

_____
Nardy Khan, Manager
OC Public Works

Approved by:

_____
Vince Gin, Manager
OC Public Works

Approved by:

_____
Ignacio G. Ochoa
Chief Engineer

ORANGE COUNTY, CALIFORNIA

NOTICE TO CONTRACTORS

Sealed proposals from contractors licensed in accordance with Section A, Subsection 16, Proposal Requirements and Conditions will be received on behalf of the Orange County Flood Control District, hereinafter referred to as "DISTRICT," at the Office of the Clerk of the Board of Supervisors, Room 101, Hall of Administration, of the County of Orange, 333 West Santa Ana Boulevard, Santa Ana, California, on or before Wednesday, the ____> day of ____>, 20____> at 2:00 p.m., at which time they will be publicly opened and read in Room 169, First Floor, Hall of Administration, 333 West Santa Ana Boulevard, Santa Ana, California, for the following project to be administered by the OC Public Works Department.

CONSTRUCTION OF

Haster Pump Station
and
Retarding Basin

Hereinafter referred to as "PROJECT."

SCHEDULE OF WORK ITEMS			
Item No.	**Item Description**	**Quantity**	**Unit**
1.	Mobilization	1	L.S.
2.	Clearing and Grubbing	1	L.S.
3.	Dust Control	1	L.S.
4.	Develop Water Supply	1	L.S.
5.	SWPPP Manual	1	L.S.
6.	Section D Permit Requirements	1	L.S.
7.	Dewatering	1	L.S.
8.	Maintain Traffic and Detours	1	L.S.
9.	Class "A" Field Office		Months
10.	Remove Asbestos Pipe (12")		L.F.

SCHEDULE OF WORK ITEMS			
Item No.	**Item Description**	**Quantity**	**Unit**
11.	Remove Asphalt Concrete Pavement		S.F.
12.	Remove Portland Cement Concrete (Reinforced)		C.Y.
13.	Remove Portland Cement Concrete Pavement		C.Y.
14.	Remove Fencing		L.F.
15.	Temporary Fence		L.F.
16.	Unclassified Excavation (Upstream RCB)		C.Y.
17.	Unclassified Excavation (Basin)		C.Y.
18.	Unclassified Excavation (Pump Station)		C.Y.
19.	Unclassified Excavation (Downstream Channel)		C.Y.
20.	Structure Excavation		C.Y.
21.	Shoring and Trench Shoring	1	L.S.
22.	Structure Backfill		C.Y.
23.	Unclassified Fill (Soccer Field And Upstream RCB)		C.Y.
24.	Unclassified Fill (Pump Station)		C.Y.
25.	Unclassified Fill (Downstream Channel)		C.Y.
26.	Asphalt Concrete Pavement		Tons
27.	Concrete Vee-Ditch		L.F.
28.	Inlet Structures		Each
29.	Junction Structures		Each
30.	Inlet Type V		Each
31.	Structure Concrete (Upstream RCB)		C.Y.
32.	Structure Concrete (Upstream C05 Inlet Structure)		C.Y.
33.	Structure Concrete (Oertly Inlet Structure)		C.Y.

SCHEDULE OF WORK ITEMS			
Item No.	**Item Description**	**Quantity**	**Unit**
34.	Structure Concrete (Pump Station)		C.Y.
35.	Structure Concrete (Downstream Channel)		C.Y.
36.	Miscellaneous Concrete		C.Y.
37.	Reinforced Masonry Block Retaining Wall		S.F.
38.	Brick and Mortar Plug	1	L.S.
39.	Chain Link Fence		L.F.
40.	Chain Link Gate		Each
41.	Guard Cable Fence		L.F.
42.	Black Wrought Iron Fence		L.F.
43.	Black Wrought Iron Gates with Automatic Sliders	2	Each
44.	Flap Gates	3	Each
45.	Reinforced Concrete Pipe (18-inch)		L.F.
46.	CML&C Steel Pipe (54-inch)		L.F.
47.	Aggregate Base Material		C.Y.
48.	Riprap Material		C.Y.
49.	Gravel Base Material		C.Y.
50.	Filter Fabric		S.F.
51.	Project Information Sign	1	Each
52.	Bridge Crane	1	L.S.
53.	Metal Work (Trash Rack)	1	L.S.
54.	Metal Work (Roof Trusses)	1	L.S.
55.	Steel Roof Decking	1	L.S.
56.	Miscellaneous Metalwork	1	L.S.

SCHEDULE OF WORK ITEMS			
Item No.	**Item Description**	**Quantity**	**Unit**
57.	Metal Stairs	1	L.S.
58.	Metal Grating for Trench	1	L.S.
59.	Flashing and Sheet Metal	1	L.S.
60.	Lightweight Concrete Roof	1	L.S.
61.	Roof and Floor Hatches	1	L.S.
62.	Metal Doors and Frames with Sound Control	1	L.S.
63.	Sound Control Window	1	L.S.
64.	Finish Hardware	1	L.S.
65.	Portland Cement Plaster and Architectural Features	1	L.S.
66.	Suspended Acoustic Ceilings		S.F.
67.	Acoustic Panel Systems		S.F.
68.	Floor Epoxy Coating		S.F.
69.	Louvers and Vents with Sound Control	1	L.S.
70.	Main Pumps		Each
71.	Right-Angle Gear Drives		Each
72.	Sump Pumps	1	L.S.
73.	Natural Gas Engines and Appurtenances	1	L.S.
74.	Ventilation Fans	1	L.S.
75.	Fiberglass Reinforced Plastic Ductwork	1	L.S.
76.	Piping, Valves and Accessories	1	L.S.
77.	Building Plumbing and Sanitary Facilities	1	L.S.
78.	Service Water	1	L.S.
79.	Restroom Metal Framing and Drywall	1	L.S.

SCHEDULE OF WORK ITEMS			
Item No.	**Item Description**	**Quantity**	**Unit**
80.	Electrical Wire, Cables, Conduit and Boxes	1	L.S.
81.	Switches and Receptacles	1	L.S.
82.	350-Kw Natural Gas Generator and Automatic Transfer Switch	1	L.S.
83.	Motor Control Center	1	L.S.
86.	O&M Manuals	1	L.S.

(A) Additive Bid Item
(D) Deletable Bid Item
(F) Final Quantity Bid Item
(P) Partial Payment Bid Item
(S) Specialty Bid Item

(A) Additive Bid Item – shall be bid items that for bidding purposes are not considered part of the base bid but shall be added or subtracted from the total contract amount (based upon the bidder's proposed bid amounts and the Agency's available funding for the project) prior to award of the project per Section 20103.8 of the Public Contract Code.

(D) Deletable Bid Item – shall be bid items that are considered part of the bidder's base bid but are items of work that may or may not be deleted from the total contract amount awarded as progression of the work proceeds for the project. A deletable bid item should not be confused with a deductive bid item per Section 20103.8 of the Public Contract Code, but deletable bid items will be subject to Section 3-2.2.1, "Contract Unit Prices," of the Standard Specifications for Public Works Construction as Published by Building News, Inc. (STANDARD SPECIFICATIONS) as modified by Section B, of these Special provisions.

(F) Final Quantity Bid Item – are bid items as described in Section C, "Final Pay Quantities," of these Special Provisions.

(P) Partial Payment Bid Item – are bid items as described in Section B, Section 9-3.2, "Partial and Final Payment," of these Special Provisions.

(S) Specialty Bid Item – are bid items that are considered part of the total base bid but are not considered part of the contractor's obligation to perform at least fifty percent (50%) of the work as specified in Section 2-3.2, "Additional Responsibility," of the STANDARD SPECIFICATIONS.

Bid Packages (reduced size Plans and Special Provisions) are available for examination without charge or may be secured upon payment, including state sales tax, of:

$ 25.00 if picked up in person
$ 25.00 if FedEx number is provided
$ 35.00 (one book set) - $39.00 (two book set) if requested by mail

Bid Package(s) requested by mail are sent via U.S.P.S. certified mail, so please include the street address to which these documents may be delivered. All plan holders are instructed to provide an e-mail address where project bid bulletins and notices can be received via e-mail.

CALL: OC Public Works/Central Files Staff (714) 834-3568 or OC Public Works Cashier (714) 834-4585

DO NOT CALL PROJECT ENGINEER FOR PURCHASE OF BID PACKAGE OR FOR A COPY OF THE PLAN HOLDER'S LIST. REQUESTS FOR THESE ITEMS FROM THE PROJECT ENGINEER MAY ONLY DELAY RECEIPT OF THESE ITEMS. SEE DETAILS BELOW.

A complete set of full-size construction plans will be available for examination without charge or may be secured upon payment, including sales tax, of the amount shown in the proper column in the table listed below:

Number of Sheets	1-5	6-10	11-15	16-20	21-25	26-30
Cost per Set	$ 3.70	$ 7.40	$ 11.10	$ 14.80	$ 18.50	$ 22.20
Number of Sheets	31-35	36-40	41-45	46-50	51-55	56-60
Cost per Set	$ 29.60	$ 33.30	$ 37.00	$ 40.70	$ 44.40	$ 48.10

Add $14.00 to price shown if plans are requested by mail.

CAUTION: THE BID PACKAGE (the reduced size Plans and Special Provisions), NOT JUST THE FULL-SIZE CONSTRUCTION PLANS, MUST BE PURCHASED TO BID THE JOB. IF ALL YOU PURCHASE IS THE FULL-SIZE CONSTRUCTION PLANS, YOU WILL NOT HAVE THE BID PACKAGE AND THE PROPOSAL FORMS THEREIN. CONSTRUCTION PLANS ARE MADE AVAILABLE FOR SEPARATE PURCHASE ONLY AS A CONVENIENCE TO CONTRACTORS/SUBCONSULTANTS.

OC Public Works (formerly PFRD/RDMD) Standard Plans (current issue) and Supplement(s) thereto are also part of a construction agreement included in the bid package, hereinafter referred to as "AGREEMENT." Copies of the Standard Plans and

Supplement(s) thereto are available for examination without charge at the following website link:

http://www.ocroad.com/docs/RoadStandardPlans.pdf

Or, in person at 300 North Flower Street (Room 252), Santa Ana, or may be secured upon payment with the Bid Package for an additional charge, including state sales tax of:

OC Public Works (RDMD) Standard Plans with addendum
$13.20 if picked up in person
$13.20 if FedEx number is provided
$23.90 if requested by mail

All checks shall be made payable to:

Orange County Flood Control District
P.O. Box 4048 (mailing address)
300 North Flower, (street address)
Santa Ana, California 92702-4048
(714)834-3568 or (714)834-4585

Orders which are not properly addressed or payable are subject to delay. The DISTRICT shall not accept responsibility for that delay.

There will be no refund for return of Bid Package(s), and return is not required.

Bidders wishing to obtain a **free list of plan holders by e-mail** may e-mail their request (please include the full PROJECT title) to the **OC Public Works Cashier** at the following address:

centralfiles@rdmd.ocgov.com

Alternatively, a plan holders list may be received by mail by notifying the OC Public Works Cashier at the mailing address shown above. Please include the full title of the PROJECT, and include a check payable to Orange County Flood Control District in the amount of fifty five cents ($0.55) to cover copying costs for the list of plan holders. A copy by fax may be received for sixteen cents ($0.16) by calling (714)834-3568 or (714)834-4585. Due to the complexity of DISTRICT projects and the typically large number of bidders encountered on each project, the OC Public Works Staff will make no attempt to read a list of plan holders to prospective bidders over the telephone. Bidders requesting lists of plan holders are advised that the list will be current as of the date the request is processed and, if requested by mail, the request should be timed as to allow for normal mail service.

Bidders calling the above listed telephone number should be prepared to leave a message on the voice mail system with adequate instruction to inform OC Public Works staff of their specific needs and the project to which they relate. OC Public Works staff will return calls as soon as they are able.

The bidder's attention is directed to the provisions in Section A, "Proposal Requirements and Conditions," regarding the requirements and conditions which must be observed in the preparation of the proposal form and the submission of the bid.

Questions on interpretation of the Bid Package prior to the date scheduled for bid opening shall conform to the provisions of Section A, paragraphs No. 4 and 5 and shall be addressed to Kasey Nielsen, *Project Engineer/Manager* (834-4786), or to Jim Volz, *Project Engineer's Engineering Supervisor* (834-2037), P.O. Box 4048, Santa Ana, CA 92702.

Per Section 3300 of the Public Contract Code, the Bidder is hereby notified that he must possess for the duration of the PROJECT a valid **Class A License** issued by of the State of California, Contractors State License Board.

The lowest responsible and responsive bidder that enters into an AGREEMENT with the DISTRICT for award of the PROJECT shall hereinafter be referred to as "CONTRACTOR." The AGREEMENT for this PROJECT requires that CONTRACTOR pay the general prevailing wage for workers employed on the PROJECT pursuant to Section 1773 of the California Labor Code. For the duration of the PROJECT, certified payroll records as described in Section 1776 of the Labor Code and/or statements of non-performance for CONTRACTOR and those of subcontractors performing work on the PROJECT shall be delivered to DISTRICT on a weekly basis no later than ten (10) calendar days after the end of each weekly pay period. In addition CONTRACTOR and any subcontractors employed on the PROJECT are required to comply with the provisions regarding the employment of apprentices pursuant to Section 1777.5 of the Labor Code.

For bid results and questions concerning performance bond, payment bond, and insurance forms contact OC Public Works /Construction Division at (7l4) 567-7800. Bid results may also be obtained through the Orange County World Wide Web site at http://www.ocpublicworks.com/Construction/bids.aspx one day after opening of bids.

Questions concerning purchase of Plans and Special Provisions and obtaining a copy of the plan holder's list should be addressed to the, County of Orange, OC Public Works /Central Files Staff (714)834-3568 or OC Public Works Cashier (714)834-4585.

By order of the Board of Supervisors of the County of Orange, California, governing board of the Orange County Flood Control District.

Date: _____

_____

Darlene J. Bloom
Clerk of the Board of Supervisors
of Orange County, California

PROPOSAL

FOR

Haster Retarding Basin and Pump Station

Name
of Bidder_____

Business Address_____
Phone No._____

City/State_____
Zip Code_____

TO THE BOARD OF SUPERVISORS OF_____
hereinafter referred to as, "DISTRICT."

The undersigned, as bidder, declares that the only persons or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm or corporation; that the bidder has carefully examined the location of the proposed work, the proposed form of CONSTRUCTION AGREEMENT, including all documents made a part thereof, and the plans herein referred to; and the bidder proposes and agrees if this proposal is accepted, that the bidder will enter into a contract with the DISTRICT, in the form set forth in said CONSTRUCTION AGREEMENT, to provide all the necessary labor, machinery, tools, apparatus and other means for construction, and to do all the work and furnish all the materials specified in the CONSTRUCTION AGREEMENT, in the manner and time therein prescribed, and according to the requirements of the ENGINEER as therein set forth, and that the bidder will accept in full payment therefor the following unit prices, to wit:

SCHEDULE OF WORK ITEMS

CONTRACTOR shall place lump sum prices in the "Item Price" column and the "Total" column.

SCHEDULE OF WORK ITEMS					
Item No.	**Estimated Quantity**	**Unit of Measure**	**Item Description**	**Item Price (in figures)**	**TOTAL (in figures)**
1.					
2.					

SCHEDULE OF WORK ITEMS					
Item No.	**Estimated Quantity**	**Unit of Measure**	**Item Description**	**Item Price (in figures)**	**TOTAL (in figures)**
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
			TOTALS:		

(A) Additive Bid Item
(D) Deletable Bid Item
(F) Final Quantity Bid Item
(P) Partial Payment Bid Item
(S) Specialty Bid Item

(A) Additive Bid Item – shall be bid items that for bidding purposes are not considered part of the base bid but shall be added or subtracted from the total contract amount (based upon the bidder's proposed bid amounts and the Agency's available funding for the project) prior to award of the project per Section 20103.8 of the Public Contract Code.

(D) Deletable Bid Item – shall be bid items that are considered part of the bidder's base bid but are items of work that may or may not be deleted from the total contract amount awarded as progression of the work proceeds for the project. A deletable bid item should not be confused with a deductive bid item per Section 20103.8 of the Public Contract Code, but deletable bid items will be subject to Section 3-2.2.1, "Contract Unit Prices," of the Standard Specifications for Public Works Construction as Published by Building News, Inc. (STANDARD SPECIFICATIONS) as modified by Section B, of these Special provisions.

(F) Final Quantity Bid Item – are bid items as described in Section C, "Final Pay Quantities," of these Special Provisions.

(P) Partial Payment Bid Item – are bid items as described in Section B, Section 9-3.2, "Partial and Final Payment," of these Special Provisions.

(S) Specialty Bid Item – are bid items that are considered part of the total base bid but are not considered part of the contractor's obligation to perform at least fifty percent (50%) of the work as specified in Section 2-3.2, "Additional Responsibility," of the STANDARD SPECIFICATIONS.

It is understood that the approximate quantities shown in the foregoing schedule are solely for the purpose of facilitating the comparison of bids, and that the CONTRACTOR's compensation will be computed upon the basis of the actual quantities in the completed work, whether they be more or less than those shown herein.

The bidder shall set forth for each item of work, in clearly legible figures, an item price and a total for the item in the respective spaces provided for this purpose. In the case of unit basis items, the amount set forth under the "Total" column shall be the extension of the item price bid on the basis of the estimated quantity for the item, unless otherwise indicated elsewhere in the AGREEMENT documents or specifications (e.g., items stated as "final Payment" or "lump sum").

In the case of discrepancy between the item price and the total set forth for the item, the item price shall prevail, provided, however, if the amount set forth as an item price is ambiguous, unintelligible or uncertain for any cause, or is omitted, or in the case of unit basis items, is the same amount as the entry in the "Total" column, then the amount set forth in the "Total" column for the item shall prevail in accordance with the following:

l. For lump sum items, the amount set forth in the "Total" column shall be the item price.

2. For unit basis items, the amount set forth in the "Total" column shall be divided by the estimated quantity for the item and the price thus obtained shall be the item price.

In case of discrepancy between the correct sum of the individual items and the total written, the correct sum shall prevail.

The cost of all work shown in the Plans and Special Provisions shall be included in related bid items. There shall be no compensation except for the bid items specified in the Proposal, and no additional compensation shall become due the CONTRACTOR by nature of compliance with the Plans and Special Provisions.

The names of all persons interested in the foregoing proposal as principals are as follows:

(IMPORTANT NOTICE: If bidder or other interested person is a corporation, state legal name of corporation, also names of the president, secretary, treasurer, and manager thereof; if a co-partnership, state true name of firm, also names of all individual co-partners composing firm; if bidder or other interested person is an individual, state first and last names in full.)

_____

_____

_____

_____

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts in behalf of the co-partnership, and if bidder is an individual, his signature shall be placed above. If signature is by an agent other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the DISTRICT prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

Accompanying this proposal is _____

_____

NOTE: Insert the words "Cash ($_____)," "Cashier's Check," "Certified Check" or "Bidder's Bond," as the case may be, in amount equal to at least ten percent of the total of the bid.

The CONTRACTOR shall be licensed in accordance with the act providing for the registration of CONTRACTOR.

License number: _____

License classification: _____

License Expiration Date: _____

Any bid not containing the above license information, or a bid which is subsequently proven false, shall be considered nonresponsive and shall be rejected.

In all contracts where federal funds are involved, no bid submittal shall be invalidated by the failure of the bidder to be licensed in accordance with the laws of this state.

However, at the time the contract is awarded, the CONTRACTOR shall be properly licensed in accordance with the laws of this state. The first payment for work or material under any contract shall not be made unless and until the Registrar of Contractors verifies to the DISTRICT that the records of the Contractors' State License Board indicate that the CONTRACTOR was properly licensed at the time the contract was awarded. Any bidder or CONTRACTOR not so licensed shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractors' State License Board. Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security of the bidder.

The CONTRACTOR bidding shall hereinafter state the subcontractor who will be the subcontractor on the job for each particular trade or subdivision of the work that exceeds one-half of one percent of the prime contractor's total bid, or in the case of bids for the construction of streets or highways, including bridges, in excess of the above stated limits, and will state the firm name and principal location of the mill, shop or office of each. If the CONTRACTOR bidding fails to specify a subcontractor for work performed under the contract in excess of one-half of one percent of the prime contractor's total bid, or $10,000.00, whichever is greater, he agrees that he is fully qualified to perform that portion himself, and he shall perform that portion himself.

DIVISION OF WORK OR TRADE	NAME OF FIRM OR CONTRACTOR	LOCATION OF MILL, SHOP OR OFFICE

By notarized signature, bidder also acknowledges receipt of:

*Addenda Nos. _____ *Bulletin Nos. _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

* - Bidder shall contact the OC Public Works Cashier at (714)834-2669 or e-mail at CentralFiles@ocpw.ocgov.com in order to verify that all Bulletins and/or Addenda issued for this PROJECT have been fully reviewed and considered by Bidder prior to submission of a formal notarized bid to the County of Orange, Clerk of the Board. Bidder, by submitting a formal notarized bid, acknowledges that he is solely responsible for acquiring, verifying, and considering all Bulletins and/or Addenda issued by the Orange County Flood Control District prior to submitting a formal notarized bid for this PROJECT.

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

Subscribed at: _____,_____,_____ on _____ _____, 20___.

(City) (County) (State) (Date)

_____

(Signature of Contractor)

NOTARY TO AFFIX SEAL AND CERTIFICATE OF ACKNOWLEDGMENT

_____

(Address – City, State, Zip Code)

_____

(Telephone)

NONCOLLUSION AFFIDAVIT

The party making the foregoing bid affirms that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived or agreed with any bidder or anyone else to put in sham bid, or that anyone shall refrain from bidding, that the bidder has not in any manner, directly or indirectly, sought by agreement, communication or conference with anyone to fix the bid price or of that of any other bidder, or to fix any overhead, profit or cost element of the bid price or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any person, corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid.

By notarized signature, bidder acknowledges compliance of the "NONCOLLUSION AFFIDAVIT" of this Proposal.

_____	_____	_____
(Print Name of Contractor)	(Signature of Contractor)	(Date)

State of California
County of Orange

Subscribed and sworn to (or affirmed) before me on

This _____ day of _____, 20_____,

by _____,

proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

(seal) _____
(Signature of Notary Public)

CONSTRUCTION AGREEMENT

This Construction Agreement, hereinafter referred to as AGREEMENT, is made and entered into this _____ day of_____ , 20_____ by and between

_____

_____

_____

hereinafter referred to as "DISTRICT" and

_____

_____

_____

hereinafter referred to as "CONTRACTOR,"

That DISTRICT and CONTRACTOR, for considerations hereinafter named, mutually agree as follows:

l. CONTRACTOR shall accomplish to the satisfaction of the ENGINEER, as defined in Section B of the Special Provisions, all work described in this AGREEMENT and the plans and specifications, and shall provide and furnish all the labor, materials, necessary tools, expendable equipment, and all utility and transportation services required for the:

Haster Retarding Basin and Pump Station

hereinafter referred to as PROJECT in accordance with this AGREEMENT. This AGREEMENT includes the following documents and their provisions which are incorporated herein by reference and made a part hereof as though fully set forth:

A. "Standard Specifications for the Public Works Construction (Greenbook)," hereinafter referred to as STANDARD SPECIFICATIONS, except Section 307, 2009 edition as published by Building News, Inc.

B. The following portions of the "Standard Specifications" (and all standard specifications and plans referenced therein), Department of Transportation, State of California, dated May 2006:

a. Construction Area Traffic Control Devices: Section 12
b. Bridges: Sections 15-4, 19, 42, “Structures” Sections 49 through 60, Sections 67, 72-6, 75, 83, 90, 91, and 95
c. Pavement Markers: Section 85
d. Signals, Lighting, and Electrical Systems: Section 86

C. The following portions of the "Standard Plans" (and all standard plans and specifications referenced thereon), Department of Transportation, State of California, dated May 2006:

a. General Road Work Plans Nos. A10 (abbreviations & symbols), A62 (limits of excavation & backfill), A77 (Metal Beam Guard Railing), D80-82, 84-86 (Culverts), and T3-5 (K-rail)
b. "Bridges" portion
c. "Signals, Lighting and Electrical Systems" portion

D. Parts 4 and 6 of the California Manual on Uniform Traffic Control Devices (CA MUTCD) dated September 26, 2006. This manual may be downloaded by accessing the following Department of Transportation, State of California, website:

http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/ca_mutcd.htm

E. The OC Public Works Department (formerly the EMA/PFRD/RDMD) Standard Plans (current issue and Supplement(s) thereto) hereinafter referred to as STANDARD PLANS.

F. Notice to Contractors.

G. Proposal requirements and conditions (Section A of the Special Provisions).

H. Supplement to Part 1 of the Standard Specifications for Public Works Construction (Section B of the Special Provisions).

I. General Miscellaneous (Section C of the Special Provisions).

J. Permits (Section D of the Special Provisions).

K. Construction Details (Section F of the Special Provisions).

2. DISTRICT agrees to pay and CONTRACTOR agrees to accept in full payment for the work to be performed pursuant to this AGREEMENT the sum of

($_____)

subject to additions and deductions at the unit prices set forth in CONTRACTOR's proposal in accordance with the AGREEMENT documents. DISTRICT agrees to make work progress payments in accordance with the provisions of Section 9-3.2 "Partial and Final Payment" of the STANDARD SPECIFICATIONS, which sums shall be computed from the prices set forth in the bid submitted by CONTRACTOR.

Interest shall begin to accrue on any unpaid progress payment thirty (30) days after the Engineer's submittal of the progress payment estimate. Interest shall be equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.

3. CONTRACTOR agrees to commence construction of the PROJECT within thirty (30) calendar days after receipt of a Notice to Proceed issued by the ENGINEER; CONTRACTOR shall notify the ENGINEER at least five (5) working days in advance of starting work and agrees to continue construction of PROJECT in a due and diligent workmanlike manner without interruption, and to complete construction thereof within

XX (XXX) Working Days

from the date of commencement of work. CONTRACTOR's notice to ENGINEER shall specify the commencement of work date and that date shall be used to compute the AGREEMENT completion date. CONTRACTOR may perform mobilization work prior to the commencement of work date. In the event that CONTRACTOR commences any other work prior to the date specified in the notice to ENGINEER, that earlier date shall be used to compute the AGREEMENT completion date.

With the consent of ENGINEER and submission and approval of all the following documents: bonds, insurance certificates, signed CONSTRUCTION AGREEMENT, each certified by DISTRICT, and a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) in accordance with the State General Construction Activity Storm Water Permit, CONTRACTOR may commence work prior to issuance of Notice to Proceed. If consent is granted, the AGREEMENT completion date, as computed per paragraph 3, shall remain unchanged. Payment shall be made for work in accordance with Paragraph 2 above of the AGREEMENT.

For AGREEMENTS which contain a plant establishment and plant maintenance period, the following applies:

The sixty (60) calendar day plant establishment period shall be accomplished prior to ENGINEER recommending AGREEMENT construction acceptance by the Board of Supervisors**,** hereinafter referred to as "BOARD"**.** The plant establishment period shall be included within the working day period allowed for this AGREEMENT. For the limited purpose of determining the completion of CONTRACTOR's plant maintenance responsibility, the sixty (60) calendar day plant maintenance period shall commence on the date of AGREEMENT construction completion as determined by the ENGINEER.

4. Liquidated Damages; Extension of Time:

In accordance with Government Code Section 53069.85, CONTRACTOR agrees to forfeit and pay to the DISTRICT as liquidated damages the sum of

XX ($ X,XXX.00)

for each and every calendar day's delay in finishing the work in excess of the summation of the number of working days prescribed herein and the number of working days granted for delays as prescribed in Section 6-6 of the STANDARD SPECIFICATIONS.

CONTRACTOR further agrees that such sum shall be deducted from payments due to or to become due to CONTRACTOR.

5. Change Orders:

DISTRICT, through its Director, OC Public Works Department, or his designee, hereinafter referred to as "DIRECTOR," may approve in writing change orders within the scope of this AGREEMENT, and the extra cost to the DISTRICT for any change or addition to the work so ordered shall not exceed five thousand dollars ($5,000) when the total amount of the original AGREEMENT does not exceed fifty thousand dollars ($50,000), nor 10 percent of the amount of any original AGREEMENT that exceeds fifty thousand dollars ($50,000), but does not exceed two hundred fifty thousand dollars ($250,000).

For an AGREEMENT whose original cost exceeds two hundred fifty thousand dollars ($250,000), the extra cost for any change or addition to the work so ordered shall not exceed twenty-five thousand dollars ($25,000), plus 5 percent of the amount of the original AGREEMENT cost in excess of two hundred fifty thousand dollars ($250,000). In no event shall any such change or alteration exceed one hundred thousand dollars ($100,000).

6. Wage Rates and Payroll Records:

Pursuant to the provisions of Section 1773 of the Labor Code of the State of California, the BOARD has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in this locality for each craft, classification or type of workman needed to execute the AGREEMENT from the Director of the Department of Industrial Relations. CONTRACTOR shall post a copy of such wage rates at the job site, and shall pay the adopted prevailing wage rates. The provisions of Labor Code Sections 1775 and 1813 will be complied with.

Travel and subsistence payments to each workman needed to execute the work shall be made as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed in accordance with Section 1773.8 of the Labor Code.

The CONTRACTOR shall comply with the provisions of Section 1774 of the Labor Code. Failure to comply with the subject section will subject the CONTRACTOR to penalty and forfeiture provisions of Section 1775 of the Labor Code.

The DISTRICT will not recognize any claim for additional compensation because of the payment by the CONTRACTOR of any wage rate in excess of the prevailing wage rate set forth in the AGREEMENT. The possibility of wage increases is one of the elements to be considered by the CONTRACTOR in determining his bid, and will not under any circumstances be considered as the basis of a claim against the DISTRICT on the AGREEMENT.

The CONTRACTOR and subcontractors shall comply with Section 1777.6 which stipulates that it shall be unlawful to refuse to accept otherwise qualified employees as registered apprentices solely on the grounds of race, religious creed, color, national origin, ancestry, sex, or age, except as provided in Section 3077.

For the duration of the PROJECT, certified payroll records as described in Section 1776 of the Labor Code and/or statements of non-performance for CONTRACTOR and those of subcontractors performing work on the PROJECT shall be delivered to DISTRICT on a weekly basis no later than ten (10) calendar days after the end of each weekly pay period.

7. Apprentices:

The CONTRACTOR shall familiarize himself with the provisions of Section 1777.5 of the Labor Code regarding employment of apprentices, and shall be responsible for compliance therewith, including compliance by his subcontractors.

CONTRACTOR agrees to comply with the provisions of Labor Code Section 1777.5 and any other applicable laws or regulations, including but not limited to, 8 California Code of Regulations, Section 230.1(A), pertaining to apprentices. Section 1777.5 shall not apply to contracts of general contractors or to contracts of specialty contractors not bidding for work through a general or prime contractor when the contracts of general contractors or those specialty contractors involve less than Thirty Thousand Dollars ($30,000).

Contractor and subcontractor shall comply with Section 1777.6 of the Labor Code which stipulates that an employer or a labor union shall not refuse to accept otherwise qualified employees as registered apprentices on any public works on any basis listed in subdivision (a) of Section 12940 of the Government Code, as those bases are defined in Sections 12926 and 12926.1 of the Government Code, except as provided in Section 3077 of the Labor Code and Section 12940 of the Government Code.

8. Antitrust Claims:

In accordance with Public Contract Code Section 7103.5, by entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the CONTRACTOR or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act, Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code, arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the CONTRACTOR, without further acknowledgment by the parties. CONTRACTOR shall cause the above requirement to be inserted in all agreements with subcontractors.

9. Auditor - Controller Inspection:

CONTRACTOR agrees to permit DISTRICT's Auditor-Controller, or his authorized representative (including auditors from a private auditing firm hired by DISTRICT) or DIRECTOR, access during normal working hours to all books, accounts, records, reports, files and other papers or property of CONTRACTOR for the purpose of auditing any aspect of performance under this AGREEMENT. CONTRACTOR agrees to maintain such records in Orange County, California, for possible audit for a minimum of three (3) years after final payment, unless a longer period of records retention is stipulated under this AGREEMENT or by law. CONTRACTOR agrees to allow interviews of any employees or others who might reasonably have information related to such records. Further, CONTRACTOR agrees to include a similar right to DISTRICT to audit

records and interview staff of any SUBCONTRACTOR related to performance of this AGREEMENT.

Should CONTRACTOR cease to exist as a legal entity, CONTRACTOR's records pertaining to this AGREEMENT shall be forwarded to the surviving entity in a merger or acquisition, or in the event of liquidation, to the DIRECTOR.

10. Federally Assisted Contract:

If this AGREEMENT is funded in whole or in part by the Federal Government, CONTRACTOR agrees to comply with the Federal labor standards provisions set forth in the Special Provisions. If the Federal prevailing wage determinations differ from the State's, CONTRACTOR shall not pay less than the higher of the two rates.

11. State Audit:

Pursuant to and in accordance with Section 8546.7 of the California Government Code, in the event that this AGREEMENT involves expenditures of Public funds aggregating in excess of Ten Thousand Dollars ($l0,000), the parties shall be subject to the examination and audit of the Auditor General of the State of California for a period of three (3) years after final payment under this AGREEMENT.

The CONTRACTOR shall maintain records for all costs connected with the performance of this AGREEMENT including, but not limited to, the costs of administering the contract, materials, labor, equipment, rentals, permits, insurance, bonds, etc., for audit or inspection by County, State, or any other appropriate governmental agency during the three (3) year period.

12. Successors and Assigns:

The terms and provisions of this AGREEMENT shall be binding upon and inure to the benefit of the parties hereto and their successors and assigns.

13. Entirety:

This AGREEMENT contains the entire agreement between the parties with respect to the matters provided for herein.

14. Severability:

If any part of this AGREEMENT is held, determined, or adjudicated to be illegal, void, or unenforceable by a court of competent jurisdiction, the remainder of this AGREEMENT shall be given effect to the fullest extent reasonably possible.

15. Governing Law and Venue:

This AGREEMENT has been negotiated and executed in the State of California and shall be governed by and construed under the laws of the State of California. In the event of any legal action to enforce or interpret this AGREEMENT, the sole and exclusive venue shall be a court of competent jurisdiction located in Orange County, California, and the parties hereto agree to and do hereby submit to the jurisdiction of such court, notwithstanding Code of Civil Procedure, Section 394.

The parties specifically agree that by soliciting and entering into and performing services under this AGREEMENT, the CONTRACTOR shall be deemed to constitute doing business within Orange County from the time of solicitation of work, through the period when all work under this AGREEMENT is completed, and continuing until the expiration of any applicable limitations period. Furthermore, the parties have specifically agreed, as part of the consideration given and received for entering into this AGREEMENT, to waive any and all rights to request that an action be transferred for trial to another County under Code of Civil Procedure, Section 394.

16. Child Support Enforcement Requirements:

In order to comply with child support enforcement requirements of the DISTRICT, within thirty (30) days of notification of selection for award of CONTRACT but prior to official award of CONTRACT, CONTRACTOR agrees to furnish to DIRECTOR the following:

1. In the case of an individual CONTRACTOR, his/her name, date of birth, Social Security number, and residence address;

2. In the case of a CONTRACTOR doing business in a form other than as an individual, the name, date of birth, Social Security Number, and residence address of each individual who owns an interest of ten (10) percent or more in the CONTRACTOR's contracting entity;

3. A certification that the CONTRACTOR has fully complied with all the applicable federal and state reporting requirements regarding its employees; and

4. A certification that the CONTRACTOR has fully complied with all lawfully served Wage and Earnings Assignment Orders and Notices of Assignment and will continue to so comply.

It is expressly understood that this data will be transmitted by DISTRICT to governmental agencies charged with the establishment and enforcement of child support orders.

Failure of the CONTRACTOR to timely submit the data and/or certifications required above or to comply with all federal and state reporting requirements for child support enforcement or to comply with all lawfully served Wage and Earnings Assignment Orders and Notices of Assignment may result in the CONTRACT being awarded to another CONTRACTOR, or, in the event a CONTRACT has been issued, shall constitute a material breach of the CONTRACT. Failure to cure such breach within sixty (60) calendar days of notice from DISTRICT shall constitute grounds for termination of the CONTRACT.

17. Charges, Fines, Penalties and Assessments

CONTRACTOR shall be responsible for any and all charges, fines, penalties, and/or assessments levied against the DISTRICT by any governmental entity, administrative or regulatory agency having jurisdiction, resulting from any action or omission of the CONTRACTOR, CONTRACTOR's subcontractor, suppliers, and/or employees, unless due to the sole and active negligence of the DISTRICT. DISTRICT is authorized to deduct any such charge, fine penalty, or assessment from any payment DISTRICT is otherwise required to make to CONTRACTOR.

If any such charge, fine, penalty, or assessment is levied against the DISTRICT subsequent to the completion of the PROJECT as a result of any action or omission as set forth above, CONTRACTOR shall nevertheless be responsible to the DISTRICT for the entire sum of such charge, fine, penalty, or assessment and agrees to pay the full amount due within sixty (60) calendar days of receiving an invoice from the DISTRICT.

CONTRACTOR shall be liable to the DISTRICT for attorney's fees and costs incurred by the DISTRICT in enforcing the provisions of this paragraph.

18. Amendments

No alteration or variation of the terms of this AGREEMENT shall be valid unless made in writing and signed by the parties; no oral understanding or agreement not incorporated herein shall be binding on either of the parties; and no exceptions, alternatives, substitutes or revisions are valid or binding on DISTRICT unless authorized by DISTRICT in writing.

19. Acceptance

Unless otherwise agreed to in writing by DISTRICT acceptance shall not be deemed complete unless in writing and until all the services have actually been received, inspected, and tested to the satisfaction of DISTRICT.

20. Non-Discrimination

In the performance of this AGREEMENT, CONTRACTOR agrees that it will comply with the requirements of Section 1735 of the California Labor Code and not engage nor permit any subcontractors to engage in discrimination in employment of persons because of the race, religious creed, color, national origin,

ancestry, physical disability, mental disability, medical condition, marital status, or sex of such persons. CONTRACTOR acknowledges that a violation of this provision shall subject CONTRACTOR to all the penalties imposed for a violation of Section 1720 et seq. of the California Labor Code.

21. Termination for Cause

A. If CONTRACTOR refuses or fails to prosecute the work with such diligence as will insure its completion within the time specified in AGREEMENT or any extension thereof, or fails to complete said work within such time, the Board of Supervisors may and in accordance with Paragraph 40 below (Breach of Contract) by written notice to CONTRACTOR, terminate his right to proceed with the work or such part of the work as to which there has been delay. In such event, DISTRICT may take over the work and prosecute the same to completion, by contract or otherwise, and may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefore. Whether or not the CONTRACTOR's right to proceed with the work is terminated, he and his sureties shall be liable for any damage to the DISTRICT resulting from his refusal or failure to complete the work within the specified time.

B. If fixed and agreed liquidated damages are provided in AGREEMENT and if COUNTY so terminates CONTRACTOR's right to proceed, the resulting damage will include, but not be limited to, such liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned by COUNTY in completing the work.

C. If fixed and agreed liquidated damages are provided in AGREEMENT and if COUNTY does not so terminate CONTRACTOR's right to proceed, the resulting damage will include, but not be limited to, such liquidated damages until the work is completed or accepted.

D. CONTRACTOR's right to proceed shall not be so terminated nor the CONTRACTOR charged with resulting damage if:

(1) The delay in the completion of the work arises from causes beyond the control and without the fault or negligence of CONTRACTOR, including, but not limited to, acts of God, acts of the public enemy, acts of DISTRICT, acts of another contractor in the performance of a contract with DISTRICT, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, other than normal weather, or delays of subcontractors or suppliers arising from causes beyond the control and without the fault or negligence of both CONTRACTOR and such subcontractors or suppliers; and

(2) CONTRACTOR within ten (10) days from the beginning of any such delays (unless DIRECTOR grants in writing a further period of time before the date of final payment under the AGREEMENT), notifies DIRECTOR in writing of the causes of delay.

DIRECTOR shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in his judgment, the delay is justified. DIRECTOR shall make written findings, and the findings of fact shall be final and conclusive on the parties, subject only to appeal as provided by law.

E. The rights and remedies of DISTRICT provided in this Section are in addition to any other rights and remedies provided by law or under this AGREEMENT.

22. Termination for Convenience

Notwithstanding any other provision of the AGREEMENT, the DISTRICT may, at any time, and without any cause, terminate this AGREEMENT in whole or in part, upon not less than seven (7) days' written notice to CONTRACTOR. Such termination shall be effected by delivery to CONTRACTOR of a notice of termination specifying the effective date of the termination and the extent of the Work to be terminated. CONTRACTOR shall immediately stop work in accordance with the notice and comply with any other direction as may be specified in the notice or as provided subsequently by the DISTRICT. DISTRICT shall pay CONTRACTOR for the Work completed prior to the effective date of the termination, and such payment shall be CONTRACTOR's sole remedy under this AGREEMENT. Under no circumstances will CONTRACTOR be entitled to anticipatory or unearned profits, consequential damages, or other damages of any sort as a result of a termination or partial termination under this Paragraph. The CONTRACTOR shall insert in all subcontracts that the sub-consultant shall stop work on the date of and to the extent specified in a notice of termination, and shall require sub-consultants to insert the same condition in any lower tier subcontracts.

23. Consent to Breach Not Waiver

No term or provision of this AGREEMENT shall be deemed waived and no breach excused, unless such waiver or consent shall be in writing and signed by the party claimed to have waived or consented. Any consent by any party to, or waiver of, a breach by the other, whether express or implied, shall not constitute consent to, waiver of, or excuse for any other different or subsequent breach.

24. Remedies Not Exclusive

The remedies for breach set forth in this AGREEMENT are cumulative as to one another and as to any other remedy provided by law, rather than exclusive; and the expression of certain remedies in this AGREEMENT does not preclude resort by either party from resorting to any other remedies provided by law.

25. Independent Contractor

CONTRACTOR shall be considered an independent CONTRACTOR and neither CONTRACTOR, its employees, nor anyone working under CONTRACTOR shall

be considered an agent or an employee of DISTRICT. Neither CONTRACTOR, its employees nor anyone working under CONTRACTOR shall qualify for workers' compensation or other fringe benefits of any kind through DISTRICT.

26. Indemnification

CONTRACTOR agrees to indemnify, defend with counsel approved in writing by DISTRICT, and hold DISTRICT and the County of Orange ("COUNTY"), their elected and appointed officials, officers, employees, agents and those special districts and agencies which County of Orange Board of Supervisors acts as the governing Board ("DISTRICT INDEMNITEES") harmless from any claims, demands or liability of any kind or nature, including but not limited to personal injury or property damage, arising from or related to the services, products or other performance provided by CONTRACTOR pursuant to this AGREEMENT. If judgment is entered against CONTRACTOR and DISTRICT/COUNTY by a court of competent jurisdiction because of the concurrent active negligence of DISTRICT or DISTRICT INDEMNITEES, CONTRACTOR and DISTRICT agree that liability will be apportioned as determined by the court. Neither party shall request a jury apportionment. Notwithstanding anything stated above, nothing contained herein shall relieve CONTRACTOR of any insurance requirements of obligations created elsewhere in this AGREEMENT.

27. Bills and Liens

CONTRACTOR shall pay promptly all indebtedness for labor, materials and equipment used in performance of the work. CONTRACTOR shall not permit any lien or charge to attach to the work or the premises, but if any does so attach, CONTRACTOR shall promptly procure its release and, in accordance with the requirements of the indemnification paragraph above, indemnify, defend, and hold DISTRICT harmless and be responsible for payment of all costs, damages, penalties and expenses related to or arising from or related thereto.

28. Changes

CONTRACTOR shall make no changes in the work or perform any additional work without the DISTRICT'S specific written approval.

29. Changes of Ownership

CONTRACTOR agrees that if there is a change or transfer in ownership of CONTRACTOR'S business prior to completion of this AGREEMENT, the new owners shall be required under terms of sale or other transfer to assume CONTRACTOR'S duties and obligations contained in this AGREEMENT and complete them to the satisfaction of DISTRICT.

30. Force Majeure

CONTRACTOR shall not be assessed with liquidated damages or unsatisfactory performance penalties during any delay beyond the time named for the

performance of this AGREEMENT caused by any act of God, war, civil disorder, employment strike or other cause beyond its reasonable control, provided CONTRACTOR gives written notice of the cause of the delay to DISTRICT within thirty-six (36) hours of the start of the delay and CONTRACTOR avails himself of any available remedies.

31. Confidentiality

CONTRACTOR agrees to maintain the confidentiality of all DISTRICT and DISTRICT -related records and information pursuant to all statutory laws relating to privacy and confidentiality that currently exist or exist at any time during the term of this AGREEMENT. All such records and information shall be considered confidential and kept confidential by CONTRACTOR and CONTRACTOR'S staff, agents and employees.

32. Compliance with Laws

CONTRACTOR represents and warrants that services to be provided under this AGREEMENT shall fully comply, at CONTRACTOR'S expense, with all standards, laws, statutes, restrictions, ordinances, requirements, and regulations (collectively "laws"), including, but not limited to those issued by DISTRICT in its governmental capacity and all other laws applicable to the services at the time services are provided to and accepted by DISTRICT. CONTRACTOR acknowledges that DISTRICT is relying on CONTRACTOR to ensure such compliance, and pursuant to the requirements of the indemnification paragraph above, CONTRACTOR agrees that in accordance with paragraph 26 above, it shall defend, indemnify and hold DISTRICT and DISTRICT INDEMNITEES harmless from all liability, damages, costs and expenses arising from or related to a violation of such laws.

33. Waiver of Jury Trial

Each party acknowledges that it is aware of and has had the opportunity to seek advice of counsel of its choice with respect to its rights to trial by jury, and each party, for itself and its successors, creditors, and assigns, does hereby expressly and knowingly waive and release all such rights to trial by jury in any action, proceeding or counterclaim brought by any party hereto against the other (and/or against its officers, directors, employees, agents, or subsidiary or affiliated entities) on or with regard to any matters whatsoever arising out of or in any way connected with this AGREEMENT and/or any other claim of injury or damage.

34. Terms and Conditions

CONTRACTOR acknowledges that it has read and agrees to all terms and conditions included in this AGREEMENT.

35. Headings

The various headings and numbers herein, the grouping of provisions of this AGREEMENT into separate clauses and paragraphs, and the organization hereof are for the purpose of convenience only and shall not limit or otherwise affect the meaning hereof.

36. Calendar Days

Any reference to the word "day" or "days" herein means calendar day or calendar days, respectively, unless otherwise expressly provided.

37. Attorney Fees

In any action or proceeding to enforce or interpret any provision of this AGREEMENT, or where any provision hereof is validly asserted as a defense, each party shall bear its own attorney's fees, costs and expenses.

38. Interpretation

This AGREEMENT has been negotiated at arm's length and between persons sophisticated and knowledgeable in the matters dealt with in this AGREEMENT. In addition, each party has been represented by experienced and knowledgeable independent legal counsel of their own choosing or has knowingly declined to seek such counsel despite being encouraged and given the opportunity to do so. Each party further acknowledges that they have not been influenced to any extent whatsoever in executing this AGREEMENT by any other party hereto or by any person representing them, or both. Accordingly, any rule or law (including California Civil Code Section 1654) or legal decision that would require interpretation of any ambiguities in this AGREEMENT against the party that has drafted it is not applicable and is waived. The provisions of this AGREEMENT shall be interpreted in a reasonable manner to affect the purpose of the parties and this AGREEMENT.

39. Notices

Any and all notices, requests demands and other communications contemplated, called for, permitted, or required to be given hereunder shall be in writing, except through the course of the parties' project managers' routine exchange of information and cooperation during the terms of the work and services. Any written communications shall be deemed to have been duly given upon actual in-person delivery, if delivery is by direct hand, or upon delivery on the actual day of receipt or no greater than four calendar days after being mailed by US certified or registered mail, return receipt requested, postage prepaid, whichever occurs first. The date of mailing shall count as the first day. All communications shall be addressed to the appropriate party at the address stated herein or such other address as the parties hereto may designate by written notice from time to time in the manner aforesaid.

For CONTRACTOR: Name:
Address:
City:
Attn:
Phone:
Email:
Fax:

For DISTRICT: Name:
Address:
City: Santa Ana, CA 92702
Attn:
Phone:
E-mail:
Fax:

40. Breach of Contract

The failure of the CONTRACTOR to comply with any of the provisions, covenants or conditions of this AGREEMENT shall be a material breach of this AGREEMENT. In such event the DISTRICT may, and in addition to any other remedies available at law, in equity, or otherwise specified in this AGREEMENT:

1. Afford the CONTRACTOR written notice of the breach and ten (10) calendar days or such shorter time that may be specified in this AGREEMENT within which to cure the breach;
2. Discontinue payment to the CONTRACTOR for and during the period in which the CONTRACTOR is in breach; and
3. Offset against any monies billed by the CONTRACTOR but yet unpaid by the DISTRICT those monies disallowed pursuant to the above.

41. Default

In the event any equipment or service furnished by the CONTRACTOR in the performance of this AGREEMENT should fail to conform to the specifications therein within one (1) calendar year from the DISTRICT's acceptance of the equipment or service, or any performance period specifically specified within the specifications or AGREEMENT, whichever is greater, the DISTRICT may reject same, and it shall become the duty of the CONTRACTOR to reclaim and remove the items without expense to the DISTRICT and to immediately replace all such rejected equipment or service with others conforming to such specifications, provided that should the CONTRACTOR fail, neglect or refuse to do so within one hundred and twenty (120) calendar days, the DISTRICT shall have the right to purchase on the open market a corresponding quantity of any such equipment or service and to deduct from any monies due or that may thereafter become due to the CONTRACTOR the difference between the price specified in this AGREEMENT and the actual cost to the DISTRICT.

In the event the CONTRACTOR shall fail to make prompt delivery as specified of any equipment or service, the same conditions as to the rights of the DISTRICT to purchase on the open market and to reimbursement set forth above shall apply, except as otherwise provided in this AGREEMENT.

In the event of the cancellation of this AGREEMENT, either in whole or in part, by reason of the default or breach by the CONTRACTOR, any loss or damage sustained by the DISTRICT in procuring any equipment or service which the CONTRACTOR agreed to supply under this AGREEMENT shall be borne and paid for by the CONTRACTOR.

Default shall include failure to carry out any of the requirements of this AGREEMENT, including, but not limited to not providing enough properly skilled workers or proper materials, persistently disregarding laws and or ordinances, not proceeding with the work as agreed to herein, or otherwise substantially violating any provision of this AGREEMENT. Upon termination of the AGREEMENT with CONTRACTOR, the DISTRICT may begin negotiations with a third-party CONTRACTOR to provide goods and/or services as specified in this AGREEMENT.

The right of either party to terminate this AGREEMENT hereunder shall not be affected in any way by its waiver of or failure to take action with respect to any previous default

42. Conflict of Interest Contractor Personnel

The CONTRACTOR shall exercise reasonable care and diligence to prevent any actions or conditions that could result in a conflict with the best interests of the DISTRICT. This obligation shall apply to the CONTRACTOR; the CONTRACTOR's employees, agents, and relatives; sub-tier contractors; and third parties associated with accomplishing work and services hereunder. The CONTRACTOR's efforts shall include, but not be limited to establishing precautions to prevent its employees or agents from making, receiving, providing or offering gifts, entertainment, payments, loans or other considerations which could be deemed to appear to influence individuals to act contrary to the best interests of the DISTRICT.

43. Non-Employment of DISTRICT Personnel

CONTRACTOR agrees that no employee of DISTRICT or DISTRICT INDEMNITEES who is involved in this PROJECT shall be given or offered employment by CONTRACTOR during the life of this AGREEMENT regardless of the assignments said employee may be given or the days or hours employee may work. By accepting this AGREEMENT, CONTRACTOR agrees, for the duration of this AGREEMENT, not to offer or discuss employment with any DISTRICT or DISTRICT INDEMNITEES employee involved in the performance of this AGREEMENT.

44. Ownership of Documents

The DISTRICT has permanent ownership of all directly connected and derivative materials produced under this AGREEMENT by the CONTRACTOR. All documents, reports and other incidental or derivative work or materials furnished hereunder shall become and remain the sole property of the DISTRICT and may be used by the DISTRICT as it may require without additional cost to the DISTRICT. None of the documents, reports and other incidental or derivative work or furnished materials shall be used by the CONTRACTOR without the express written consent of the DISTRICT.

45. Title to Data

All materials, documents, data or information obtained from the DISTRICT data files or any DISTRICT medium furnished to the CONTRACTOR in the performance of this AGREEMENT will at all times remain the property of the DISTRICT. Such data or information may not be used or copied for direct or indirect use by the CONTRACTOR after completion or termination of this AGREEMENT without the express written consent of the DISTRICT. All materials, documents, data or information, including copies furnished to CONTRACTOR by DISTRICT must be returned to the DISTRICT at the end of this AGREEMENT unless otherwise authorized in writing by the ENGINEER.

46. Availability of Funds

The obligation of DISTRICT is subject to the availability of funds appropriated for this purpose, and nothing herein shall be construed as obligating the DISTRICT to expend or as involving the DISTRICT in any contract or other obligation for future payment of money in excess of appropriations authorized by law.

47. Employee Eligibility Verification

The CONTRACTOR warrants that it fully complies with all Federal and State statutes and regulations regarding the employment of aliens and others and that all its employees performing work under this AGREEMENT meet the citizenship or alien status requirement set forth in Federal statues and regulations. The CONTRACTOR shall obtain, from all employees performing work hereunder, all verification and other documentation of employment eligibility status required by Federal or State statutes and regulations including, but not limited to, the Immigration Reform and Control Act of 1986, 8 U.S.C. §1324 et seq., as they currently exist and as they may be hereafter amended. The CONTRACTOR shall retain all such documentation for all covered employees for the period prescribed by the law. The CONTRACTOR shall indemnify, defend with counsel approved in writing by DISTRICT, and hold harmless, the DISTRICT, its agents, officers, and employees from employer sanctions and any other liability which may be assessed against the CONTRACTOR or the DISTRICT or both in connection with any alleged violation of any Federal or State statutes or regulations

pertaining to the eligibility for employment of any persons performing work under this AGREEMENT.

48. Contingency of Funding

CONTRACTOR acknowledges that funding or portions of funding for this AGREEMENT may also be contingent upon receipt of funds from, and/or appropriation of funds by, the State of California (or other funding agency) to DISTRICT. If such funding and/or appropriations are not forthcoming, or are otherwise limited, DISTRICT may immediately terminate or modify this AGREEMENT without penalty.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hand and seal the day and year first hereinabove written.

_____

CONTRACTOR

By*_____

TITLE

By*_____

TITLE

(If, a corporation, both Secretary and President or Vice President must sign.)
(Attach acknowledgments)

_____

FUNDING AGENCY
ORANGE COUNTY FLOOD CONTROL DISTRICT

By_____
Chair of its Board of Supervisors

Signed and certified that a copy of this document has been delivered to the Chair of the Board per Government Code Section 25103 and Board Resolution 79-1535

Attest:

_____
Darlene J. Bloom
Clerk of the Board of Supervisors
County of Orange, California

Approved as to form:
Office of the County Counsel,
Orange County, California

By_____
Deputy

* Note: Pursuant to the requirements of the California Corporations Code Section 313, one of the following two methods must be used by a corporation when it enters into a contract:

1) Two people must sign the document; One of them must be the Chairman of the Board, the President or any Vice-President. The other must be the Secretary, any Assistant Secretary, the Chief Financial Officer or any Assistant Treasurer.

2) One Corporate officer may sign the document, providing that written evidence of the officer's authority to bind the corporation with only his or her signature must be provided. This evidence would ideally by a corporate resolution.

Revised: 19May2010

SECTION A

PROPOSAL REQUIREMENTS AND CONDITIONS

DISTRICT, as referenced herein, shall be synonymous with the legal entity identified on Page P-1 of the Proposal.

1. **CONTRACT DOCUMENTS**: The contract documents shall consist of those set forth in the Construction Agreement, all of which are on file at the County of Orange, Central Files, Room 252, 300 North Flower Street, Santa Ana, California, and are hereby referred to and made a part hereof.

2. **PROPOSALS**: Bids to receive consideration shall be made in accordance with the following instructions:

   a. Bids shall be made upon the blank form provided for that purpose. Bids shall be properly executed by the CONTRACTOR. The signatures of signing shall be in longhand. The completed form shall be without interlineations or alterations.

   b. Bids shall be submitted only upon the items of bid stated in the Bid Package/Plans and Special Provisions; bids upon other bases will not be considered. Bids that do not reference all addenda and bulletins or that are not submitted on the prescribed forms or reasonable facsimile thereof may be rejected.

   c. Unless called for, alternate bids will not be considered.

   d. CONTRACTOR shall set forth in his bid:

(1) The name and location of the place of business of each subcontractor who will perform work or labor or render service to the CONTRACTOR in or about the work in any amount in excess of one-half of one percent of the CONTRACTOR's total bid.

(2) The portion of the work which will be done by each subcontractor.

e. In the event that alternate bids are called for and the CONTRACTOR intends to use different or additional subcontractors on the alternate or alternates, CONTRACTOR shall fill out additional forms of the list of subcontractors and shall identify such forms with relation to whether they apply to the base or alternate bids.

f. If the CONTRACTOR fails to specify a subcontractor for any portion of the work to be performed under the AGREEMENT in excess of one-half of one percent of the prime CONTRACTOR's total bid, or in the case of bids for the construction of streets and highways, including bridges, in excess of the above stated limits, he agrees to perform that portion himself. If the CONTRACTOR fails to specify a subcontractor for work performed under the AGREEMENT in excess of one-half of one percent of the prime CONTRACTOR's total bid, or $10,000, whichever is greater, for all other work not related to streets and highways, he agrees to perform that portion himself. The successful bidder shall not, without the consent of the DISTRICT, either:

(1) Substitute any person, firm or corporation as subcontractor in place of the subcontractor designated in the original bid, or

(2) Permit any subcontract to be assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the bid.

g. Bids shall be accompanied either by:

(1) Cash;
(2) A cashier's check made payable to the order of the DISTRICT;
(3) A certified check made payable to the order of the DISTRICT;
(4) Or an acceptable bidder's bond executed by an admitted surety insurer made payable to the order of the DISTRICT;

for an amount not less than ten percent (10%) of the bid.

For alternative bids, the accompanying bidders bond shall be based on the highest alternate bid. Said cash, check, or bond shall be given as a guarantee that the CONTRACTOR will enter into a contract if awarded the work; and in case of refusal or failure to enter into said contract, the cash, check, or bond, as the case may be, shall be forfeited.

h. Before submitting a bid, CONTRACTOR shall examine carefully the site of the work, the plans and Special Provisions, read the general conditions and the form of AGREEMENT, fully inform itself as to all existing conditions and limitations, and include in the bid a sum to cover the cost of all items included in the AGREEMENT.

i. Bids shall be delivered to the Office of the Clerk of the Board of Supervisors, Room 101, 10 Civic Center Plaza, Hall of Administration, of the County of Orange, 333 West Santa Ana Boulevard, Santa Ana, California, on or before the day and hour set for the opening of bids in the Notice to Contractors, enclosed in a sealed envelope and bearing the title of the work and the name of the CONTRACTOR.

3. **WITHDRAWAL OF BIDS**: Bids may be withdrawn by written request received from CONTRACTOR prior to the time set for opening of bids. The request shall be executed by the CONTRACTOR or his duly authorized representative. The withdrawal of a bid does not prejudice the right of the CONTRACTOR to file a new bid.

4. **INTERPRETATION OF DRAWINGS AND DOCUMENTS**: If any person contemplating submitting a bid for the proposed AGREEMENT is in doubt as to the true meaning of any part to the plans and Special Provisions, or other proposed AGREEMENT documents, or finds discrepancies in, or omissions from, the drawings or Special Provisions, the CONTRACTOR may submit to the ENGINEER a written request for all interpretations or corrections thereof. The person submitting the request will be responsible for its prompt delivery. All requests must be submitted in writing to the ENGINEER no less than seven (7) working days prior to the date set in the Notice to Contractors for the opening of bids.

Any interpretation or correction of the proposed documents will be made only by Addendum or Bulletin duly issued, and a copy of such Addendum or Bulletin will be mailed, e-mailed, faxed, or delivered to each person receiving a set of reduced size Plans and Special Provisions (also referred to as the Bid Package) in the Notice to Contractors. The

DISTRICT will not be responsible for any other explanations or interpretations of the proposed documents.

5. **ADDENDA OR BULLETINS**: Any addenda or bulletins issued during the time of bidding, or forming a part of the documents sold to the CONTRACTOR for the preparation of his bid, shall be referred to in the bid and shall be made a part of the AGREEMENT.

   Addenda will be issued by the Orange County Board of Supervisors, hereinafter referred to as "Board", and acting on behalf of the DISTRICT, to effect major changes in the work to be done and/or to effect changes in the quantities shown in the Notice to Contractors and Proposal if the work to be done or quantity change results in an adjustment to the estimated total contract cost of more than 5% or $5,000 whichever is greater. Bulletins will be issued by the DIRECTOR to effect minor changes in the work to be done and minor changes in contract quantities and to amend and clarify the plans and Special Provisions.

6. **OPENING OF BIDS**: Bids will be publicly opened and read at the time set in the Notice to Contractors, Room 169, Hall of Administration, 10 Civic Center Plaza, of the County of Orange, 333 West Santa Ana Boulevard, Santa Ana, California.

7. **AWARD OR REJECTION OF BIDS**: The award of AGREEMENT will be the date the Board of Supervisors accepts the lowest responsible and responsive bid. The award of the contract, if it be awarded, will be to the lowest responsible bidder complying with these Proposal Requirements and Conditions and with the Notice to Contractors. Such award, if made, will be made within sixty (60) calendar days after the opening of the proposals. The sixty (60) calendar-day period of time shall be subject to extension for such further period as may be agreed upon in writing between the DISTRICT and CONTRACTOR. In the case where alternative bids are requested, the DISTRICT reserves the right to select the apparent low bid of any alternative, regardless of the overall apparent low bid. All bids will be compiled on the basis of the estimated quantities of work to be done as shown in the Proposal.

   The DISTRICT, however, reserves the right to reject any and all bids, and to waive any informality in bids received.

8. **AGREEMENT AND BONDS**: The Construction Agreement, which the successful bidder, as CONTRACTOR, will be required to execute is included in the AGREEMENT documents and should be carefully examined by the CONTRACTOR.

   The successful bidder, simultaneously with his execution of the AGREEMENT, will be required to furnish a payment bond and a faithful performance bond. Said bonds shall be in the form of the sample bonds included in these AGREEMENT documents at the end of Section A and

shall be secured from a surety company who satisfies the State of California Code of Civil Procedure Section 995.660(a), Subsections (1) through (4).

All alterations, extensions of time, extra and additional work, and other changes authorized by these Special Provisions or any part of the AGREEMENT may be made without securing the consent of the surety or sureties on the AGREEMENT bonds.

The Construction Agreement shall be signed by the successful bidder and returned, together with the AGREEMENT bonds in the form set forth below in this section, and the insurance documents required in Section B herein, within twelve (12) days, not including Sundays and legal holidays, after the successful bidder has been awarded the contract. The twelve day limitation shall start from the date of Board's action awarding the contract.

In the event the successful bidder delays signing the AGREEMENT beyond the twelve (12) day limitation, there will be a deduction of one working day from the total working days allotted in the Construction Agreement for every working day of delay caused by the successful bidder in executing the AGREEMENT. The AGREEMENT, together with the required bonds, will be, after execution by the Board, filed with the Clerk of the Board of Supervisors. "Signing the Construction Agreement" shall be defined as submittal of acceptable bonds, insurance documents and the signed Construction Agreement.

Failure of the lowest successful bidder to execute the AGREEMENT and file acceptable bonds as provided herein within twelve (12) calendar days, not including Sundays and legal holidays, after the date of Board action awarding the contract to him, shall be just cause for the forfeiture of the Proposal Guaranty, and determination by the Board that the CONTRACTOR has abandoned the contract and thereupon, this proposal and the acceptance thereon shall be null and void. The successful bidder may file with the Board a written notice, signed by the CONTRACTOR or his authorized representative, specifying that the CONTRACTOR will refuse to execute the AGREEMENT if presented to him. The filing of such notice shall have the same force and effect as the failure of the CONTRACTOR to execute the AGREEMENT and furnish acceptable bonds within the time hereinbefore prescribed.

9. **SPECIAL NOTICE**: CONTRACTOR shall inform himself/herself fully of the conditions relating to construction and labor under which the work will be performed, and the CONTRACTOR must employ, so far as possible, such methods and means in the carrying out of this work as will not cause any interruption or interference with any other CONTRACTOR.

l0. **BIDDERS INTERESTED IN MORE THAN ONE BID**: No person, firm or corporation shall be allowed to make or file or be interested in more than one bid, as prime CONTRACTOR for the same work.

ll. **BIDS TO BE LEFT ON DEPOSIT**: No CONTRACTOR may withdraw his bid for a period of sixty (60) calendar days after the time set for opening thereof. The DISTRICT will return all proposal guarantees no later than sixty (60) days from the time the award is made.

12. **NON-COLLUSION AFFIDAVIT**: Pursuant to Section 7106 of the Public Contract Code, CONTRACTORS are required to submit along with their bid proposal a Non-Collusion Affidavit. The appropriate form is included in the Proposal Section of these Special Provisions.

    No bids will be considered without the properly completed affidavit included with the bid proposal.

13. **SUBSTITUTIONS**: Where the Special Provisions or drawings specify any material, product, thing, or service by one or more brand names, whether or not "or equal" is added, and a CONTRACTOR wished to propose the use of another item as being equal, he shall request approval therefor as set forth in Section 4-1.6, "Trade Names or Equals," of the Standard Special Provisions for Public Works Construction.

14. **ASSIGNMENT OF CONTRACT**: No assignment by the CONTRACTOR of any AGREEMENT to be entered into hereunder or of any part thereof, or of funds to be received thereunder by the CONTRACTOR, will be recognized by the awarding authority unless such assignment has had the prior written approval of the awarding authority and the surety has been given due notice of such assignment in writing and has consented thereto in writing.

15. Upon request, the successful bidder shall furnish a statement of his financial condition and previous construction experience or such other evidence of his qualifications as may be required by the Board.

16. **LICENSE REQUIREMENTS**: No bid shall be considered from a CONTRACTOR who, at the time the contract is awarded, is not licensed to contract for this project in accordance with the law under provisions of Division III, Chapter 9, Section 7000 et. seq. of the Business and Professions Code of the State of California. In all contracts where federal funds are involved, no bid submittal shall be invalidated by the failure of the CONTRACTOR to be licensed in accordance with the laws of this state. However, at the time the contract is awarded, the CONTRACTOR shall be properly licensed in accordance with the laws of this state. The first payment for work or material under any contract shall not be made unless and until the Registrar of Contractors verifies to the DISTRICT that the records of the Contractor's License Board indicate that CONTRACTOR was properly licensed at the time the contract was

awarded. Any CONTRACTOR or bidder not so licensed shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractor's State License Board. Failure of the CONTRACTOR to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security of the CONTRACTOR.
In accordance with Section 3300, Chapter 3, Article 3, of Part 1 of Division 2 of the Public Contract Code, the CONTRACTOR shall possess at least one of the following "checked" classifications of Contractor's License:

____ Class A -- General Engineering Contractor
____ Class B -- General Building Contractor
____ Class C-8 -- Concrete
____ Class C-10 -- Electrical (General)
____ Class C-12 -- Earthwork and Paving
____ Class C-13 -- Fencing
____ Class C-21 -- Building Moving and Demolition
____ Class C-27 -- Landscaping
____ Class C-29 -- Masonry
____ Class C-32 -- Parking and Highway Improvement
____ Class C-34 -- Pipeline
____ Class C-36 -- Plumbing
____ Class C-42 -- Sanitation System
____ Class C-45 -- Electrical (Sign)
____ Class C-50 -- Steel, Reinforcing
____ Class C-51 -- Steel, Structural
____ Other _____

In the event of a dispute as to the classification of license required, the opinion of the Contractor's State License Board shall prevail.

17. In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the CONTRACTOR or subcontractor offers and agrees to assign to the awarding body all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code, arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the CONTRACTOR without further acknowledgment by the parties.

18. The signatures of the CONTRACTOR shall be verified by a Certificate of Acknowledgment as set forth in Section 1189 of the California Civil Code.

SAMPLE PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the Orange County Flood Control District, hereinafter designated as the "DISTRICT",

has awarded to _____
(INSERT NAME)

as principal, hereinafter designated as the "CONTRACTOR," a contract for the work described as follows: _____

_____

_____
(INSERT DESCRIPTION OF PROJECT)

AND WHEREAS, said contract is hereby referred to and made a part hereof;

AND WHEREAS, the CONTRACTOR is required to furnish a bond in connection with said contract guaranteeing the faithful performance thereof;

AND WHEREAS, _____ as "Surety(ies) agree(s) to be held firmly bound unto CONTRACTOR in the sum of _____ ($_____) which is _____ (_____%) of the total AGREEMENT amount for the above stated AGREEMENT, for the payment of which sums CONTRACTOR and Surety(ies) agree to be bound, jointly and severally, and firmly by these presents;

NOW, THEREFORE, we the undersigned CONTRACTOR and Surety, are held and firmly bound unto the DISTRICT, in the sum of ($_____), to be paid to the DISTRICT, its successors and assigns; for which payment, well and truly to be made, we bind ourselves, our heirs, executors and administrators successors or assigns, jointly and severally, firmly by these presents.

THE CONDITION of this obligation is such, that if the above bounden CONTRACTOR, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the foregoing contract and any alteration thereof made as therein provided, on his or their part to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify, defend with counsel approved in writing by DISTRICT, and save harmless the DISTRICT, its officers and agents, as therein stipulated, then this obligation shall become and be null and void; otherwise it shall be and remain in full force and virtue.

The Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Construction Agreement or the work to be performed thereunder, or the Special Provisions accompanying the same shall otherwise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Construction Agreement or to the work or to the Special Provisions.

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

_____
CONTRACTOR

By**_____
TITLE

By**_____
TITLE

Name of Surety: _____(Seal)

Signatory Attorney-in-Fact: _____*

Approved as to form:

Office of the County Counsel
Orange County, California

BY: _____
Deputy

Dated: _____

Approved as to Surety and Limits:

Office of CEO, Risk Management
Orange County, California

BY: _____

Dated:_____

* Signature of surety representative must be notarized. Attach certificate of notarization to this document.

** Pursuant to the requirements of the California Corporations Code Section 313, one of the following two methods must be used by a corporation when it enters into a contract:

3) Two people must sign the document; One of them must be the Chairman of the Board, the President or any Vice-President. The other must be the Secretary, any Assistant Secretary, the Chief Financial Officer or any Assistant Treasurer.

2) One Corporate officer may sign the document, providing that written evidence of the officer's authority to bind the corporation with only his or her signature must be provided. This evidence would ideally by a corporate resolution.

SAMPLE PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, the Orange County Flood Control District**,** hereinafter designated as the "DISTRICT,"

has awarded to _____
(INSERT NAME)

as "CONTRACTOR", a contract for the work described as follows: _____

_____
(INSERT DESCRIPTION OF PROJECT)

hereinafter described as "Contract";

AND WHEREAS, said Contract is hereby referred to and made a part hereof;

AND WHEREAS, said CONTRACTOR is required to furnish a bond in connection with the Contract, to secure the payment of claims of laborers, mechanics, materialmen, and other persons, as provided by law:

AND WHEREAS, _____ as "Surety(ies) agree(s) to be held firmly bound unto CONTRACTOR in the sum of _____ ($_____) which is _____ (_____%) of the total AGREEMENT amount for the above stated AGREEMENT, for the payment of which sums CONTRACTOR and Surety(ies) agree to be bound, jointly and severally, and firmly by these presents;

NOW THEREFORE, we the undersigned CONTRACTOR and surety(ies) are held firmly bound unto the DISTRICT in the sum of ($_____), for which payment well and truly to be made we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly, severally, and firmly by these presents.

SAMPLE PAYMENT BOND (Continued)

THE CONDITION OF THIS OBLIGATION IS SUCH,

That if the CONTRACTOR, his or its heirs, executors, administrators, successors or assigns, or subcontractors, shall fail to pay any of the persons named in Civil Code Section 3181 for any materials, provisions, provender or other supplies, or teams, implements or machinery, used in, upon, for or about the performance of the work under the contract to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the CONTRACTOR and his subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the surety(ies) herein will pay for the same, in an amount not exceeding the sum specified in this bond. In case suit is brought upon the bond, the surety(ies) will pay a reasonable attorneys' fee to be fixed by the court.

This bond shall inure to the benefit of any of the persons named in Civil Code Section 3181 as to give a right of action to such persons or their assigns in any suit brought upon this bond.

The Surety(ies) hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Construction Agreement or the work to be performed thereunder, or the Special Provisions accompanying the same shall otherwise affect its obligations on this bond, and it does hereby waive notice of any such change, extension

of time, alteration or addition to the terms of the Construction Agreement or to the work or to the Special Provisions.

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

_____
CONTRACTOR

By**_____
TITLE

By**_____
TITLE

Name of Surety: _____(Seal)

Signatory Attorney-in-Fact: _____*

Approved as to form:

Office of the County Counsel
Orange County, California

BY: _____
Deputy

Dated: _____

Approved as to Surety and Limits:

Office of CEO, Risk Management
Orange County, California

BY: _____

Dated:_____

* Signature of surety representative must be notarized. Attach certificate of notarization to this document.

** Pursuant to the requirements of the California Corporations Code Section 313, one of the following two methods must be used by a corporation when it enters into a contract:

4) Two people must sign the document; One of them must be the Chairman of the Board, the President or any Vice-President. The other must be the Secretary, any Assistant Secretary, the Chief Financial Officer or any Assistant Treasurer.

2) One Corporate officer may sign the document, providing that written evidence of the officer's authority to bind the corporation with only his or her signature must be provided. This evidence would ideally by a corporate resolution.

SAMPLE CERTIFICATE OF ACKNOWLEDGMENT

State of California)
) ss.
County of _____)

On _____ before me,
(Date)

_____
(Insert Name and Title of the Officer)

personally appeared _____
(Insert name of Notary)

_____

_____,

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

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

WITNESS my hand and official seal.

Signature _____ (Seal)

Revised: 20May2010

SECTION B
SUPPLEMENT TO THE STANDARD
SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

PAGE 2 - DELETE THE DEFINITION OF ENGINEER IN SECTION 1-2, AND ADD THE FOLLOWING:

> **ENGINEER:** The Chief Engineer, OC Public Works Department, acting either directly or through authorized agents (such as Resident Engineer or Resident Inspector), such agent acting within the scope of the particular duties delegated to them.

PAGE 2 - DELETE DEFINITION OF NOTICE TO PROCEED IN SECTION 1-2, AND ADD THE FOLLOWING:

> **NOTICE TO PROCEED:** A written notice given by DISTRICT to CONTRACTOR establishing a period of time within which the AGREEMENT time will start.

PAGE 8 - ADD THE FOLLOWING TO SECTION 2-3.1, "GENERAL":

> The ENGINEER, as duly authorized officer, may consent to subcontractor substitution requested by the CONTRACTOR subject to the limitations and notices prescribed in Section 4107 of the Public Contract Code.

PAGE 13 - ADD THE FOLLOWING TO SECTION 3-2.1, "GENERAL":

> If the CONTRACTOR is delayed in completing the work by reason of any change made pursuant to this section, the time for completion of the work shall be extended by change order for a period commensurate with such delay. The CONTRACTOR shall not be subject to any claim for liquidated damages for this period of time, but the CONTRACTOR shall have no claim for any other compensation for any such delay.

PAGE 14 - DELETE THE SECOND PARAGRAPH AND DELETE THE LAST PARAGRAPH IN SECTION 3-2.2.1,"CONTRACT UNIT PRICE", AND INSERT THE FOLLOWING AFTER THE FIRST PARAGRAPH:

> If the total pay quantity of any item of work required under the AGREEMENT varies from the bid quantity therefor by more than 25 percent, in the absence of an executed contract change order specifying the compensation to be paid, the compensation payable to the CONTRACTOR will be determined in accordance with (1), (2), or (3) below.

(1) **Increases of More Than 25 Percent:** Should the total pay quantity of any item of work required under the AGREEMENT exceed the bid quantity therefor by more than 25 percent, the work in excess of 125 percent of the bid quantity and not covered by an executed AGREEMENT change order specifying the compensation to be paid therefor will be paid for by adjusting the AGREEMENT unit price, as hereinafter provided; or at the option of the ENGINEER, payment for the work involved in such excess will be made on the same basis as extra work as provided in Section 3-3, "Extra Work."

Such adjustment of the AGREEMENT unit price will be the difference between the AGREEMENT unit price and the actual unit cost, which will be determined as hereinafter provided, of the total pay quantity of the item. Fixed costs will be deemed to have been recovered by the CONTRACTOR by the payments made for 125 percent of the AGREEMENT quantity for such item, and in computing the actual unit cost, such fixed costs will be excluded. Subject to the above provisions, such actual unit cost will be determined by the ENGINEER in the same manner as if the work were to be paid for on the same basis as extra work as provided in Section 3-3, "Extra Work," or such adjustment will be as agreed to by the CONTRACTOR and the ENGINEER.

When the compensation payable for the number of units of an item of work performed in excess of 125 percent of the bid quantity is less than $5,000 at the applicable AGREEMENT unit price, the ENGINEER reserves the right to make no adjustment in said price if he so elects, except that an adjustment will be made if requested in writing by the CONTRACTOR.

(2) **Decreases of More Than 25 Percent**: Should the total pay quantity of any item of work required under the AGREEMENT be less than 75 percent of the bid quantity therefor, an adjustment in compensation pursuant to this section will not be made unless the CONTRACTOR so requests in writing. If the CONTRACTOR so requests, the quantity of said item performed, unless covered by an executed AGREEMENT change order specifying the compensation payable therefor, will be paid for by adjusting the AGREEMENT unit price as hereinafter provided; or at the option of the ENGINEER, payment for the quantity of the work of such item performed will be made on the same basis as extra work as provided in Section 3-3, "Extra Work," provided, however, that in no case

shall the payment for such work be less than that which would be made at the AGREEMENT unit price.

Such adjustment of the AGREEMENT unit price will be the difference between the AGREEMENT unit price and the actual unit costs, which will be determined as hereinafter provided, of the total pay quantity of the item, including fixed costs. Such actual unit cost will be determined by the ENGINEER in the same manner as if the work were to be paid for on the same basis as extra work as provided in Section 3-3, "Extra Work"; or such adjustment will be as agreed to by the CONTRACTOR and the ENGINEER.

The payment for the total pay quantity of such item of work will in no case exceed the payment which would be made for the performance of 75 percent of the bid quantity for such item at the original AGREEMENT unit price.

(3) **Eliminated Items:** Should any AGREEMENT item of the work be eliminated in its entirety, in the absence of an executed AGREEMENT change order covering such elimination, payment will be made to the CONTRACTOR for actual costs incurred in connection with such eliminated AGREEMENT item if incurred prior to the date of notification in writing by the ENGINEER, of such elimination.

If acceptable material is ordered by the CONTRACTOR for the eliminated item prior to the date of notification of such elimination by the ENGINEER, and if orders for such material cannot be canceled, it will be paid for at the actual cost to the CONTRACTOR. In such case, the material paid for shall become the property of the DISTRICT, and the actual cost of any further handling will be paid for DISTRICT. If the material is returnable to the vendor and if the ENGINEER so directs, the material shall be returned and the CONTRACTOR will be paid for the actual cost of charges made by the vendor for returning the material. The actual cost of handling returned material will be paid for DISTRICT.

The actual costs for change orders to be paid by the DISTRICT to the CONTRACTOR as provided in this section (3) will be computed in the same manner as if the work were to be paid for as extra work as provided in Section 3-3, "Extra Work".

PAGE 15 - ADD THE FOLLOWING TO SECTION 3-3.2.2.(a), "LABOR":

The Labor Surcharge listed in State of California Department of Transportation publication entitled Labor Surcharge and Equipment Rental Rates which is in effect on the date upon which the work is accomplished shall be used as full compensation for that portion of the labor costs for employer payment of payroll taxes, workers compensation insurance liability insurance, and other direct costs resulting from Federal, State or local laws.

PAGE 15 - THE SECOND PARAGRAPH OF SECTION 3-3.2.2(c), "TOOL AND EQUIPMENT RENTAL," SHALL BE DELETED AND THE FOLLOWING SHALL BE SUBSTITUTED IN ITS PLACE:

The rates to be used determining equipment rental costs shall be those rates listed for such equipment in the State of California, Business, Transportation and Housing Agency, Department of Transportation publication entitled Labor Surcharge and Equipment Rental Rates, which is in effect on the date upon which the work is accomplished, regardless of ownership and any rental or other agreement, if such may exist, for the use of such equipment entered into by the CONTRACTOR. If it is deemed necessary by the ENGINEER to use equipment not listed in the said publication, a suitable rental rate for such equipment will be established by the ENGINEER. The CONTRACTOR may furnish any cost data which might assist the ENGINEER in the establishment of such rental rate.

Operators of rented equipment will be paid for as provided in Section 3-3, "Extra Work".

Rental time will not be allowed while equipment is inoperative due to breakdowns.

PAGE 16 – DELETE SECTION 3-3.2.3, “MARK UP,” AND SUBSTITUTE THE FOLLOWING:

(a) **Work by the CONTRACTOR**. The following percentages shall be added to the CONTRACTOR’s costs and shall constitute the mark up for all overhead and profits:

1) Labor …….33
2) Materials ……...15
3) Equipment Rentals ……15
4) Other Items and Expenditures ……..15

To the sum of the costs and mark ups provided for in this Section, one (1) percent shall be added as compensation for bonding.

(b) **Work by Subcontractor**. When all or any part of the Extra Work is performed by a subcontractor, the mark up established in Section 3-3.2.3 (a), as listed herein above, shall be applied to the subcontractor's actual cost of such work. A mark up of ten (10) percent on the first $5,000 of the subcontracted portion of the Extra Work and a mark up of five (5) percent on the work added in excess of $5,000 of the subcontracted portion of the Extra Work may be added by the CONTRACTOR.

PAGE 16 - ADD THE FOLLOWING TO SECTION 3-3.3, "DAILY REPORTS BY CONTRACTOR":

Daily cost reports shall be submitted within ten working days from the day the work is performed. The Daily Cost Report shall list all cost for the work and shall contain the same information listed in the Daily Reports with the addition of all final costs.

PAGE 17 - ADD THE FOLLOWING TO SECTION 3-5, "DISPUTED WORK":

SECTION 3-5.1, "RESOLUTION OF CONSTRUCTION CLAIMS"

(1) This article applies to all claims of three hundred seventy-five thousand dollars ($375,000) or less, which arise between CONTRACTOR and DISTRICT. This article does not apply to claims between CONTRACTOR and DISTRICT if DISTRICT elects to resolve dispute pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2 of the Public Contract Code, Division 2, relating to public construction.

(2) "Claim" means a separate demand by the CONTRACTOR for:
  (A) a time extension,
  (B) payment of money or damages arising from work done by or on behalf of the CONTRACTOR pursuant to the contract for a public work and payment of which is not expressly provided for or the claimant is not otherwise entitled to, or
  (C) an amount the payment of which is disputed by DISTRICT.

(3) The claim shall be in writing and include the documents necessary to substantiate the claim. For disputes arising under and by virtue of the contract, including an act or failure to act by the COUNTY, the CONTRACTOR shall provide a signed written initial notice claim to the COUNTY within five (5) business days from the date the dispute first arose. The initial notice of claim shall provide the nature and circumstances involved in the dispute. Nothing in this article is intended to

extend the time limit or supersede notice requirements otherwise provided by the AGREEMENT for the filing of claims.

The CONTRACTOR shall provide the COUNTY the opportunity to examine the site of work within five (5) days from the date of the initial notice of claim. The CONTRACTOR shall proceed with the performance of contract work unless otherwise specified or directed by the COUNTY.

Throughout the disputed work, the CONTRACTOR shall maintain records that provide a clear distinction between the incurred direct costs of disputed work and that of undisputed work. The CONTRACTOR shall allow the ENGINEER access to the CONTRACTOR's project records deemed necessary by the COUNTY to evaluate the potential claim within twenty (20) days of the date of the ENGINEER's written request.

Within fifteen (15) days of submitting the initial notice of claim, the CONTRACTOR shall provide a signed supplemental notice of claim to the ENGINEER that provides the following information:

(A) The complete nature and circumstances of the dispute which caused the claim.
(B) The contract provision that provide the basis of claim.
(C) The estimated cost of the claim, including an itemized breakdown of individual costs and how the estimate was determined.
(D) A time impact analysis of the project schedule that illustrates the effect on the scheduled completion date due to schedule changes or disruptions where a request for adjustment of contract time is made.

CONTRACTOR acknowledges that in resolving disputed claims, both parties shall act in good faith and in reliance upon the veracity of the information provided by the other to resolve the dispute, and that the COUNTY will expend considerable amounts of staff time and financial resources in the investigation of claims, the total amount of which may be difficult to quantify. Consequently, CONTRACTOR agrees that the information provided by CONTRACTOR to COUNTY in the initial notice of claim and in items A and B above shall constitute the CONTRACTOR's complete justification for additional compensation or adjustments for that claim and no

additional justification or information can be submitted by CONTRACTOR related to or arising from that claim at a later date.

(4) (A) For claims of less than fifty thousand dollars ($50,000), DISTRICT shall respond in writing to any written claim within 45 calendar days of receipt of the claim, or may request, in writing, within 30 calendar days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims DISTRICT may have against the claimant.

(B) If additional information is thereafter required, it shall be requested and provided pursuant to this article, upon mutual agreement of DISTRICT and the claimant.

(C) DISTRICT's written response to the claim, as further documented, shall be submitted to the claimant within 15 calendar days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

(5) (A) For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred and seventy-five thousand dollars ($375,000), DISTRICT shall respond in writing to all written claims within 60 calendar days of receipt of the claim, or may request, in writing, within 30 calendar days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims DISTRICT may have against the claimant.

(B) If additional information is thereafter required, it shall be requested and provided pursuant to this article, upon mutual agreement of DISTRICT and the claimant.

(C) DISTRICT's written response to the claim, as further documented, shall be submitted to the claimant within 30 calendar days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

(6) If the claimant disputes DISTRICT's written response, or DISTRICT fails to respond within the time prescribed, the claimant may so notify DISTRICT in writing either within 15 calendar days of receipt of DISTRICT's response or within 15 calendar days of DISTRICT's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, DISTRICT shall schedule a meet and confer conference within 30 calendar days for settlement of the dispute.

(7) If following the meet and confer conference, the claim, or any portion remains in dispute, the claimant may file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to paragraph (3) hereinabove until the time the claim is denied, including any period of time utilized by the meet and confer conference.

(8) As set forth in Section 20104.4 of Chapter 1 of Part 3 of Division 2 of the Public Contract Code, the following procedures are established for all civil actions filed to resolve claims subject to this article:

(A) Within 60 calendar days, but no earlier than 30 calendar days, following the filing of responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 calendar days by both parties of a disinterested third person as mediator, shall be commenced within 30 calendar days of the submittal, and shall be concluded within 15 calendar days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court, or by stipulation of both parties. If the parties fail to select a mediator within the 15 calendar day period, any party may petition the court to appoint the mediator.

(B1) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter

2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986 (Article 3, commencing with section 2016, of Chapter 3 of Title 3 of Part 4 of the Code Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

(B2) Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for the purposes of this article shall be experienced in Construction Law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees be paid by state or DISTRICT funds.

(B3) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party appealing an arbitration award who does not obtain a more favorable judgment at the trial de-novo shall, in addition to payment of costs and fees under that chapter, also pay the attorney's fees of the other party arising out of the trial de-novo.

(9) (A) DISTRICT shall not fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in the AGREEMENT.

(B) In any suit filed under Section 20104.4, DISTRICT shall pay interest at the legal rate on any arbitration award of judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

SECTION 3-6 - COST REDUCTION INCENTIVE

In accordance with the provisions of the California Public Contract Code, Section 7101, "Extra Compensation," the DISTRICT may provide for the payment of extra compensation to the CONTRACTOR for cost reduction changes in the plans and Special Provisions for the project made pursuant to

a proposal submitted by the CONTRACTOR. The cost reduction proposal shall not impair, in any manner, the essential functions or characteristics of the Project, including but not limited to: service life, economy of operations, ease of maintenance, desired appearance, or design and safety standards. Under no circumstances shall the proposal compromise the health, safety, or welfare of the public.

The provisions of this Section 3-6 shall not be construed to require the ENGINEER to consider any cost reduction proposal which may be submitted hereunder.

The DISTRICT shall not be liable to the CONTRACTOR for failure to accept or act upon any cost reduction proposal submitted pursuant to this Section nor any delays to the work attributable to any such proposal.

Cost reduction proposals shall contain the following information:

(1) A description of the proposed construction changes required by the cost reduction proposal including an itemization of the AGREEMENT requirements that must be changed if the proposal is adopted.

(2) A specification for each new item of work not adequately addressed by existing specifications.

(3) Modifications to existing specifications necessary to implement the proposal.

(4) A detailed comparison of the cost for performing the work under the existing AGREEMENT and under the proposed change, to include but not be limited to the following:

    (a) Costs for each impacted or new item of work including a schedule of values for proposed lump sum items to be paid in increments of progress; the estimates of cost shall be determined as provided in Section 3-3.2.2, “Basis for Establishing Costs” and 3-3.2.3, “Markup” of the Standard Specifications for Public Works Construction.

    (b) Increased cost for inspection beyond that which would have been required had the work progressed in accordance with the existing AGREEMENT.

    (c) Increased cost for materials testing beyond that which would have been required had the work progressed in accordance with the existing AGREEMENT.

(d) Cost of additional survey work required.

(e) An estimate of the effects the proposed change will have on future costs to the DISTRICT such as: diminished real property value due to increased encumbrance, costs related to altered lifespan of improvements, and changed cost of maintenance and/or operation.

(f) Cost for any change in insurance or bond premium.

(g) A list of permits to be required or modified and the related change in cost.

(5) Acknowledgement that the cost reduction proposal will expire 30 calendar days from the date of submittal if not approved and that the work will be completed in accordance with the existing AGREEMENT

(6) A proposed schedule showing the impact on the existing schedule; if the existing schedule is a CPM, the proposed schedule must be a CPM; the project completion date may not be extended.

(7) A list of all the trades and subcontractors that will be impacted

(8) A list of all new subcontractors, materialmen, and suppliers needed

Selection of the CONTRACTOR's engineer who prepares the plans and specifications for the cost reduction proposal, hereinafter referred to as A/E, shall be subject to the approval of DISTRICT. It is a requirement of this AGREEMENT that the A/E be a licensed Civil Engineer in the State of California.

All work submitted by the A/E shall be complete and shall be carefully checked prior to submission. If the DISTRICT discovers any errors or omissions prior to approving the A/E's work, the work will be returned for correction. Should the DISTRICT or others discover errors or omissions in the work submitted by the A/E after the DISTRICT's approval thereof, the DISTRICT's approval shall not be used as a defense by the CONTRACTOR or A/E.

If the A/E subcontracts portions of the cost reduction design services on this project to others, the A/E shall obtain evidence that subcontractors have purchased Professional Liability Insurance to the same limits as described in

the paragraphs below and containing the same clauses as the insurance required herein. Evidence of subcontractor's insurance shall be submitted to the DISTRICT upon request.

The A/E shall maintain insurance coverage appropriate to protect against all risks arising from or in any way connected with A/E's work on this project, acceptable to DISTRICT, effective from the time the A/E commences work until a Notice of Completion is approved for construction of the project. The policy(ies) shall be underwritten by insurers admitted to operate in the State of California (California admitted carriers) , acceptable to the DISTRICT on forms no less broad in the scope of coverage than standard forms.

The CONTRACTOR shall deliver to the DISTRICT with the cost reduction proposal certificates of insurance (certificates shall be in a form obtainable from the DISTRICT) and endorsements in duplicate to satisfy the DISTRICT that insurance requirements have been complied with and to keep such insurance in effect and the certificates therefore on deposit with the District during the entire term of the AGREEMENT.

The A/E shall furnish additional certified copies of insurance policy(ies) if requested by DISTRICT.

The DISTRICT shall retain the right to review the coverage, form, and amount of the insurance provided by the A/E. If, in the opinion of the DISTRICT, the certificates and endorsements provided by the A/E do not provide the coverage, form, and amount of insurance required and listed herein, the DISTRICT shall notify the CONTRACTOR within five (5) calendar days of receipt thereof. The cost reduction proposal shall not be approved without receipt of acceptable insurance.

The procuring of such required policy(ies) shall not be construed to limit the A/E's liability.

Entire limits of liability maintained must be certified but in no event shall limits be less than specified herein. Any aggregate limitation of liability shall be separate as to the risks arising out of the subject matter of this AGREEMENT.

Coverage	Minimum Limits
A. Commercial General Liability for bodily injury and property damage, including fire perils, including Completed Operation Liability, Contractual Liability and Broad Form Property Damage Endorsement and Underground Explosion and Collapse Hazard Endorsement (where applicable)	$1,000,000 combined single limit per occurrence. $2,000,000 aggregate
B. Automobile Liability (including all owned, non-owned and hired vehicles)	$1,000,000 combined single limit per occurrence.
C. Workers' Compensation	Statutory
D. Employers' Liability	$1,000,000 combined single limit per occurrence.
E. Professional Liability (Errors and Omissions)	$1,000,000 claims made

A Special Endorsement form is included at the end of Section B. This Special Endorsement contains additional mandatory insurance requirements. Printed or electronic copies of this form are available from the OC Public Works Department, Construction Division and may be requested by calling (714)567-7800.

The A/E's insurer shall have an "A-" or higher rating in the Best Insurance Guide or a Financial Performance Rating (FPR) of 7 or higher. In addition, the insurer shall have a financial size rating of VIII or higher. The form of insurance policy must meet the ISO standard and may not include any endorsements beyond those described in this "Insurance" specification unless approved in writing by DISTRICT.

The CONTRACTOR's engineer shall stamp and sign all calculations, reports, and plans submitted for review. Plans shall be submitted on mylar and on CD or DVD disks as CADD files using software acceptable to the DISTRICT. The drawings shall conform to the standards used by the OC Public Works Department. Revisions to the Special Provisions shall be submitted on 8½" x 11" bond paper and on CD or DVD disks using Microsoft Word.

Cost reduction proposals requiring the acquisition of additional easements of any type or fee right of way will not be considered.

Proposed changes in the basic design of a bridge or of a pavement type will not be considered as an acceptable cost reduction proposal

If a cost reduction proposal is similar to a change in the plans or Special Provisions, under consideration by the ENGINEER for the Project, at the time said proposal is submitted, or if such a proposal is based upon or similar to the Standard Specifications, Standard Special Provisions, or STANDARD PLANS adopted by the DISTRICT after the advertisement for the AGREEMENT, the ENGINEER will not accept such proposal and the DISTRICT reserves the right to make such changes without compensation to the CONTRACTOR under the provisions of this Section.

The CONTRACTOR shall continue to perform the work in accordance with the requirements of the AGREEMENT until an executed change order, incorporating the cost reduction proposal has been issued. No additional time shall be added to the AGREEMENT for any delay attributed to the preparation, review, approval, or implementation of a cost reduction proposal.

If an executed change order has not been issued by the date upon which the CONTRACTOR's cost reduction proposal specifies that a decision thereon should be made, such cost reduction proposal shall be deemed rejected.

To be valid for consideration by the ENGINEER, a cost reduction proposal shall result in a minimum net savings of five percent (5%) of the total AGREEMENT price bid or ten thousand dollars ($10,000), whichever is greater.

The ENGINEER shall be the sole judge of the acceptability of the cost reduction proposal and of the estimated net savings in construction costs from the adoption of all or any part of such proposal. In determining the estimated net savings, the right is reserved to disregard the AGREEMENT bid prices if in the judgment of the ENGINEER, such prices do not represent a fair measure of the value of the work to be performed or to be deleted. The decision of the ENGINEER as to the acceptance or rejection of such proposal, and as to the estimated net savings in construction costs, shall not be subject to Section 3-5, "Disputed Work," of the Standard Specifications for Public Works Construction, or Section 3-5.1, "Resolution of Construction Claims," of Section B of these Special Provisions.

The DISTRICT has already expended substantial time and money to complete plans and Special Provisions for the project. Additional time to review a cost reduction proposal represents added cost. This additional labor cost shall be subtracted from the total calculated savings before determining the CONTRACTOR’s share.

If the proposal is not approved, the CONTRACTOR shall pay this entire additional DISTRICT review cost. The CONTRACTOR acknowledges this obligation by execution of the AGREEMENT. The DISTRICT will deduct this amount from the amount payable at the next regular progress payment following disapproval of the cost reduction proposal.

If the DISTRICT does not have the time or the expertise to review the proposal, the CONTRACTOR shall hire an independent engineering firm acceptable to the ENGINEER to conduct the necessary review. The DISTRICT shall notify the CONTRACTOR, if this is necessary, within five (5) calendar days of receipt of the cost reduction proposal.

If the CONTRACTOR's cost reduction proposal is accepted in whole or in part, such acceptance will be by a change order which shall specifically state that it is executed pursuant to this Section 3-6, "Cost Reduction Incentive." Such change order shall incorporate the changes in the plans and Special Provisions which are necessary to permit the cost reduction proposal or such part of it as has been accepted to be put into effect, and shall include any conditions upon which the DISTRICT's approval thereof is based if the approval of the ENGINEER is conditional. The change order shall also set forth the estimated net savings in construction costs attributable to the cost reduction proposal effectuated by the change order, and shall further provide that the CONTRACTOR be paid fifty percent (50%) of said estimated net savings amount in accordance with the provisions of the California Public Contract Code, Section 7101. The CONTRACTOR's cost of preparing the cost reduction incentive proposal shall be excluded from consideration in determining the estimated net savings in construction costs.

The amount specified to be paid to the CONTRACTOR on the change order which effectuates a cost reduction proposal shall constitute full compensation to the CONTRACTOR for the cost reduction proposal and the performance of the work thereof pursuant to the said change order.

The ENGINEER expressly reserves the right to adopt a cost reduction proposal for general use on contracts administered by the ENGINEER when it determines that said proposal is suitable for application to other contracts. When an accepted cost reduction proposal is adopted for general use, only the CONTRACTOR who first submitted such proposal will be eligible for compensation pursuant to this Section, and in that case, only as to those contracts awarded to him prior to submission of the accepted cost reduction proposal, and as to which, such cost reduction proposal is also submitted and accepted. Cost reduction proposals identical or similar to previously submitted proposals will be eligible for consideration and compensation under the provisions of this Section 3-6, "Cost Reduction Incentive," if the identical or similar previously submitted proposals were not adopted for general application to other contracts administered by the ENGINEER.

Subject to the provisions contained herein, the State or any other public entity shall have the right to use all or any submitted cost reduction proposal without obligation or compensation of any kind to CONTRACTOR.

PAGE 17 - ADD THE FOLLOWING SENTENCE TO FIRST PARAGRAPH OF SECTION 4-1.1, "GENERAL" AFTER THE SECTION TITLE:

The CONTRACTOR shall furnish all materials required to complete the work, except materials that are designated in the special provisions to be furnished by the DISTRICT.

PAGE 18 - IN LIEU OF REQUIREMENTS LISTED IN SECTION 4-1.3.1, "GENERAL", THE FOLLOWING PARAGRAPHS SHALL PREVAIL:

SECTION 4-1.3.1 "GENERAL"

Materials to be used in the work will be subject to inspection and tests by the ENGINEER or his designated representative. The CONTRACTOR shall furnish the ENGINEER a list of his sources of materials and the locations at which such materials will be available for inspection. The list shall be furnished to the ENGINEER in sufficient time to permit inspecting and testing of materials to be furnished from such listed sources in advance of their use. The ENGINEER may inspect, sample or test materials at the source of supply or other locations, but such inspection, sampling or testing will not be undertaken until the ENGINEER is assured by the CONTRACTOR of the cooperation and assistance of both the CONTRACTOR and the supplier of the material. The CONTRACTOR shall assure that the ENGINEER or his authorized representative has free access at all times to the material to be inspected, sampled or tested. It is understood that such inspections and tests, if made at any point other than the point of incorporation in the work, in no way shall be considered as a guarantee of acceptance of such material nor of continued acceptance of material presumed to be similar to that upon which inspections and tests have been made, and that inspection and testing performed by the DISTRICT shall not relieve the CONTRACTOR or his suppliers of responsibility for quality control.

Adequate facilities shall be furnished free of charge to make the necessary inspection. The ENGINEER assumes no obligation to inspect materials at the source of supply.

Manufacturer's warranties, guarantees, instruction sheets and parts lists, which are furnished with certain articles or materials incorporated in the work, shall be delivered to the ENGINEER before acceptance of the AGREEMENT.

Reports and records of inspections made and tests performed, when available at the site of the work, may be examined by the CONTRACTOR.

PAGE 19 - IN LIEU OF REQUIREMENTS LISTED IN SECTION 4-1.5, "CERTIFICATE OF COMPLIANCE CERTIFICATION", THE FOLLOWING PARAGRAPHS SHALL PREVAIL:

SECTION 4-1.5 "CERTIFICATES OF COMPLIANCE"

A Certificate of Compliance shall be furnished prior to the use of any materials for which these specifications or the Special Provisions require that such a Certificate by furnished. In addition, when so authorized in these specifications or in the special provisions, the ENGINEER may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. 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. 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.

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 Special Provisions, and any such material not conforming to such requirements will be subject to rejection whether in place or not.

The DISTRICT reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.
The form of the Certificate of Compliance and its disposition shall be as directed by the ENGINEER.

PAGE 22 - ADD TO SECTION 5-5, "DELAYS", THE FOLLOWING:

If through the failure of the DISTRICT to acquire or clear right-of-way, the CONTRACTOR sustains loss which could not have been avoided by the judicious handling of forces, equipment and plant, there shall be paid to the CONTRACTOR such amount as the ENGINEER may find to be a fair and reasonable compensation for such part of the CONTRACTOR's actual loss as, in the opinion of the ENGINEER, was unavoidable, determined as follows:

Compensation for idle time of equipment will be determined in the same manner as determinations are made for equipment

used in the performance of extra work paid for as provided in Section 3-3, "Extra Work," with the following exceptions:

(l) The right-of-way delay factor for each classification of equipment shown in the State of California, Department of Transportation publication entitled Labor Surcharge and Equipment Rental Rates, will be applied to such equipment rental rate.

(2) The time for which such compensation will be paid will be the actual normal working time, per Caltrans, during which such delay condition exists, but in no case will exceed eight hours in any day.

(3) The days for which compensation will be paid will be the calendar days, excluding Saturdays, Sundays and legal holidays, during the existence of such delay.

Actual loss shall be understood to include no items of expense other than idle time of equipment and necessary payments for idle time of men, cost of extra moving of equipment, and cost of longer hauls. Compensation for idle time of equipment will be determined as provided herein, and compensation for idle time of men will be determined as provided in Section 3-3, "Extra Work," and no markup will be added in either case for overhead and profit.

If the performance of the CONTRACTOR's work is delayed as a result of the failure of the DISTRICT to acquire or clear right-of-way, an extension of time determined pursuant to the provisions in Section 6-6, "Delays and Extensions of Time", will be granted.

PAGE 25 - DELETE THE SECOND PARAGRAPH OF SECTION 6-6.1, "GENERAL", AND SUBSTITUTE THE FOLLOWING:

No extension of time will be granted for a delay caused by a shortage of materials unless the CONTRACTOR furnished documentary proof to the ENGINEER that CONTRACTOR has diligently made every effort to obtain such materials from all known sources within reasonable reach of the work, and further proof in the form of a supplementary progress schedule that the inability to obtain such materials when originally planned, did in fact cause a delay in final completion of the entire work.

PAGE 25 - ADD THE FOLLOWING TO SECTION 6-6.3, "PAYMENT FOR DELAYS":

Should delays be initiated by DISTRICT, compensation shall be as set forth in Section 3-2, "Changes Initiated by the Agency," of the Standard Specifications for Public Works Construction, and as modified herein.

PAGE 26 - ADD TO SECTION 6-8, "COMPLETION ACCEPTANCE, AND WARRANTY" THE FOLLOWING:

In entering into a public works contract or a subcontract to supply goods, service, or materials pursuant to a public works contract, the CONTRACTOR or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code, arising from purchases of goods, services or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the CONTRACTOR, without further acknowledgment by the parties.

PAGE 26 - DELETE SECTION 6-9, "LIQUIDATED DAMAGES."

PAGE 27 - ADD TO SECTION 7-2.2 “LAWS”, THE FOLLOWING:

Through the duration of this AGREEMENT, certified copies of payroll records and/or statements of non-performance for CONTRACTOR and those of subcontractors performing work on the PROJECT shall be delivered to DISTRICT on a weekly basis no later than ten (10) calendar days after the end of each weekly pay period. Certified payroll records shall conform to the reporting format and words of certification as indicated in Title 8 of the California Code of Regulations, Section 16401. The following link may be used search for Title 8, “Industrial Relations,” Division 1, Chapter 8, Subchapter 3, Article 6, Section 16401:

http://government.westlaw.com/linkedslice/default.asp?SP=CCR-1000

The place and manner of delivery shall be as specified by the ENGINEER prior to commencement of work. In the event that the CONTRACTOR is engaged concurrently in more than one project with the DISTRICT, certified payroll records shall be submitted individually for each project and shall bear reference to the subject project and to the Construction Agreement Number for that project. In the event of noncompliance with these requirements, and upon receipt of written notice, the CONTRACTOR shall be subject to penalty pursuant to Labor Code Section 1776 and Section CA of these Special provisions. Said penalty shall be withheld from payments due to or to become due to the CONTRACTOR.

PAGE 28 - DELETE SECTION 7-3, "LIABILITY INSURANCE" AND SUBSTITUTE THE FOLLOWING:

SECTION 7-3 - INSURANCE

CONTRACTOR shall maintain insurance acceptable to DISTRICT in full force and effect throughout the term of this AGREEMENT. If the CONTRACTOR fails to maintain insurance acceptable to DISTRICT for the full term of this AGREEMENT, this AGREEMENT shall be deemed to be in default, and DISTRICT will be entitled to all legal remedies. In addition, all subcontractors performing work on behalf of the CONTRACTOR and for this AGREEMENT shall be covered under the CONTRACTOR's insurance or shall obtain insurance subject to the same terms and conditions as set forth herein for the CONTRACTOR.

The policy or policies of insurance maintained by CONTRACTOR shall be issued by an insurance company authorized by the Insurance Commissioner to transact business in the State of California (California Admitted Carrier) and shall provide the limits and coverages as set forth herein below. If the carrier is a non-admitted carrier in the State of California, the County Executive Office/Office of Risk Management retains the right to approve or reject the carrier after a review of the company's performance and financial ratings.

All insurance policies required by this contract shall be primary insurance, and any insurance maintained by the DISTRICT and/or the County of Orange shall be excess and non-contributing with insurance provided by these policies.

Any deductibles or self-insured retentions (SIR's) shall be stated on the Certificate of Insurance. Any liability deductible or SIR, excluding automobile liability, over $25,000 requires approval by the County Executive Office/Office of Risk Management, Automobile liability deductible or SIR over $5,000 requires the approval of County Executive Office/Office of Risk Management.

Coverage	Minimum Limits
A. Commercial General Liability for bodily injury and property damage, including fire perils, including Completed Operation Liability, Contractual Liability and Broad Form Property Damage Endorsement and Underground Explosion and Collapse Hazard Endorsement (where applicable)	$1,000,000 combined single limit per occurrence. $2,000,000 aggregate
B. Automobile Liability (including all owned, non-owned and hired vehicles)	$1,000,000 combined single limit per occurrence.
C. Workers' Compensation	Statutory
D. Employers' Liability	$1,000,000 combined single limit per occurrence.
E. Property Insurance-Course of Construction or Builder's Risk Policy covering Fire and Extended Coverage Perils.	CONTRACTOR shall purchase a policy to cover structures being built, or additions or alterations to existing buildings, under the terms of this AGREEMENT to at least 90% of their replacement cost. As a minimum, construction property insurance shall be provided for replacement cost and for fire and the extended coverage perils.

Insurance shall be in force the first day of the term of this AGREEMENT.

CONTRACTOR agrees to deposit with DISTRICT within the time frame set forth in Section A, Proposal Requirements and Conditions, Paragraph 8, Certificates of Insurance and endorsements necessary to satisfy DISTRICT that the insurance provisions of this AGREEMENT have been complied with, and to keep such insurance and the certificates therefor on deposit with DISTRICT during the entire term of this AGREEMENT.

A Special Endorsement and Certificate of Insurance form are included at the end of Section B. The Special Endorsement form contains additional

mandatory insurance requirements. The CONTRACTOR is advised to read these carefully and discuss with the proposed insurance carrier prior to submitting a bid for this PROJECT. The Certificate of Insurance form has been modified from the ACORD 25-S standard Certificate of Insurance to conform to the requirements of the County of Orange. Printed or electronic copies of these forms are available from the OC Public Works Department, Construction Division and may be requested by calling (714)567-7800.

The CONTRACTOR's insurer shall have an "A-" or higher rating in the Best Insurance Guide or a Financial Performance Rating (FPR) of 7 or higher. In addition, the insurer shall have a financial size rating of VIII or higher. The form of insurance policy must meet the ISO standard and may not include any endorsements beyond those described in this “Insurance” specification unless approved in writing by DISTRICT.

DISTRICT shall retain the right at any time to review the coverage, form, and amount of the insurance required hereby. If, in the opinion of DISTRICT's Risk Management Services, the insurance provisions in this AGREEMENT do not provide adequate protection for DISTRICT, DISTRICT may require CONTRACTOR to obtain insurance sufficient in coverage, form, and amount to provide adequate protection. DISTRICT's requirements shall be reasonable and shall be designed to assure protection from and against the kind and extent of risks which exist at the time a change in insurance is required. If such a change results in an increased cost to CONTRACTOR, DISTRICT shall compensate any reasonable increase.

DISTRICT shall notify CONTRACTOR in writing of changes in the insurance requirements. If CONTRACTOR does not deposit copies of acceptable certificates of insurance and endorsements with DISTRICT incorporating such changes within sixty days of receipt of such notice, this AGREEMENT shall be in default without further notice to CONTRACTOR, and DISTRICT shall be entitled to all legal remedies.

The procuring of such required policy or policies of insurance shall not be construed to limit CONTRACTOR's liability hereunder not to fulfill the indemnification provisions and requirements of this AGREEMENT.

CONTRACTOR agrees to indemnify, defend with counsel approved in writing by DISTRICT, and hold DISTRICT and County of Orange (hereinafter “COUNTY”), their elected and appointed officials, officers, employees, agents and those special districts and agencies which COUNTY’S Board of Supervisors acts as the governing Board (“COUNTY INDEMNITEES”) harmless from any claims, demands or liability of any kind or nature, including but not limited to personal injury or property damage, arising from or related to the services, products or other performance provided by CONTRACTOR pursuant to this AGREEMENT. If judgment is entered against CONTRACTOR and DISTRICT by a court of

competent jurisdiction because of the concurrent active negligence of DISTRICT or COUNTY INDEMNITEES, CONTRACTOR and COUNTY agree that liability will be apportioned as determined by the court. Neither party shall request a jury apportionment. Notwithstanding anything stated above, nothing contained herein shall relieve CONTRACTOR of any insurance requirements or obligations created elsewhere in this AGREEMENT.

The DISTRICT will not be liable for any accident, loss or damage to the Work prior to its completion and acceptance, except as provided for in Section 6-10, "Use of Improvement During Construction," of the STANDARD SPECIFICATIONS.

PAGE 34 – ADD TO SECTION 7-10.4, "SAFETY," THE FOLLOWING PARAGRAPH:

SECTION 7-10.4.5, "SITE CONDITIONS."

The following shall apply to any CONTRACT which involves digging trenches or other excavations that extend deeper than four feet below the surface:

(1) The CONTRACTOR shall promptly, and before the following conditions are disturbed, notify the ENGINEER, in writing, of any:

(a) Material that the CONTRACTOR believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

(b) Subsurface or latent physical conditions at the site differing from those indicated.

(c) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the CONTRACT.

(2) The DISTRICT shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the CONTRACTOR's cost of, or the time required for, performance

of any part of the work, shall issue a change order under the procedures described in the CONTRACT.

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

PAGE 39 - ADD THE FOLLOWING BETWEEN THE FIRST AND SECOND SENTENCES OF THE SECOND PARAGRAPH OF SECTION 9-3.2, "PARTIAL AND FINAL PAYMENT":

For contract work items designated as "Partial Payment" items (P) in the "Notice to Contractors" and "Proposal" sections of these Special Provisions, the ENGINEER will also make an approximate measurement of the acceptable materials furnished through the closure date, provided that such materials are furnished and delivered by the CONTRACTOR on the ground at the job site and not used, and as a basis for making monthly payments, estimate their value, based on some fraction of Contract Unit Prices determined by the ENGINEER, or as provided for in Section 9-2, "LUMP SUM WORK." Only material to be incorporated into the work will be considered.

PAGE 38 - ADD TO THE FIFTH PARAGRAPH OF SECTION 9-3.2, "PARTIAL AND FINAL PAYMENT", THE FOLLOWING:

At the request and expense of CONTRACTOR, DISTRICT will accept equivalent to the amount withheld pursuant to Section 9-3.2, "Partial and Final Payment." Such substituted security, meeting the requirements of Section 10263 and 22300, Public Contract Code, shall be deposited with a state or federally chartered bank as escrow agent and shall be covered by an escrow agreement.

PAGE 39 - ADD TO SECTION 9-3, "PAYMENT", THE FOLLOWING PARAGRAPH:

SECTION 9-3.5 "CLERICAL ERRORS"

For a period of three years after acceptance of the work by the DISTRICT, all estimates and payments made pursuant to Section 9-3, "Payment," including the final estimate and payment, shall be subject to correction and

adjustment for clerical errors in the calculations involved in the determination of quantities and payments. Except for such clerical errors, the final payment shall be binding. The CONTRACTOR and the DISTRICT agree to pay to the other any sum due under the provisions of this paragraph, provided, however, that if the sum due is less than $100.00, no such payment shall be made.

PAGE 54 - ADD TO THE END OF SECTION 201-1.1.5, "TEST FOR PORTLAND CEMENT CONCRETE", THE FOLLOWING:

Concrete represented by compressive strength tests which fail to meet the requirements of this section shall be removed from the work. However, at the discretion of the ENGINEER, the concrete represented by the failing compressive strength tests may be cored for strength testing. Coring shall commence within five (5) working days of notification by the ENGINEER. Drilled cores shall be obtained by the CONTRACTOR in the presence of the ENGINEER and tested at the CONTRACTOR's expense in accordance with ASTM C42 by a Laboratory acceptable to the ENGINEER. Drilled cores having a minimum 100 mm in nominal diameter will be obtained unless otherwise directed by the ENGINEER. A minimum of three (3) cores shall be taken in each area represented by the failing 28-day compressive strength tests. Unless otherwise directed by the ENGINEER, the cores shall be tested wet following a forty (40) hour submergence. If each core produces a compressive strength result 85% or greater of the specified 28-day compressive strength, the concrete represented may be accepted with no further action required.

PAGE 132, ADD TO SECTION 207-2.8, "CAUSES FOR REJECTION", THE FOLLOWING:

(18) The pipe has an internal surface which varies greater than 8mm (¼ inch) from a 2.4 meters (eight (8) feet) longitudinally placed steel straight edge.

PAGE 448 - TO SECTION 310-5.6.5, "TRAFFIC STRIPES AND MARKINGS," CHANGE THE SECOND SENTENCE OF NOTE 2 TO READ:

Normal segments for roadways are seven (7) feet, and gaps are seventeen (17) feet .

Delete the third sentence in its entirety.

PAGE 449 - UNDER STANDARD TRAFFIC STRIPE, "A. SINGLE TRAFFIC STRIPE," DELETE THE WORDING:

"1. Prevailing speed of 64 km/h (40 mph) or less."

PAGE 449 - UNDER STANDARD TRAFFIC STRIPE, DELETE "A.2 PREVAILING SPEED OF 72 KM/H (45 MPH) OR MORE" IN ITS ENTIRETY.

UNLESS OTHERWISE SPECIFIED, ERRATA AND SUPPLEMENTS TO THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION SHALL BE PART OF THESE SPECIAL PROVISIONS.

INSURANCE AND ENDORSEMENT FORMS

Special Endorsement for
The Orange County Flood Control District, California

Name of the Insured: Effective Date of Endorsement: _____

All of the following provisions apply to each and every insurance policy cited on the attached certificate.

1. Additional Insured Endorsement:
It is agreed that such insurance as is afforded by this policy shall also apply to the Orange County Flood Control District, County of Orange, their elected and appointed officials, officers, employees, agents and volunteers and they are to be covered as insureds as respects liability or claims actually or allegedly caused by, or arising out of, or resulting from the operations performed by or on behalf of the named insured.

2. Primary Insurance:
It is further agreed that such insurance as is afforded by this policy for the benefit of the Orange County Flood Control District , County of Orange shall be primary insurance, but only as respects the claims, loss or liability arising out of the operations of the named insured. Any insurance maintained by the additional insured shall be excess and non-contributory.

3. Waiver of Subrogation:
It is further agreed that subrogation is waived against the Orange County Flood Control District, County of Orange, their elected and appointed officials, officers, employees, agents and volunteers when acting within the scope of their employment or appointment.

4. Separation of Insureds:
It is further agreed that each insurance policy referred to in the attached certificate shall provide that coverage applies separately to each insured except with respect to the limits of liability.

The four provisions above also apply to the following additional insureds as if their name replaces the Orange County Flood Control District, County of Orange in each of the provisions: <_____>.

5. Loss Payee for Property Insurance:
It is further agreed that if property insurance is included on the attached certificate, the Orange County Flood Control District, County of Orange or <_____>, whichever is the owner of the property where a loss is sustained, shall be the loss payee on this policy.

6. Loss Payee/Obligee on Employee Dishonesty Coverage:
It is further agreed that if employee dishonesty coverage is included on the attached certificate, the Orange County Flood Control District, County of Orange or <_____>, whichever suffers the loss from a disappearance of funds, vandalism, etc. shall be the loss payee/obligee on this policy.

7. Cancellation Clause:
It is further agreed that each insurance policy required by this contract (or reflected in the attached certificate) shall be endorsed to state that coverage shall not be canceled by either party except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the County of Orange at the address upon the attached certificate.

8. Claim Reports:
It is further agreed that the insurer will report in writing, to the address noted on the attached certificate, any claims in excess of fifty thousand dollars ($50,000), made with respect to this policy, whether related to this project or not.

The inclusion of the Orange County Flood Control District and the County of Orange as additional insureds shall not affect any right that such organization would have as a claimant if not so included.

This endorsement is attached to and hereby made a part of the policy No(s): _____

_____
(Agent) ***BLUE INK**** Signature

Revised: 01Jul08

SECTION C
GENERAL MISCELLANEOUS

C-[1] CONSTRUCTION AREA

CONTRACTOR shall protect property and facilities adjacent to the construction area and all property and facilities within the construction area which are shown on the plans to be protected. After project completion, the construction area shall be in a clean and presentable condition. All public or privately owned improvements and facilities shall be restored to their original condition and location. If improvements or facilities are damaged, they shall be replaced with new materials which are at least equal to the original materials.

Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, way, or parking area during performance of the AGREEMENT work. CONTRACTOR shall conduct its operations so as not to interfere with the authorized work of utility companies or other agencies in such streets, ways or parking areas.

The CONTRACTOR shall be responsible for investigating conditions of available public and private roads and of clearances, restrictions and other limitations affecting transportation and ingress and egress to the site of the work.

Use of equipment will be minimized during any Stage II or Stage III smog alerts. All equipment will meet emissions standards. AGREEMENT specifications require dust control.

All proper public safety measures are to be used during construction, including barriers, flagmen and signing.

Equipment usage should be limited to normal working hours, in accordance with the AGREEMENT specifications. Equipment must conform with all applicable noise regulations.

C-[1] SOUND CONTROL REQUIREMENTS

The CONTRACTOR shall comply with all County of Orange and local sound control and noise level rules, regulations and ordinances which apply to any work performed pursuant to the AGREEMENT, and shall make every effort to control any undue noise resulting from the construction operation.

Each internal combustion engine used for any purpose on the job or related to the job shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

The noise level from the CONTRACTOR's operations between the hours of 8 p.m. and 7 a.m. on weekdays, including Saturday, or at any time on Sunday or a Federal holiday, shall be in accordance with the County ordinance covering "Noise Control." This requirement in no way relieves the CONTRACTOR of responsibility for complying with local ordinances regulating noise level.

Said noise level requirement shall apply to all equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the CONTRACTOR. The use of loud sound signals shall be avoided in favor of light warnings, except those required by safety laws for the protection of personnel.

C-[1] WATER CONSERVATION

The CONTRACTOR shall, whenever possible, minimize the use of water during project construction. Watering equipment shall be kept in good working order. Water leaks shall be repaired promptly. Washing of equipment, except when necessary for the safety or for the protection of equipment, shall be discouraged.

Water curing of concrete improvements as specified in Section 303-1.10, "Curing" of the Standard Specifications for Public Works Construction, shall not be allowed unless specifically permitted by these Special Provisions or directed by the ENGINEER.

Nothing in this section, "Water Conservation," shall be construed as relieving the CONTRACTOR of furnishing sufficient water as required for the proper construction of this project in accordance with the Standard Specifications for Public Works Construction and these Special Provisions.

C-[1] FLOW AND ACCEPTANCE OF WATER

It is anticipated that storm, surface and possible ground or other waters will be encountered at various times and locations during the work. Such waters may interfere with CONTRACTOR's operations and may cause damage to adjacent or down-stream private and/or public property by flooding, lateral erosion, sedimentation, or pollution if not properly controlled by the CONTRACTOR. The CONTRACTOR, by submitting a bid, assumes all of said risk and the CONTRACTOR acknowledges that its bid was prepared accordingly.

The CONTRACTOR shall conduct its operations in such a manner that storm or other waters may proceed without diversion or obstruction along existing street and drainage courses. Drainage of water from existing or proposed catch basins shall be maintained at all times. Diversion of water for short reaches in order to protect construction in progress will be permitted if public or private properties are not damaged or, in the opinion of the ENGINEER, are not subject to the probability of damage. CONTRACTOR shall at no cost to DISTRICT obtain written permission from the appropriate public agency or property owner before any diversion of water will be permitted by the ENGINEER.

During the course of water control the CONTRACTOR shall conduct construction operations to protect waters from being polluted with fuels, oils, bitumens or other harmful materials, and shall be responsible for removing said materials in the event protective measures are not effective.

Construction site shall be maintained in such a condition that an anticipated storm does not carry wastes or pollutants off site.

Discharges of material other than stormwater are allowed only when necessary for performance and completion of construction practices and where they do not: cause or contribute to a violation of any water quality standard; cause or threaten to cause pollution, contamination, or nuisance; or contain a hazardous substance in a quantity reportable under Federal Regulations 40 CFR Parts 117 and 302, or any other law or applicable regulation.

Potential pollutants include but are not limited to: vehicle/equipment fuels, oils, lubricants, and hydraulic, radiator or battery fluids; vehicle/equipment wash water and concrete mix wash water; concrete, detergent or floatable wastes; wastes from any engine/equipment steam cleaning or chemical degreasing; solid or liquid chemical spills; wastes from sealants, limes, and solvents; and superchlorinated potable water line flushings.

During construction, disposal of such materials should occur in a specified and controlled temporary area on-site, physically separated from potential storm water run-off, with ultimate disposal in accordance with local, state, and federal requirements.

C-[1] SURVEYING SERVICES

**** - NOTE TO ENGINEER: Select the method of Surveying for the PROJECT. First paragraph dictates that OC Public Works shall accomplish all boundary and control surveying for the job. Second paragraph to end dictates that Contractor must hire Surveyor to conduct all surveying for project.**

The DISTRICT will provide normal surveying and inspection services for construction of this project as described in Section 2-9, "Surveying," of the Standard Specifications for Public Works Construction. The survey work week shall be from Monday through Thursday, with no survey crew available on Friday. Therefore, the CONTRACTOR shall schedule survey requests accordingly.

CONTRACTOR shall, to the satisfaction of the ENGINEER, lay out the work from the plans and shall establish all bench marks, monuments, lines and levels necessary for the construction covered by this contract unless otherwise specified herein. The CONTRACTOR shall employ a qualified land surveyor registered in the State of California, to lay out the work and to verify the lines and elevations as the work progresses. All dimensions shall be checked against existing conditions and discrepancies reported immediately to the ENGINEER. CONTRACTOR shall be responsible for establishment of basic layout of entire area to the satisfaction of the ENGINEER prior to beginning any major portion of grading for construction. Any discrepancies arising from preliminary layout shall be resolved prior to construction. During the progress of construction, the CONTRACTOR shall provide surveying service as necessary, or upon request of the ENGINEER, to assure that the construction complies with the plans and specifications.

The DISTRICT will furnish the basic control for alignment and grades consisting of the following:

(1) Initial establishment of project centerline or baseline.

(2) Establishment of the reference bench marks indicated on the plans.

While the ENGINEER may, at his discretion, check the CONTRACTOR's surveying work at any time, checking by DISTRICT survey parties may be limited to checking finished product being within the tolerances given in other sections of the specifications. CONTRACTOR shall furnish the ENGINEER with copies of original field notes, computations, and other records during progress of the work.

The cost of all surveying, to the lines and grades shown on the plans, shall be considered as included in the various items of work and no separate payment will be allowed therefor.

C-[1] INSPECTION SERVICES

CONTRACTOR shall be made aware that the DISTRICT has a work schedule with limited inspection services available on Friday. The CONTRACTOR is required to keep the ENGINEER informed in advance of his schedule so as to assure inspection is available for on-site work that will be performed by the CONTRACTOR, or off-site work, such as material sampling and testing, which may or may not be performed by the CONTRACTOR.

To Section 2-11, "Inspection," of the Standard Specifications for Public Works Construction, DELETE the second sentence and substitute the following:

> The CONTRACTOR shall notify the ENGINEER before noon of the working day before inspection is required, except for inspection on Friday. Requests for inspection on Friday shall be made by 4:00 p.m. on the preceding Wednesday.

C-[1] MEASUREMENT AND COMPENSATION

Compensation for items of work not specifically identified in these Special Provisions shall include all labor, materials, tools, equipment, safety measures, and supervision required to complete the work to grades and dimensions shown on the plans or staked in the field. There shall be no compensation except for the bid items specified in the Proposal. The cost of all work shown in the plans and specifications but not specifically identified as a bid item or described within a bid item shall be included in related bid items, and no additional compensation shall become due the CONTRACTOR by nature of compliance with the plans and specifications except as provided in Section 3, "Changes in Work" of the Standard Specifications for Public Works Construction.

C-[1] PAYMENTS

Attention is directed to Section 9-3, "Payment," of the Standard Specifications for Public Works Construction, and these Special Provisions.

For the purpose of making partial payments pursuant to Section 9-3.2, "Partial and Final Payment" of the Standard Specifications for Public Works Construction, the amount set forth for the AGREEMENT items of work hereinafter listed shall be deemed to be the maximum value of said AGREEMENT items of work which will be recognized for progress payment purposes.

Mobilization ____>
Clearing and Grubbing ____>

After acceptance of the Work pursuant to Section 6-8, "Completion and Acceptance" of the Standard Specifications for Public Works Construction, the amount, if any, payable for an AGREEMENT item of work in excess of the maximum value for progress payment purposes hereinabove listed for said item, will be included for payment in the first estimate made after acceptance of the Work. Work shall be as defined under Section 1, “Terms, Definitions, Abbreviations, Units of Measure, and Symbols,” of the Standard Specifications for Public Works Construction.

No payment will be made to the CONTRACTOR for any materials on hand which are furnished but not incorporated into the work.

Upon satisfactory completion of the work, the ENGINEER shall recommend the acceptance of the work to the Board of Supervisors. Said Board shall cause to be filed and recorded in the records of the County Recorder a Notice of Completion.

Thirty-five (35) days after the recording of the Notice of Completion or within sixty (60) days after the Date of Completion in accordance with Public Contract Code Section 7107, the CONTRACTOR shall be entitled to the balance due for completion and acceptance of the work, provided all claims for labor and materials have been paid, and no claim shall have been filed with the DISTRICT based upon acts or omissions of the CONTRACTOR and no liens or withhold notices shall have been filed against said work or the property on which the work was done. If there is a dispute between the DISTRICT and CONTRACTOR, DISTRICT may retain up to 150% of the estimated value of the disputed amount from the final payment in accordance with Section 7107 of the Public Contract Code.

Section 7107 of the Public Contracts Code defines Completion as any of the following:

(1) The occupation, beneficial use, and enjoyment of a work of improvement, excluding any operation only for testing, startup, or commissioning, by the DISTRICT, or its agent, accompanied by cessation of labor on the work of improvement.

(2) The acceptance by the DISTRICT, or its agent, of the work of improvement.

(3) After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 100 days or more, due to factors beyond the control of the CONTRACTOR.

(4) After commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 30 days or more, if the DISTRICT files or records a notice of cessation or a notice of completion.

C-[1] AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS

CONTRACTOR shall abide by the following clause and shall include same in all contracts with subcontractors:

The CONTRACTOR shall not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is qualified. The recipient or CONTRACTOR agrees to take Affirmative Action to employ, advance in employment, and otherwise treat qualified handicapped individuals without discrimination, based upon their physical or mental handicaps in all employment practices such as the following: employment, upgrading, demotion, layoff or termination, rate of pay or other forms of compensation, and selection for training, including apprenticeship.

C-[1] SUBCONTRACTING

Attention is directed to the provisions in Section 2-3, "Subcontracts" of the Standard Specifications for Public Works Construction.

C-[1] CULTURAL/SCIENTIFIC RESOURCES FINDS

There are no known cultural/scientific resources at the site. If the CONTRACTOR's operations uncover or CONTRACTOR's employees find any burial grounds or remains, ceremonial objects, petroglyphs, and archaeological or paleontological or other artifacts of like nature within the construction area, CONTRACTOR shall immediately notify the ENGINEER of CONTRACTOR's findings and shall modify construction operations so as not to disturb the findings pending receipt of notification as to determination of the final disposition of such finding from the ENGINEER.
Should the findings, or notification as to disposition of findings, result in delays or extra work, additional time and/or extra work payment will be allowed as provided for in the Standard Specifications for Public Works Construction, Section 6-6, "Delays and Extensions of Time" and Section 3-3, "Extra Work."

Any findings of a cultural/scientific resource nature shall remain the property of the DISTRICT and not become the property of the person or persons making the discovery.

C-[1] HOLIDAYS

Attention is directed to the provisions in Section 6-7.2, "Working Day" of the Standard Specifications for Public Works Construction.

C-[1] FINAL PAY QUANTITIES

When an item of work is designated as "Final Quantity" (F) in the "Notice to Contractors" and "Proposal" Sections of these Special Provisions, 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 the amount represented by the eliminated portion of the item of work.

The estimated quantity for each item of work designated as "Final Quantity" (F) in the "Notice to Contractors" and "Proposal" Sections of these Special Provisions 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.

In case of discrepancy between the quantity shown in the "Notice to Contractors" and "Proposal" Sections of these Special Provisions 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 in the "Notice to Contractors" and "Proposal" Sections of these Special provisions.

C-[1] FEDERAL LABOR STANDARDS INFORMATION

This project requires compliance with the labor standards promulgated by the United States Secretary of Labor as specified in Section E of these specifications.

The CONTRACTOR's attention is directed to some important provisions of Section E that shall be accomplished by the CONTRACTOR. The provisions are as follows:

(l) Pay not less than the prevailing wages outlined in the AGREEMENT and these Special Provisions, including time and one-half to those employees who worked over eight hours per day or forty hours per week on the project.

(2) Pay all employees at least once a week.

(3) Post the applicable wage determinations on the job site so that employees may verify their rates of pay.

(4) Submit weekly payroll records and a statement of compliance to the contracting government, and keep these records for three years from the date of completion of the contrast.

(5) Make the provisions of Section E a part of all subcontractor contracts.

C-[1] SOIL CONDITIONS

The CONTRACTOR's attention is directed to the diagram on the plans entitled "Log of Test Borings." These diagrams are records of the data obtained by the DISTRICT and represent the character of material encountered at the test boring sites. These diagrams are included only for the convenience of the bidders. There is no guarantee, either expressed or implied, that the conditions indicated are representative of those actually existing throughout the project, or any part of it, or that unforeseen developments may not occur.

The diagrams were accompanied by a report which is available in the office of the DISTRICT for study by prospective bidders and the CONTRACTOR. The plotted locations shown on the plans are locations estimated in the field.

The inclusion of the test boring log in the plans shall not be construed to be a waiver of the CONTRACTOR's obligation to inspect the soil conditions before submitting a bid. By submitting a bid, the CONTRACTOR acknowledges satisfaction as to the quality of the geotechnical information, including but not restricted to the conditions affecting handling and storage of materials, disposal of excess material, and level and amount of groundwater.

Copies of the Geotechnical Report(s) are available for review by the CONTRACTOR. The following geotechnical reports are currently on file with the OC Public Works Department:

1. ____>
2. ____>

If the CONTRACTOR so wishes to review the above report(s), he should contact Kasey Nielsen at (714) 834-4786. A fee will be charged for any reproduction requested by the CONTRACTOR.

The Soils Report shall not be construed to be a waiver of the CONTRACTOR's obligation to inspect the soil conditions before submitting a bid. By submitting a bid, the CONTRACTOR acknowledges satisfaction as to the quality of the soil information, including but not restricted to the conditions affecting handling and storage of materials, disposal of excess material, and level and amount of groundwater.

C-[1] UTILITIES TO PROTECT

The CONTRACTOR's attention is directed to the drawings and to Section 5, "Utilities," of the Standard Specifications for Public Works Construction. The DISTRICT has attempted to show all underground facilities in their proper place.

The CONTRACTOR shall, by appropriate methods, verify the location of underground facilities prior to excavation. All underground facilities are to be protected in place, except as noted.

C-[1] UNFORESEEN DIFFICULTIES

The CONTRACTOR shall promptly notify the ENGINEER of any work site conditions per Section 3-4 of the STANDARD SPECIFICATIONS, in writing, upon their discovery and identification, and before they are disturbed. All loss or damage arising out of the nature of the work to be accomplished under the AGREEMENT, or from any unforeseen obstructions or difficulties which may be encountered during the progress of the work and in the prosecution of the same, or from the action of elements, or from encumbrances on the line of work, shall be sustained by the CONTRACTOR for failure to notify the ENGINEER per Section 3-4 of the STANDARD SPECIFICATIONS and these Special provisions.

C-[1] PROVISIONS FOR EMERGENCIES

Unusual conditions may arise during the work which require that immediate and unusual provisions be made to protect the public from danger, loss or prosecution of the work. It is part of the service required of the CONTRACTOR to make such provisions and to furnish such protection.

The CONTRACTOR shall take such steps and precautions as his operations make necessary in order to protect the public from danger, damage, or loss of life or property which would result from the interruption or contamination of public water supply, irrigation or other public service, or from the failure of partly complete work.

Whenever, in the opinion of the ENGINEER an emergency exists against which the CONTRACTOR has not taken adequate precautions for public safety or for protection of utilities, adjacent structures or property which may be injured by process of construction on account of such neglect and immediate action is necessary in order to protect public, private, personal or property interest, or prevent likely loss of human life or damage on account of AGREEMENT operations, then the ENGINEER may provide suitable protection to said interests by causing such work to be done and material to be furnished which the ENGINEER deems reasonable and necessary.

The cost of said repairs, including labor and materials, as may be deemed necessary by the ENGINEER shall be borne by the CONTRACTOR. If the CONTRACTOR does not pay said cost and expenses upon presentation of the bills therefor, duly certified by the ENGINEER, said cost and expense will be paid by the DISTRICT and shall be deducted from any amounts due, or which may become due the CONTRACTOR. Failure of the DISTRICT however, to take such precautionary measures shall not relieve the CONTRACTOR of his full responsibility for public safety.

Revised: 29Jun2009

SECTION D
PERMITS

D-1 CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD:

D-1.1 NPDES DEWATERING PERMIT, SANTA ANA REGION:

On March 27, 2009, the California Regional Water Quality Control Board, Santa Ana Region adopted Order No. R8-2009-0003 (NPDES No. CAG998001). General Water Discharge Requirements for Discharges to Surface Waters that pose an insignificant (De Minimus) threat to water quality. The CONTRACTOR shall comply with the requirements of the permit for all PROJECT dewatering operations.

A copy of this document may be found on the internet at:

http://www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2009/09_003_deminimus_permit_wdr.pdf

For short term groundwater related discharges and de minimus wastewater discharges to surface waters within the San Diego Creek/Newport Bay Watershed, the COUNTY received NPDES Permit No. CAG998002, Order No. R8-2004-0021 on December 20, 2004 which was subsequently amended by Order No. R8-2006-0065 on October 13, 2006.

A copy of these documents may be found on the internet at:

http://www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2004/04_021_wdr_general_sd_crk_newport_bay_12202004.pdf
http://www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2006/06_065_gen_wdr_amend04_021_10132006.pdf

The CONTRACTOR is hereby directed to read them thoroughly and comply with the requirements as specified therein.

The CONTRACTOR is hereby notified that the COUNTY will undertake all effluent monitoring, sampling, and reporting to the California Regional Water Quality Control Board, Santa Ana Region as required by the permit and the related Monitoring and Reporting Program. The CONTRACTOR shall comply with all requests from the COUNTY for construction and location of sampling stations; construction of settling/stilling basins; and any other mitigation measures required to conform to the Permit and the Monitoring and Reporting Program

D-1.2 NPDES MUNICIPAL PERMIT

On May 22, 2009 the COUNTY obtained Municipal MS4 NPDES Permit No. CAS618030, Order No. R8-2009-0030 from the California Regional Water Quality Control Board, Santa Ana Region. A copy of the permit may be found on the internet at:

http://www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2009/09_030_oc_stormwater_ms4_permit.pdf

The CONTRACTOR is hereby directed to read the permit thoroughly and comply with the requirements as specified therein.

The Monitoring Reporting Requirements as stipulated under R8-2009-0030 are made part of these Special Provisions by reference.

The following specification may not be appropriate for all projects. A SWPPP is required for projects of one (1) acre and greater, however it is recommended that you consider inclusion of a SWPPP if your project is less than one (1) acre and includes soil-disturbing activities. Please read carefully and edit as necessary.

D-1.3 STATE GENERAL CONSTRUCTION ACTIVITY STORMWATER PERMIT:

Prior to CONTRACTOR commencing work, a certified Notice of Intent (NOI)/Notice of Construction Activity must be submitted to the California Regional Water Quality Control Board (CRWQCB) to comply with the State General Construction Activity Storm Water Permit (Construction Permit) for the discharge of storm water from the construction site during the construction of the project.

The NOI form to be used on projects within the Santa Ana Region has been simplified and is included in these specifications. It is referred to as the Notice of Construction Activity. It is to be used in lieu of the standard NOI form found in the Construction Permit.

Prior to CONTRACTOR commencing work, a completed and certified PROJECT SWPPP MANUAL must also be submitted to the ENGINEER as required in Section F-, "SWPPP MANUAL." Review and approval by the ENGINEER is for administrative purposes only and shall not be construed by any party as relieving the CONTRACTOR from any responsibility or liability for conforming to the requirements of the Construction Permit as modified by Resolution No. 2001-046. A copy of the Storm Water Pollution Prevention Plan (SWPPP) Manual shall be on file at the construction site at all times and for the complete duration of construction activity.

The Notice of Construction Activity, SWPPP Manual, and the Construction Permit (WATER QUALITY ORDER 99-08-DWQ), as modified by Resolution No. 2001-046, shall be considered as part of these Special Provisions. The Construction Permit and Resolution 2001-046 may be viewed on the internet at the State Water Resources Control Board web site

http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/finalconstpermit.pdf

No storm water quality problems are anticipated as a result of the construction activity, however if problems develop, the CONTRACTOR shall comply with all conditions and requirements contained within the Construction Permit. By submitting a bid, the CONTRACTOR acknowledges that he has read and understands the requirements of the Construction Permit and Resolution No. 2001-046.

oc/noc/9/6/96

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)
[OC Public Works **provides template with limited project information and CONTRACTOR prepares SWPPP,** OC Public Works **certifies]**

The DISTRICT has provided templates with limited PROJECT information for the Notice of Intent (NOI) /Notice of Construction Activity and Storm Water Pollution Prevention Plan to facilitate compliance with the Construction Permit. The CONTRACTOR shall complete the NOI and submit it to the ENGINEER for certification along with the statutory fee, after which, both will be forwarded <Project Engineer shall remove the phrase: "along with the statutory fee" for projects located within OCFCD or other co-permittee right of way> to the Santa Ana Regional Board office for filing. In addition, the CONTRACTOR shall review and complete the SWPPP template to reflect his actual construction activity, practices, and progress of work to conform to the requirements of the Construction Permit.

A copy of the NOI/Notice of Construction Activity and SWPPP templates have been reproduced herein and shall be considered as part of these Special Provisions.

The CONTRACTOR shall submit the final NOI/Notice of Construction Activity and completed SWPPP for review, approval, and certification by the DISTRICT prior to start of work and mobilization.

The CONTRACTOR is notified that the SWPPP must be amended from time to time during the course of work to reflect actual construction progress and construction practices.

The modifications contained in Resolution No. 2001-046 referenced above include requirements for the SWPPP to identify a sampling and analysis strategy (and schedule depending on the location of the construction activity). Monitoring, including sampling and analysis, may be required. It will be the CONTRACTOR's responsibility to develop a strategy and monitoring program that will address the pollution potential of materials that will be brought to the site for use in completion of the proposed improvements.

The SWPPP document shall not be construed to be a waiver of the CONTRACTOR's obligation to review and understand the Construction Permit before submitting a bid. By submitting a bid, the CONTRACTOR acknowledges that he has read and understands the requirements of the Construction Permit and Resolution No. 2001-046.

The CONTRACTOR is hereby notified that specific construction practices in the Standard Specifications for Public Works Construction (STANDARD SPECIFICATIONS), Section 7-8, "Project Site Maintenance, "are considered to be Best Management Practices. Applicable construction practices in the STANDARD SPECIFICATIONS shall be incorporated into the SWPPP. Full compensation for including and complying with construction practices in the STANDARD SPECIFICATIONS shall be considered as included in the various items of work involved and no additional compensation will be allowed therefor.

It is the requirement of the Construction Permit that the SWPPP include a maintenance schedule for Best Management Practices (BMPs) installed during construction and designed to reduce or eliminate pollutants after construction is completed (post construction BMPs). A Post Construction Storm Water Operation and Management Plan (PCOMP) that identifies post construction BMPs applicable to this project and establishes the maintenance schedule has been developed, is reproduced herein, and shall be considered as part of these Special Provisions.

D-1.4 SECTION 401 CERTIFICATION:

The DISTRICT has obtained a letter from the Regional Board, dated >, which indicates that the proposed project does not require certification under Section 401 of the Federal Clean Water Act (reproduced herein).

D-1.4 SECTION 401 CERTIFICATION:

The DISTRICT has obtained certification under Section 401 of the Federal Clean Water Act from the Regional Board, dated >. The CONTRACTOR is hereby directed to read the permit, as reproduced herein, thoroughly and comply with the mitigation conditions as described therein.

D-2 U.S. ARMY CORPS OF ENGINEERS:

The DISTRICT has obtained a Section 404 Individual Permit for the project. The 404 permit is included herein. The CONTRACTOR shall thoroughly read and comply with all permit provisions, and CONTRACTOR shall make note of the Special Conditions on page > of the permit.

D-2 U.S. ARMY CORPS OF ENGINEERS:

The DISTRICT has applied for a Section 404 Permit under the Federal Clean Water Act from the Los Angeles District, Corps of Engineers, Regulatory Branch. The USCOE has found that the subject project does not require an individual permit under Section 404, and has directed the DISTRICT to comply with the provisions as set forth in the USCOE's Nationwide permit. A copy of the Nationwide Permit is attached, and the CONTRACTOR is directed to read the Nationwide permit thoroughly and comply with the requirements as specified therein.

D-3 CALIFORNIA DEPARTMENT OF FISH AND GAME:

The DISTRICT has entered into a Section 1602 Agreement with the California Department of Fish and Game. The 1602 Agreement is included herein. A copy of the Agreement must be kept on the jobsite at all times and made available to any Department representative at their request.

SECTION F

CONSTRUCTION DETAILS

Section F, "Construction Details," is included as an integral part of the CONSTRUCTION AGREEMENT, also referred to as AGREEMENT, as previously described and listed on page CA-1 and CA-2, and the AGREEMENT shall be hereinafter referred to in Section F as "CONTRACT."

F-1 DESCRIPTION OF WORK

The work to be done consists, in general, of re-grading the basin, constructing a pump station, extending the inlet into the basin, reconstruction of the basin outlet, and construction of park improvements.

Other items of work or details not mentioned above that are required by the Plans, STANDARD SPECIFICATIONS, or these Special Provisions, shall be performed, placed, constructed or installed.

F-2 SITE VISITATIONS

Prior to the submission of the bid, the CONTRACTOR shall visit the job site and make a thorough examination and evaluation of the existing site conditions and surrounding area. CONTRACTOR shall include the costs for SITE VISITATIONS in the prices paid for the various CONTRACT items of work and no additional compensation will be allowed therefor.

F-3 PROGRESS SCHEDULE

Within fifteen (15) calendar days after receipt of the Notice to Proceed, the CONTRACTOR shall provide three (3) copies of his proposed Progress Schedule to the ENGINEER for review and comment. No work shall commence until the Progress Schedule is approved by the ENGINEER in writing. The Progress Schedule shall cover the entire CONTRACT duration and shall consist of, but not limited to, the following:

1) The Progress Schedule shall include all proposed construction activities including major procurement items, material submittals, plan and shop drawing submittals, including shop drawing reviews. See paragraph (1) of the Preliminary Progress Schedule for reference.

2) The Progress Schedule shall include the duration and sequencing of each bid item or construction activity.

3) The Progress Schedule shall include a tabulated activity report which shall include the following minimum data for each bid item or construction activity:

A) activity beginning and ending event numbers or activity number preference
B) estimated duration
C) activity description
D) early and latest allowable start date (calendar dated)
E) early and latest allowable finish date (calendar dated)
F) Status of each activity (critical)
G) total float of each activity
H) cost value of each activity

4) The Progress Schedule shall include the proposed sequencing of all subcontractors, trade crews, and major construction equipment. In developing the Progress Schedule and tabulated activities report, the CONTRACTOR shall be responsible for assuring that all subcontractor work, as well as his own work, is included in the schedule, that work sequences are logical, and that the diagram shows a coordinated plan of work.

5) The Progress Schedule and tabulated activities report shall show the sequence and interdependence of activities required for complete performance of the work. The work shall be divided into activities with a maximum duration of fifteen (15) working days each but not less than one (1) working day, unless otherwise directed by the ENGINEER, except for non-construction activities such as procurement of construction materials, fabrication of materials, delivery of equipment, etc.

6) Within five (5) working days from receipt of the ENGINEER's comments, the CONTRACTOR shall revise and resubmit the Progress Schedule and tabulated activity report in accordance with the ENGINEER's comments, or formally (in writing) request a joint meeting to resolve any objections to the ENGINEER's comments. The joint meeting must be held within ten (10) working days from receipt of the ENGINEER's comments unless otherwise specified by the ENGINEER. If the aforementioned meeting is held, the CONTRACTOR shall revise the Progress Schedule and tabulated activities report to the satisfaction of both parties and resubmit three (3) copies of the Progress Schedule and tabulated activity report within (5) working days following the meeting.

7) Subsequent to the time that submittal of a Progress Schedule is required in accordance with these Special Provisions, no progress payments shall be made for any work until a satisfactory Progress Schedule has been approved, in writing, by the ENGINEER.

F-3.1 REVISIONS TO THE SCHEDULE

At least once a month the CONTRACTOR shall meet with the ENGINEER to jointly review the CONTRACTOR's activities and progress as they relate to the approved Progress Schedule. If it appears the schedule does not accurately represent the CONTRACTOR's prosecution and progress of the work, the ENGINEER shall request, and the CONTRACTOR shall furnish, two (2) copies of a revised Progress Schedule within five (5) working days of the meeting which, to the ENGINEER's satisfaction, accurately represents the CONTRACTOR's activities. If a revised Progress Schedule is deemed necessary, no progress payments will be disbursed to the CONTRACTOR until a revised Progress Schedule is approved by the ENGINEER.

If the CONTRACTOR desires to make changes in the Progress Schedule or tabulated activity report to reflect revisions in his method of operating and scheduling of work, the CONTRACTOR shall notify the ENGINEER in writing, stating the reasons for the proposed revision(s). The CONTRACTOR shall furnish the ENGINEER with two (2) copies of the proposed-revised schedule and tabulated activity report. If the CONTRACTOR changes the approved Progress Schedule or tabulated activity report without consent of the ENGINEER, no progress payments will be disbursed to the CONTRACTOR until the revised schedule and report is approved by the ENGINEER.

F-3.2 REVISED PROGRESS SCHEDULE FOR CHANGES, DELAYS, TIME EXTENSIONS, AND CONTRACTOR REQUESTS

When change orders are initiated, delays are experienced, or the CONTRACTOR desires to revise the Progress Schedule, the CONTRACTOR shall submit to the ENGINEER a Time Impact Analysis incorporating the change, delay, or revision. Activity time delays will not automatically guarantee the CONTRACTOR an extension of CONTRACT time. An extension in CONTRACT time will only be allowed when the CONTRACTOR can demonstrate that the duration of the activity, affected by the delay, affects the critical path of the PROJECT and all available float has been exhausted.

The CONTRACTOR shall submit two (2) copies of the revised schedule for the approval of the ENGINEER. No CONTRACT time extensions or extra payments will be applied toward monthly progress payments until the revised schedule is approved by the ENGINEER.

F-3.3 PAYMENT

Full compensation for conforming to the requirements of PROGRESS SCHEDULE including all submittals, revisions, coordinating, scheduling, labor, materials, tools, equipment, and incidentals necessary shall be included in CONTRACT bid price paid for MOBILIZATION and no additional compensation will be allowed therefor.

F-4 ORDER OF WORK:

The CONTRACTOR shall follow the sequence of operations as set forth herein. Full compensation for conforming with such requirements will be considered as included in the prices paid for the various CONTRACT items of work, and no additional compensation will be allowed therefor.

The order of work shall be as follows:

1. Class A Field Office and Project Information Sign,
2. All other CONTRACT work required.

F-5 COOPERATION

The requirements of Subsection 5-6, "Cooperation," and 7-7, "Cooperation and Collateral Work," of the STANDARD SPECIFICATIONS, are amended as follows:

The CONTRACTOR shall cooperate with all private property owners affected by the PROJECT, notifying them at least 24 hours before commencement of any work on/or adjacent to their property.

The CONTRACTOR's attention is directed to Section F, "Utility Disposition" of these Special Provisions. Several utilities will be performing work concurrent with work on this PROJECT. The CONTRACTOR shall cooperate with these utilities and allow them sufficient time to complete their work.

Full compensation for conforming to the requirements of COOPERATION shall be considered as included in the various items of work involved and no additional compensation will be allowed therefor.

F-6 DUST CONTROL:

To Subsection 7.8.1, "Cleanup and Dust Control," of the STANDARD SPECIFICATIONS add the following:

Dust control shall hereby be defined as the elimination and/or control of dirt, dust, mud and debris from propagating or spreading onto properties, private or public, adjacent to the PROJECT and CONTRACTOR's work areas.

No separate payment will be made for any work performed or material used to control dust resulting from the CONTRACTOR's performance of the work, or by public traffic, either inside or outside the right-of-way.

Construction activity will take place in a highly developed residential neighborhood. Dust Control shall be strictly enforced. CONTRACTOR shall at all times keep a water truck or other equipment at the job site in working order capable of performing dust control for the duration of the CONTRACT period. Subject to paragraph two of Subsection 7.8.1, "Cleanup and Dust Control," of the STANDARD SPECIFICATIONS, the CONTRACTOR is required to furnish and operate a self loading motor sweeper with spray nozzles a minimum of once each work day, when and where required for proper dust control, and as directed by the ENGINEER. Cost for furnishing and operating sweeper (including those instances in addition to the minimum requirements) shall be included in the unit price bid for DUST CONTROL and no additional compensation will be allowed therefor.

Dust control shall be performed a minimum of four times a day for the duration of the CONTRACT period: twice in the morning and twice in the afternoon (time periods to be equally spaced), and as directed by the ENGINEER. Dust control performed by the CONTRACTOR in addition to the minimum daily requirement and at the direction of the ENGINEER, shall be considered as included in the CONTRACT unit price bid and no additional compensation will be allowed therefor.

Performing the minimum dust control required by the CONTRACT will in no way relieve the CONTRACTOR from his responsibility for providing adequate dust control measures.

Full compensation for conforming to the requirements of DUST CONTROL including all labor, equipment, tools, materials, and incidentals shall be considered as included in the CONTRACT LUMP SUM price bid and no additional compensation will be allowed therefor.

F-7 DEVELOP WATER SUPPLY

Work shall consist of developing a water supply and for furnishing and placing all water required for work done in the contract, including water used for extra work.

Full compensation for developing a water supply and for furnishing and placing all water required for work done in the contract, including extra work, shall be included in the CONTRACT LUMP SUM price bid for DEVELOP WATER SUPPLY and no additional compensation will be allowed therefor.

F-8 SWPPP MANUAL

The CONTRACTOR shall prepare a Storm Water Pollution Prevention Plan (SWPPP) as required within Section D-1, “California Regional Water Quality Control Board.” The SWPPP shall be prepared, stamped, and signed by a Civil Engineer currently registered in the State of California who has completed at least twenty-four (24) hours of formal training and received a certificate of completion. The template is available in electronic format upon request and should be included as part of a SWPPP Manual. For use within these Special Provisions, a SWPPP Manual is defined as the combination of the completed County

of Orange SWPPP Template and the CONTRACTOR's detailed plan to comply with all the requirements set forth in the State General Construction Activity Storm Water Permit (Construction Permit).

The PROJECT SWPPP Manual should be prepared in accordance with the CalTrans SWPPP/WPCP Preparation Manual, the California Stormwater Quality Association (CASQA) Construction Handbook, or equivalent.

The SWPPP Manual shall include provisions for erosion control, sediment control, and for any monitoring and sampling of sediment and storm water constituents as required in the Construction Permit during storm events. The CONTRACTOR shall implement, maintain, and amend the SWPPP Manual during construction to reflect actual construction practices. The SWPPP Manual shall include at a minimum the following provisions as required by the Construction Permit:

1. Implementation Schedule
2. Source Identification
3. Erosion Control
4. Stabilization
5. Sediment Control
6. Non-Storm Water Management
7. Post Construction Storm Water Management
8. Maintenance, Inspection, and Repair Program
9. Training
10. List of Subcontractor's Certifications
11. Monitoring Program for Silt/sediment
12. Monitoring Program for Non-Visible Pollutants

The CalTrans SWPPP Preparation Manual/Template is available for download at:
http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm

The CASQA Construction Handbook SWPPP Template is available for download at:
http://www.cabmphandbooks.com
The CONTRACTOR shall implement, maintain, and amend the SWPPP Manual during the prosecution of construction activity to reflect actual construction practices. The CONTRACTOR shall submit to the ENGINEER copies of all CONTRACTOR generated SWPPP Manual documents, including all test results and inspection reports, within twenty-four (24) hours when requested by the ENGINEER.

Full compensation for conforming to the requirements of SWPPP MANUAL shall include, but not be limited to, the following:

1. Complete and submit the Notice of Intent (NOI) or Notice of Construction Activity to the ENGINEER;
2. Complete the SWPPP template to conform to CONTRACTOR's actual construction practices;
3. Administer, implement, maintain, and ensure adequate functioning of the various water quality control measures identified within the SWPPP Manual during construction. These tasks must be performed by a representative who has completed at least twenty-four (24) hours of formal water quality and SWPPP preparation training and received a certificate of completion;
4. Provide and maintain all documentation and administration for the entire AGREEMENT period;
5. Perform any additional work required for compliance with the requirements of the Construction Permit including construction of a contingency basin, chemical treatments, etc.;
6. Perform any additional work required for compliance with Resolution No. R8-2001-046 including identification of strategies and monitoring activities (sampling, testing, reporting, etc.);

7. Provide all labor, tools, equipment, materials, and incidentals required to conform to the permit requirements;

and shall be considered as included in the CONTRACT LUMP SUM price paid for SWPPP MANUAL and no additional compensation will be allowed therefor.

F-9 SECTION D PERMIT REQUIREMENTS

The CONTRACTOR shall comply with the requirements of the following Permits, listed under SECTION D PERMITS, of these Special Provisions:

1. 401 Water Quality Certification from the Regional Board
2. 1602 Streambed Alteration Agreement from CDFG
3. 404 Permit from the U.S. Army Corps of Engineers

The CONTRACTOR shall review all permit requirements and shall modify the construction schedule, modify construction access, provide temporary protection and modify construction practices as necessary to comply with the provisions of the SECTION D PERMITS.

Full compensation for complying with the requirements of SECTION D PERMITS, with the exception of the Construction Permit, as specified in Section D-1.3 of these Special Provisions, shall be included in the CONTRACT Lump Sum Price paid for SECTION D PERMIT REQUIREMENTS, and no additional compensation will be allowed therefor. Permit requirements that provide for construction of permanent facilities at completion of PROJECT are listed as a separate pay item elsewhere within SECTION F of these Special Provisions, or will be accomplished by others, as noted.

F-10 UTILITIES

The DISTRICT has endeavored to locate and show on the plans the approximate locations of all private and public utilities and facilities to be encountered during construction. However, it is possible that, during the work, unknown substructures requiring relocation or protection may be encountered. Such unknown substructures will generally fall into two classes:

Class I - Those requiring relocation or protection at the expense of the owner, and
Class II - Those requiring relocation or protection at the expense of the DISTRICT.

For Class I utilities, the CONTRACTOR shall provide time and working space for protection or relocation activities and may be entitled to an extension of time for completion and/or extra compensation under the provisions of Subsection 5-5, "Delays."

For Class II utilities, the DISTRICT will make arrangements for the protection or relocation by the Owner or by the CONTRACTOR or by others. In the event either the protection or the relocation is to be accomplished by the CONTRACTOR, the procedures of Section 3, "Changes in Work," of the STANDARD SPECIFICATIONS shall be used. In the event protection or relocation is accomplished by the owner or by others, the CONTRACTOR shall provide time and working space and may be entitled to an extension of time for completion and/or extra compensation under the provisions of said Section 5-5, "Delays."

In the event any such unknown substructures should be disturbed or damaged, by no fault of the CONTRACTOR exercising reasonable care, the CONTRACTOR shall at once make necessary emergency repairs at no cost to the CONTRACTOR. Permanent repairs, if necessary, and/or relocation will be arranged by the DISTRICT at no cost to the CONTRACTOR.

Where facilities are shown on the plans, "To Be Relocated By Others," the DISTRICT will issue the owner a "Notice to Relocate" or, by DISTRICT agreement with owner, require owner to relocate. In the event difficulties delay relocation, which in the judgment of the ENGINEER cannot reasonably be foreseen, and require a delay in CONTRACTOR's completion date after all reasonable remedies for keeping CONTRACT on schedule have been exhausted by CONTRACTOR including, but not limited to flow-charts and critical path scheduling, work simplification, and alternative construction methods, ENGINEER may allow extra compensation and extra time to the CONTRACTOR.

Add to Section 5, "Utilities", of the STANDARD SPECIFICATIONS the following:

> The CONTRACTOR shall protect facilities shown on the plans, "To Be Relocated By Others," in both original and relocated positions and any damage to such facilities shall be immediately repaired to the owner's satisfaction at no cost to the DISTRICT.

Prior to the commencement of work, the CONTRACTOR shall verify the location and depth of all utilities, including service laterals and service connections, which have been indicated on the plans or marked by the respective owners and which may affect or be affected by its operations.

All utilities designated on the plans to be protected in place shall be carefully uncovered if located within the lines of excavation and time shall be allowed for the ENGINEER to field check the location of such utilities to make certain that they will not interfere with construction. In the event a utility conflict exists, the DISTRICT will either arrange for utility owner to relocate the utility or adjust grade and/or alignment of the proposed improvement. In the event any such facility should be disturbed or damaged, the CONTRACTOR shall at once make repairs to the satisfaction of the owner, or arrange with the owner to make repairs, at no cost to the DISTRICT. Any delays or reconstruction of improvements resulting from the CONTRACTOR's failure to verify utility locations and depths shall be made at the CONTRACTOR's expense.

If the CONTRACTOR wishes to have any of the following utilities located, he must contact the responsible utility company or district at least two working days prior to construction in the immediate vicinity of the utility.

> >(714)

The CONTRACTOR's attention is directed to the utility notification service provided by UNDERGROUND SERVICE ALERT (USA). USA member utilities will provide the CONTRACTOR with the locations of their substructures in the construction area when the CONTRACTOR gives at least two working days notice to the Underground Service Alert by calling 1-800-422-4133. The CONTRACTOR shall call USA prior to any work (such as filling, resurfacing, paving) over substructures to allow owners to locate and/or obtain accurate "ties" on their manholes, valve covers, meter boxes, etc.

Full compensation for conforming to the requirements of UTILITIES shall be considered as included in the various items of work involved and no additional compensation will be allowed therefor.

F-10.1 VERIFICATION OF UTILITY LOCATION AND DEPTH

Full compensation for VERIFICATION OF UTILITY LOCATION AND DEPTH, shall be considered as included in the various contract items of work involved and no additional compensation will be allowed therefor.

F-10.2 IDENTIFICATION OF UTILITY DISPOSITION

F-11 DEWATERING

The CONTRACTOR's attention is directed to the probability of encountering surface run-off and groundwater during the excavation for the channel.

Any groundwater that may be encountered shall be controlled and removed by methods of the CONTRACTOR's choice subject to the requirements of the California Regional Water Quality Control Board Individual Dewatering Permit, Section 401 Permit, and Section 402 (SWPPP) Permit, Fish and Game Permit, US Army Corps of Engineers Permit (see Section D) and Flow and Acceptance of Water (see Section C).

The dewatering system chosen shall relieve seepage pressure and keep the subgrade free from water. Regardless of the dewatering method chosen by the CONTRACTOR, the subgrade elevations shall be maintained. If the material at subgrade is unstable due to a high moisture content, the CONTRACTOR shall remove the material and place fill at 90% relative compaction to re-establish the subgrade at no cost to the DISTRICT. The CONTRACTOR may provide other methods of stabilization at subgrade at no cost to the DISTRICT.

The CONTRACTOR shall control the water level below the subgrade to prevent pumping of gravel base material.

No discharge water quality problems are anticipated other than desilting prior to discharging into the downstream portion of the channel. The cost of desilting the discharge shall be included in the CONTRACT price for dewatering.

CONTRACTOR shall submit a dewatering plan to the ENGINEER for review and approval prior to the start of dewatering operations for the PROJECT. ENGINEER/DISTRICT review and approval process of dewatering plan is for the review of possible construction conflicts and oversights and CONTRACT administration of the PROJECT. Review and approval by ENGINEER/DISTRICT in no way alleviates the CONTRACTOR from, or implies that the ENGINEER/DISTRICT accepts in any way, liability and responsibility for the CONTRACTOR's design, construction, and operation of the installed dewatering plan.

CONTRACTOR shall submit plan for DISTRICT review at least twenty (20) working days prior to start of his scheduled dewatering. DISTRICT shall have ten (10) working days to review plan and request modifications, changes, or additions to plan. If CONTRACTOR does not agree with DISTRICT review, CONTRACTOR may request and schedule a meeting with the ENGINEER within five (5) working days from return of reviewed plans to discuss requested modifications, changes, or additions.

CONTRACTOR shall receive no CONTRACT time extensions for DISTRICT review except when time for DISTRICT review may exceed ten (10) working days for the first review, only, as specified in the above paragraph. Subsequent reviews will not be subject to the ten (10) working day limit and are not subject to a claim for CONTRACT extension.

A desilting basin will be required in at least one location to conform to the provisions of CRWQCB dewatering permit.

Full compensation for conforming to the requirements of DEWATERING including:

1. Cost of Flow and Acceptance of Water (Section C).
2. Construction requirements and discharge requirements imposed by the PROJECT permits (Section D).

shall be included in the CONTRACT LUMP SUM bid price and no additional compensation will be allowed therefor.

F-12 MAINTAIN TRAFFIC AND DETOURS

Add to Subsection 7-10.1, "Traffic and Access," of the STANDARD SPECIFICATIONS the following:

When entering or leaving roadways carrying public traffic, the CONTRACTOR's equipment, whether empty or loaded shall in all cases yield to public traffic. No excavation within five feet of the traveled way shall remain open longer than is necessary to perform the work, and in no case shall remain unfenced or unplated overnight or on weekends.

Add to Subsection 7-10.3, "Street Closures, Detours, Barricades," of the STANDARD SPECIFICATIONS the following:

The CONTRACTOR shall provide and maintain all signs, barricades, pedestals, flashers, delineators and other necessary facilities for the protection of the motoring public within the limits of the construction area and all its approaches, including advanced signing and barricades. CONTRACTOR shall also post proper signs to notify the public regarding the conditions of the roadway, all in accordance with the provisions of the Vehicle Code, and Parts 4 and 6 of the California Manual on Uniform Traffic Control Devices (CA MUTCD) dated September 26, 2006

Access to private properties shall be maintained at all times during the construction where practical. Prior to restricting normal access to private properties CONTRACTOR shall provide notification as required in section F- 5, "Cooperation," of these Special Provisions. In no case shall access to private property be restricted longer than 24 hours unless otherwise approved by the ENGINEER.

The CONTRACTOR shall maintain one 12' lane of traffic in each direction at all times.

Portable delineators shall be spaced as necessary for proper delineation of the travel way. The maximum spacing between delineators should be approximately equal in feet to the speed limit, except that the maximum spacing shall not exceed 50 feet.

If the traffic cones or portable delineators are damaged, displaced or are not in an upright position, from any cause, said cones or portable delineators shall immediately be replaced or restored to their original location in an upright position, by the CONTRACTOR.

A flashing arrow sign shall be used for each lane closed on an arterial highway.

Lane closures shall be prohibited on Arterial Highways, as identified on the Orange County Transportation Authority Master Plan of Arterial Highways and the County of Orange Circulation Plan, Monday through Friday from 6:00 a.m. to 9:00 a.m. and from 3:00 p.m. to 6:00 p.m. unless otherwise approved in writing by the ENGINEER.

The CONTRACTOR shall furnish such flagmen as are necessary to give adequate warning to traffic or to the public of any dangerous conditions to the encountered. Flagmen, while on duty and assigned to give warning to the public of any dangerous conditions to be encountered, shall perform their duties and shall be provided with the necessary equipment in accordance with the current "Instructions to Flagmen" of the Department of Transportation. The equipment shall be furnished and kept clean and in good repair by the CONTRACTOR, at his expense.

Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the CONTRACTOR, at CONTRACTOR's expense.

Should the CONTRACTOR furnish insufficient warning and protective measures as above provided, the ENGINEER may direct that the necessary warning and protective measures be furnished and installed by the CONTRACTOR, at CONTRACTOR's expense. However, the ENGINEER shall not be responsible for detecting the inadequacies of the CONTRACTOR's

warnings and protective measures. Public safety by furnishing proper warning and protective devices shall be the sole responsibility of the CONTRACTOR.

The CONTRACTOR may be required to obtained city permit(s) or approvals regarding hauling and traffic control. The CONTRACTOR may be required to submit a traffic detour plan to the City of Garden Grove for approval when temporary traffic lane closures are necessary.

CONTRACTOR shall contact Dan Candaleria, City of Garden Grove Traffic Engineer at 714-xxx-xxxx to coordinate all traffic detours and hauling routes within the City of Garden Grove.

CONTRACTOR shall be responsible for coordinating all approvals and acquiring all permits with City.

Full compensation for conforming to the requirements of MAINTAIN TRAFFIC AND DETOURS including:

1. furnishing all labor, tools, equipment and materials necessary to do the work.
2. obtaining haul permit from the City of Garden Grove.

shall be considered as included in the CONTRACT LUMP SUM price paid and no additional compensation will be allowed therefor.

F-13 MOBILIZATION

The lump sum price paid for MOBILIZATION shall include full compensation for providing bonds, insurance, financing, and moving equipment to the job site and no additional payment will be made therefor.

The lump sum listed in Section C, "Payments," of these Special Provisions or the CONTRACT lump sum price bid as submitted by the CONTRACTOR in the Proposal, whichever is less, shall be paid with the first monthly progress payment. Any amount bid in excess of the value for progress payments purposes listed in Section C, "Payment," of these Special Provisions, will be included for payment in the first estimate made after acceptance of the CONTRACT. The total price bid for Mobilization shall include the cost of all mobilization and administration for the entire CONTRACT period.

F-14 CLASS "A" FIELD OFFICE

The CONTRACTOR shall furnish and maintain a Class A Field Office for the exclusive use of the ENGINEER and his staff in accordance with the provisions of Section 8-2.1, "Class "A" Field Office," of the STANDARD SPECIFICATIONS. The sanitary facility provided by the CONTRACTOR shall be maintained in a clean, neat and sanitary fashion at all times and shall be for the exclusive use of the ENGINEER and his staff. All sanitary paper products required for

the sanitary facility shall be supplied by the CONTRACTOR and shall be considered as included in the CONTRACT unit price bid.

In addition, the Field Office shall be provided with air conditioning and a facsimile machine with a separate phone line and a copying machine capable of photocopying 11"x17" size paper for the exclusive use of the ENGINEER and his staff for the entire duration of the PROJECT.

CONTRACTOR shall be aware that theft and vandalism at the job site may be a problem. CONTRACTOR shall be responsible for the security of the Class A Field Office.

If for any reason the air conditioning, phone, copier, facsimile machine, any office furniture, and/or sanitary facility is vandalized, stolen, or in need of repair, the CONTRACTOR, upon receipt of written notice by ENGINEER, shall have a maximum of five (5) working days to replace or repair the above items to full working order. If CONTRACTOR fails to comply within the five (5) working days specified, the DISTRICT may at its option withhold monthly progress payments until Class A Field Office is returned to full and complete working order.

CONTRACTOR shall meet with the ENGINEER prior to construction (and at any other time circumstances warrant), and together, shall mutually agree to a location for the field office.

Full compensation for conforming to the requirements of CLASS A FIELD OFFICE shall include, but not be limited to, the following:

1. supply office, air conditioning, and sanitary facility,
2. furnish office,
3. service office,
4. supply utilities for office (electricity and phone),
5. service and maintain sanitary facility,
6. wireless internet service for DISTRICT provided computer,
7. color document scanner for 8 ½” by 11” paper,
8. technical assistance to set up computer system and email, wireless internet, and color scanner
9. remove office from job site at the completion of the PROJECT,
10. security, and
11. all labor, tools, equipment, materials, and incidentals necessary to furnish facility complete and in place

and shall be included in the CONTRACT LUMP SUM price bid for CLASS A FIELD OFFICE and no additional compensation will be allowed therefor.

NOTE: No monthly progress payments will be due to the CONTRACTOR until all provisions and requirements of CLASS A FIELD OFFICE are complete and in place.

F-15 CLEARING AND GRUBBING

Clearing and Grubbing shall conform to the provisions of Subsection 300-1, "Clearing and Grubbing," of the STANDARD SPECIFICATIONS and these Special Provisions.

Add to Subsection 300-1.1, "General," the following:

Areas to be cleared shall be grubbed to a depth necessary to remove all stumps, roots, buried logs, and all other objectionable material.

Clearing and Grubbing shall include but not be limited to the following:

1. Removal of approximately 101 trees – many of them large diameter
2. Bypass Garden Grove Well 29 discharge to waste line
3. Demolish Garden Grove Well 29 discharge to waste line
4. Demolish dilapidated exercise equipment around basin
5. Demolish picnic tables and benches
6. Remove un-reinforced concrete pads under the picnic tables
7. Remove and dispose of up to ten charcoal bar-b-que stands at various locations around the basin
8. Removal of extensive system of irrigation controllers and irrigation pipelines
9. Removal of an existing 10 cfs pump station with containment shed near the location of the new pump station
10. Removal of “Twin Lakes Freedom Park” marquee sign and transport to City of Garden Grove maintenance yard
11. Removal of existing block wall along downstream RCB

Interfering portions of trees, shrubs and other vegetation over or within the right-of-way shall be trimmed or removed by the CONTRACTOR when required to maintain access to the construction area or as directed by the ENGINEER.

Where the grading plane is more than five feet above natural ground, all trees, stumps and roots shall be cut off not more than one foot above natural ground, or completely removed where necessary for placement of piles, structures, trenches or removal of unsuitable material.

Clearing and Grubbing shall be limited to the area within excavation and embankment slope rounding lines and within two feet of ditches, structures, or other items to be constructed. All other vegetation outside clear and grub areas shall be protected in place from damage resulting from the CONTRACTOR's operations.

Areas to be cleared shall be limited to the immediate construction area only, and shall not include the entire right-of-way.

The CONTRACTOR's attention is directed to the existing landscaped areas within the right-of-way and the need to conform to the requirements of Subsection 300-1.2, "Preservation of Property."

Property owners will be notified by the OC Public Works, Construction Division that they may salvage their landscaping and improvements within the construction area prior to construction by the CONTRACTOR. Any landscaping or improvements remaining with the immediate construction area at the time of construction shall be removed by the CONTRACTOR.

Sprinkler lines found within the construction area shall be removed and capped outside the construction area, as directed by the ENGINEER.

All combustible materials, trash, debris and other waste materials from Clearing and Grubbing or from any construction operations of this CONTRACT shall be disposed of outside the road right-of-way in accordance with Section 300-1.3, "Removal and Disposal of Material," of the STANDARD SPECIFICATIONS.

The CONTRACTOR shall protect all existing structures or facilities which are adjacent to or fall within, the limits of the work to be done under this contract, in accordance with Section 7-9, "Protection and Restoration of Existing Improvements," of the STANDARD SPECIFICATIONS. This item shall also include those structures and facilities which these specifications indicate are to be protected. Any structure or facility to be protected, which is damaged as a result of the CONTRACTOR's construction operation shall be replaced by the CONTRACTOR, at his cost, to the satisfaction of the ENGINEER.

Full compensation for conforming to the requirements of CLEARING AND GRUBBING shall be considered as included in the CONTRACT LUMP SUM price bid for CLEARING AND GRUBBING and no additional compensation will be allowed therefor.

The lump sum listed in Section C, "Payments," of these Special Provisions or the CONTRACT lump sum price bid as submitted by the CONTRACTOR in the Proposal, whichever is less, shall be paid with the monthly progress payments. Any amount bid in excess of the value for progress payments purposes listed in Section C, "Payment," of these Special Provisions, will be included for payment in the first estimate made after acceptance of the CONTRACT.

F-16 EXISTING FACILITIES

This work shall consist of removing, relocating, or protecting existing facilities which interfere with construction. Removed facilities shall be disposed of, salvaged, relocated as specified in these Special Provisions, as shown on the Plans, or as directed by the ENGINEER.

Trenches, holes, depressions and pits caused by the removal of highway facilities shall be backfilled with embankment material as provided in Section 300, "Earthwork", of the STANDARD SPECIFICATIONS. Such trenches, holes, depressions and pits that are in surfaced areas, otherwise to remain undisturbed, shall be backfilled with materials equal to or better in quality and to the same thickness as the surrounding materials.

Material, shown on the plans or designated in these Special Provisions, which is to be salvaged or used in the reconstructed work and which has been damaged or destroyed as a result of the CONTRACTOR's operations, shall be repaired or replaced by the CONTRACTOR, at his expense.

Payment for these items shall be as described below.

F-17 REMOVE ASPHALT CONCRETE PAVEMENT

Remove Asphalt Concrete Pavement shall include the following:

1. Removal of the existing 44 space parking lot
2. Removal of the existing 3900 lineal foot and 12-ft wide asphalt basin perimeter road

The work shall conform to the provisions in Subsection 300-1.3, "Removal and Disposal of Materials," of the STANDARD SPECIFICATIONS, and these Special Provisions.

The pay quantities of pavement to be removed will be measured by the cubic yard, before and during removal.

Existing pavement shall be sawcut to the limits shown on the plans, and reconstructed to join existing conditions to provide a smooth transition, as directed by the ENGINEER.

Full compensation for conforming to the requirements of REMOVE ASPHALT CONCRETE PAVEMENT including:

1. furnishing labor, tools, equipment, and materials necessary for accomplishing the work
2. sawcutting
3. disposal of removed materials

shall be considered as included in the CONTRACT unit bid price bid per cubic yard and no additional compensation will be allowed therefor.

F-18 REMOVE PORTLAND CEMENT CONCRETE (REINFORCED)

REMOVE PORTLAND CEMENT CONCRETE (REINFORCED) shall include the following items:

1. remove existing East Garden Grove Wintersburg Channel outlet structure into Haster Basin
2. remove existing Oertly outlet structure

Remove existing reinforced P. C. C. as designated on the plans. The work shall conform to the provisions in Subsection 300-1.3, "Removal and Disposal of Materials," of the STANDARD SPECIFICATIONS, and these Special Provisions.

The pay quantities of P. C. C. to be removed will be measured by the cubic yard, before and during removal.

Full compensation for conforming to the requirements of REMOVE REINFORCED CONCRETE including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place, and
2. Sawcutting
3. Disposal of removed materials

shall be considered as included in the CONTRACT unit bid price bid for REMOVE PORTLAND CEMENT CONCRETE (REINFORCED) per cubic yard and no additional compensation will be allowed therefor.

F-19 REMOVE PORTLAND CEMENT CONCRETE PAVEMENT

REMOVE PORTLAND CEMENT CONCRETE PAVEMENT shall include the following items:

1. remove reinforced concrete pad near the spillway location at the southwest area of the basin near the pump station
2. remove existing concrete sidewalk along parking lot
3. remove the portion of the basin perimeter road that is concrete

The work shall conform to the provisions in Subsection 300-1.3, "Removal and Disposal of Materials," of the STANDARD SPECIFICATIONS, and these Special Provisions.

The pay quantities of pavement to be removed will be measured by the cubic yard, before and during removal.

Existing pavement shall be sawcut to the limits shown on plans, and reconstructed to join existing conditions to provide a smooth transition, as directed by the ENGINEER.

Full compensation for conforming to the requirements of REMOVE PORTLAND CEMENT CONCRETE including:

1. furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place
2. sawcutting
3. disposal of removed materials

shall be considered as included in the CONTRACT unit bid price per cubic yard and no additional compensation will be allowed therefor.

F-20 REMOVE FENCING

Removed fencing shall be salvaged in 50 foot rolls and become property of the CONTRACTOR.

The CONTRACTOR shall notify the ENGINEER 24 hours prior to the removal of any fencing existing or temporary to obtain approval prior to beginning work.

The CONTRACT unit price bid per linear foot for REMOVE FENCING shall constitute full compensation for furnishing all labor, materials including placing and removal of temporary fencing if required, tools, equipment, incidentals and for accomplishing all work involved and no additional compensation will be allowed therefor.

No adjustment in the unit price bid will be allowed for any increase or decrease in the quantity of REMOVE FENCING.

F-21 TEMPORARY FENCE

TEMPORARY FENCE shall conform to Standard Plan 1412 and as shown on the plans or as directed by the ENGINEER.

Removed existing fencing may be used as temporary fencing provided it is free from defects and as approved by the ENGINEER.

New material provided for temporary fencing shall have a fabric width of not less than > inches.

All existing fencing used as temporary fencing shall become the property of the CONTRACTOR.

Full compensation for TEMPORARY FENCE shall be considered as included in the CONTRACT price bid per linear foot which shall constitute full compensation for furnishing all labor, materials including placing, removal and salvage of temporary fencing, tools, equipment, incidentals and for accomplishing all work involved and no additional compensation will be allowed therefor.

F-22 EARTHWORK

Earthwork shall conform to the provisions of OC Public Works (RDMD) Standard Plan 1806, Section 300, "Earthwork," of the STANDARD SPECIFICATIONS, and these Special Provisions.

To Section 300, "Earthwork," of the STANDARD SPECIFICATIONS, add the following:

Whenever reference to finished grade is made, it shall be considered to be the finished surface of the completed facility.

Relative compaction of not less than 90 percent (90%) shall be obtained for a minimum depth of 0.5 foot below the grading plane, including shoulders, whether in excavation or embankment.

In connection with earthwork, tests shall be made to conform with Section 211, "Soils and Aggregate Tests," and the following:

TEST	TEST METHOD
RELATIVE COMPACTION	*
SAND EQUIVALENT	NO. CALIF. 217
RESISTANCE (R-VALUE)	NO. CALIF. 301
SIEVE ANALYSIS	NO. CALIF. 202
NUCLEAR DENSITY GAUGE	NO. CALIF. 231 (PART I)

* - Relative Compaction shall conform to the testing requirements as specified in OC Public Works Standard Plan 1801, General Note No. 11.

Trenches, holes, depressions and pits caused by the removal of facilities shall be backfilled with embankment material as provided in Section 300, "Earthwork," of the STANDARD SPECIFICATIONS. Such trenches, holes, depressions and pits that are in surfaced areas, otherwise to remain undisturbed, shall be backfilled with material equal to or better in quality and to the same thickness as the surrounding materials.

When hauling is done over public highways, and when directed by the ENGINEER, loads shall be trimmed and all material removed from shelf area of vehicles in order to eliminate spilling of material. If directed by the ENGINEER, loads shall be watered after trimming to eliminate dust.

Operations shall be conducted in such a manner that existing highway facilities, utilities, and other upon-highway facilities which are to remain in place will not be damaged.

Surplus excavated material shall become the property of CONTRACTOR. CONTRACTOR shall be responsible to dispose surplus material outside of PROJECT right-of-way in accordance with all applicable ordinances.

Cross-sections were derived from topographic maps. The accuracy specification of the topographic map is that 90% of the points field checked in the inspection of the map are accurate within one-half contour interval.

F-22.2 SUBGRADE TOLERANCES

Subsection 301-1.4, "Subgrade Tolerances," shall be deleted and the following added:

> Subgrade for pavement, sidewalk, curb and gutter or other roadway structures shall not vary more than 0.05 foot from the specified grade and cross section. Subgrade for sub-base or base material shall not vary more than 0.10 foot from the specified grade and cross section. Variations within the above-specified tolerances shall be compensating so that the average grade and cross section specified are met.

After subgrade is made, the CONTRACTOR shall notify the ENGINEER to inspect the subgrade to determine the final structural section of pavement.

F-23 UNCLASSIFIED EXCAVATION

Unclassified Excavation shall conform to the provisions of Section 300-2, "Unclassified Excavation," of the STANDARD SPECIFICATIONS for Public Works Construction and these Special Provisions.

Unclassified excavation material shall become the property of the CONTRACTOR. CONTRACTOR shall be responsible to dispose surplus material outside of PROJECT right-of-way. CONTRACTOR shall make all arrangements for disposal of the material at off-site locations.

Delete the second paragraph of Subsection 300.2.8 and substitute the following:

> Measurement of Unclassified Excavation will be based on the volume it occupied prior to excavation. Disagreement regarding volume measurements shall be resolved prior to excavation. Any remeasuring or resurveying required as a result of disagreement will be at CONTRACTOR's expense.
>
> No excavation within five (5) feet of the traveled way shall remain open longer than is necessary to perform the work.
>
> At the end of each working day, if a difference in excess of 0.33 foot exists between the elevation of the existing pavement and the elevation of any excavation within five feet of the traveled way, material shall be placed up and compacted against the vertical cuts adjacent to the traveled way.
>
> The material shall be placed to the level of the elevation of the top of existing pavement and tapered at a slope of 4:1 or flatter to the bottom of the excavation.
>
> During excavation operations, native material may be used for this purpose; however, once the placing of the structural section commences, structural material shall be used.

Contour grading and rounding of the tops and ends of excavation and toes of fill slopes will be required.

No payment for material excavated as part of structural excavation and removal shall be included in the price paid for UNCLASSIFIED EXCAVATION.

No payment for material excavated as part of shoring operations, including slopes, shall be included in the price paid for UNCLASSIFIED EXCAVATION.

Full compensation for conforming to the requirements of UNCLASSIFIED EXCAVATION including:

1. Providing all of the equipment, tools, labor and materials required for accomplishing the work complete and in place necessary.

shall be considered as included in the CONTRACT unit price bid per cubic yard and no additional compensation will be allowed therefor.

F-24 STRUCTURE EXCAVATION

Structure Excavation shall conform to Subsections 300-3 and 300-7 of the STANDARD SPECIFICATIONS. All surplus excavated shall become the property of the CONTRACTOR and shall be disposed of outside of PROJECT right-of-way in accordance with all applicable ordinances.

Please see Section C of these special provisions for directions on how to download the Geotechnical Report for this project from the DISTRICT's FTP site.

The quantities used in determining payment for STRUCTURE EXCAVATION shall be calculated based upon the paylines shown on the plans.

Full compensation for conforming to the requirements of Structure Excavation including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.
2. Disposal of surplus excavated material.

shall be considered as included in the CONTRACT unit price bid per cubic yard and no additional compensation will be allowed therefor.

F-25 SHORING AND TRENCH SHORING

Shoring and Trench Shoring for the PROJECT shall conform to the provisions in Subsection 306-1.1.6, "Bracing Excavation," of the STANDARD SPECIFICATIONS and these Special Provisions.

CONTRACTOR SHALL OBTAIN A CAL-OSHA PERMIT PRIOR TO ANY TRENCH EXCAVATION.

The CONTRACTOR's attention is directed to the provisions in Subsection 7-10.4.1, "Safety Orders," which require submitting a shoring/bracing plan for DISTRICT review and approval.

Approval by the ENGINEER of the shoring drawings or shoring inspection performed by the ENGINEER will in no way relieve CONTRACTOR of full responsibility for adequacy of the shoring.

Construction is taking place in a developed residential area, the CONTRACTOR shall take all necessary precautions to protect the public, especially children, from the hazards of open excavation. Trenches shall be covered at night and on weekends and during non-working hours.

Full compensation for conforming to the requirements of SHORING AND TRENCH SHORING shall be considered as included in the CONTRACT lump sum bid price and no additional compensation will be allowed therefor.

F-26 STRUCTURE BACKFILL

To Section 300-3.5, "Structure Backfill," add the following:

> Compaction equipment or methods which may cause excessive displacement, or may damage structures, shall not be used.

Structure Backfill shall have a minimum sand equivalent of 20 and shall conform to Subsection 300-3.5 of the STANDARD SPECIFICATIONS.

The quantities used in determining payment for STRUCTURE BACKFILL shall be calculated based upon the paylines shown on the plans.

Full compensation for conforming to the requirements of STRUCTURE BACKFILL including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

shall be considered as included in the CONTRACT unit price bid per cubic yard and no additional compensation will be allowed therefor.

F-27 UNCLASSIFIED FILL

Unclassified Fill shall conform to Subsection 300-4 of the STANDARD SPECIFICATIONS.

Unclassified Fill shall include all fill required to construct finished lines and grades within the payline limits shown on the plans or as directed by the ENGINEER. No payment shall be made for placing material excavated as part of, or in place of, a shoring operation including material excavated for sloping or placement of shoring.

Full compensation for transporting excavated material and placing it as compacted fill shall be considered as being included in the CONTRACT bid price per cubic yard for Unclassified Fill compacted in place; and no adjustment for shrinkage, subsidence or any other allowance will be made therefor.

Structural and unclassified excavated material may be used as unclassified fill as approved by the ENGINEER.

Whenever selection is possible, excavation material having sand equivalent value less than 20 shall not be placed within 2.5 feet of finished grade, and shall be placed in the lower portions of embankments.

Measurement of all Unclassified Fill will be based only on the volume it occupies in its final position after compaction. Any disagreement over volume measurements requiring verification by survey will be.

Before placing material for compacted fill, the surfaces shall be cleared of all existing obstructions, vegetation, and debris.

Unsuitable material shall be removed as directed by the ENGINEER and the existing surfaces scarified to a depth of 6 inches before placing the fill. Fill material shall be compacted in horizontal layers such that the compaction equipment will be brought to bear on the full width and depth of the fill layer.

Fill shall be compacted to a relative compaction of not less than 90 percent.

Full compensation for conforming to the requirements of UNCLASSIFIED FILL shall be considered as included in the CONTRACT unit price bid per cubic yard and no additional compensation will be allowed therefor.

F-28 ASPHALT CONCRETE PAVEMENT

Asphalt Concrete Pavement shall conform to the Special Provisions outlined in Standard Plan 1805.

Full compensation for conforming to the requirements of ASPHALT CONCRETE including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

shall be considered as included in the CONTRACT unit price bid per cubic yard and no additional compensation will be allowed therefor.

F-29 CONCRETE STRUCTURES

All Concrete Structures shall conform to Standard Plan 1803, the provisions in Subsection 303, "Concrete and Masonry Construction," of the STANDARD SPECIFICATIONS, these Special Provisions, and the details shown on the plans.

Materials comprising construction shown on the plans and referenced to in these Special Provisions shall conform to Section 201, "Concrete, Mortar and Related Materials," and Section 201-2, "Steel Reinforcement for Concrete," of the STANDARD SPECIFICATIONS, and OC Public Works Standard Plan 1803.

All concrete used in non-precast structures shall be Class 560-C-3250 as specified by Section 201-1.1.2, "Concrete Specified by Class," of the STANDARD SPECIFICATIONS.

All precast units shall be made of concrete having a minimum compressive strength (f'c) of 5000 psi at 28 days (6-1/2 sack mix).

All cement shall be Type II or approved equal.

All reinforcing steel shall be ASTM A-615 Grade 60.

F-30 CONCRETE VEE-DITCH

Concrete Vee-Ditch shall conform to OC Public Works (RDMD) Standard Plan 1321.

Full compensation for conforming to the requirements of CONCRETE VEE-DITCH including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

shall be considered as included in the CONTRACT unit price bid per LINEAR FOOT and no additional compensation will be allowed therefor.

F-31 INLET STRUCTURES

Inlet Structures shall be Type I, Type II Type III and Type IV, conforming to OC Public Works (RDMD) Standard Plan 1301, 1302, 1303, 1304, 1306 and 1307 respectively, with local depressions, conforming to OC Public Works Standard Plan No. 1308, or as modified by plans, and shall be constructed at locations shown on the plans.

Full compensation for conforming to the requirements of INLET STRUCTURES including:

1. furnishing all labor, tools, equipment and materials necessary for accomplishing the work complete and in place
2. excavation
3. fill
4. reinforcing steel
5. manhole frame and cover

shall be considered as included in the CONTRACT unit bid price per EACH and no additional compensation will be allowed therefor.

F-32 JUNCTION STRUCTURES

Junction Structures shall be Type I, Type II, Type III, Type IV, Type V and Type IV conforming to OC Public Works (RDMD) Standard Plan 1310, 1311, 1312, 1313, 1314, and 1315, or as shown on the plans.

A minimum concrete strength of 3250 psi must be attained before any backfilling will be allowed.

Junction Structure manholes shall be adjusted to grade in the manner prescribed in these Special Provisions.

Full compensation for conforming to the requirements of JUNCTION STRUCTURES including:

1. furnishing all labor, tools, equipment and materials necessary for accomplishing the work complete and in place
2. excavation
3. fill
4. reinforcing steel

shall be considered as included in the CONTRACT unit bid price per EACH JUNCTION STRUCTURE and no additional compensation will be allowed therefor.

F-33 INLET TYPE V

Inlet Type V shall conform to Section 207-11 "Corrugated Steel Pipe and Pipe Arches", and Section 306-1 "Open Trench Operations", OC Public Works (RDMD) Standard Plan 1305 and as shown on the plans.

All exposed metal surfaces shall be galvanized. Pipe and fitting shall be 16 gage minimum unless otherwise shown on the plans.

The CONTRACT unit price paid per EACH for INLET TYPE V shall be considered full compensation for furnishing all materials, concrete, excavation, backfill and incidentals and no additional compensation will be allowed therefor.

F-34 STRUCTURE CONCRETE

Portland Cement Concrete (P.C.C.) for structures shall conform to the provisions of OC Public Works (RDMD) Standard Plan 1803, the provisions in Subsection 303-1, "Concrete Structures," and these Special Provisions. The concrete shall be P.C.C. as specified in Subsection 201-1.1.2., "Concrete Specified by Class" of the STANDARD SPECIFICATIONS and as indicated on the plans. Concrete shall be thoroughly consolidated to ensure high density and impermeability.

Structure Concrete shall include the following items:

1. pump station wet well
2. pump station inlet apron
3. pump station outlet channel to Aspenwood
4. pump station pump house
5. Oerly inlet structure
6. East Garden Grove Wintersburg Channel extension from Haster/Los Alamitos intersection to basin
7. East Garden Grove Wintersburg Channel outlet structure

F-34.1 GENERAL CHANNEL LINING INFORMATION

The CONTRACTOR shall furnish all equipment, labor, tools and materials to construct reinforced Portland cement concrete channel, and appurtenant work to the grades and dimensions shown on the Plans or staked in the field. The CONTRACTOR shall submit a method for placement of P.C.C. for the ENGINEER's approval, at least five days prior to commencement of work.

Unless otherwise specified, transverse construction joints shall be placed in all reinforced sections at intervals of not less than 10 feet or more than 50 feet. The joints shall be in the same plane for the entire structure. Concrete thicknesses greater than six inches shall be keyed in accordance with OC Public Works Standard Plan 1318 and as directed by the ENGINEER.

The concrete invert shall be given a steel trowel finish.

F-34.2 ALTERNATE PANEL METHOD

After placement of all concrete in a panel or section on one side of a joint has been completed, placement of concrete on the other side of the joint shall be delayed as directed by the ENGINEER but in no event shall the delay be less than eight hours.

F-34.3 CONTINUOUS PAVING METHOD

This method of paving shall not be used for this PROJECT.

F-34.4 FORMS

Add to Subsection 303-1.3, "Forms," the following:

> Forms shall be braced to withstand the pressures developed and shall be tight to prevent the loss of P.C.C. or mortar. Formed wall surface shall be free of any unevenness greater than one-fourth (1/4) inch when checked with a ten (10) foot straight edge.

If "snap-ties" are to be used for bracing of forms, only non-metallic "snap-ties" shall be used. In addition, after removal of forms all "snap-ties," and any portions thereof, protruding or exposed on the concrete surface shall be removed and any holes patched.

A clear non-staining form release agent, which will neither discolor nor affect the surface texture of the concrete and which does not react with any ingredients of the concrete, shall be used. The cost of furnishing and placing form release agent shall be included in the cost of Portland cement concrete.

F-34.5 TOLERANCES AND SURFACE FINISHES

Top of channel walls elevation shall not vary from true line and grade more than one-half (1/2) inch in thirty (30) foot. Unevenness of all surfaces shall not be more than one-half (1/2) inch when checked with a ten (10)-foot straight edge.

The ten (10)-foot straight edge or template shall be furnished by the CONTRACTOR and shall be readily available prior to placing of concrete.

Except as specified above, vertical or horizontal position of structures as shown on the plans or as specified in these specifications shall not vary more than one-half (1/2) inch from true position. Elevation at inlet lips shall not vary more than one-fourth (1/4) inch from elevations shown on plans.

Add to 303-1.9.2, "Ordinary Surface Finish," the following:

> Ordinary Surface shall not apply to rock pockets which, in the opinion of the ENGINEER, are of such an extent or character as to affect the strength of the structure materially or to endanger the life of the steel reinforcement. In such cases, he may declare the concrete defective and require the removal and replacement of the structure affected.

F-34.6 CURING

Add to Subsection 303-1.10, "Curing," the following:

Where the curing compound method is used on concrete surfaces exposed after construction, sloped surfaces flatter than 3/4:1 shall be sealed with Type 2 white pigmented wax base compound. Surfaces steeper than 3/4:1 shall be sealed with a Type 1 clear or translucent wax base curing compound.

F-34.7 WEEPHOLES

Weephole pipes placed for channel construction shall be PVC CL315, schedule 40, conforming to ASTM D 2729, or an ENGINEER-approved equivalent. Weepholes shall be placed 10 feet on center and wrapped in filter fabric as shown on the plans.

Payment for all labor, materials, tools, equipment, glue, and other appurtenant items to install weepholes shall be included in the unit price bid for Portland Cement Concrete and no additional compensation shall be allowed.

Add to Subsection 303-1.11, "Payment," the following:

Full compensation for conforming to the requirements of STRUCTURE CONCRETE shall include but not be limited to:

1. All labor, equipment, tools, materials and incidentals (exclusive of bar reinforcing steel and gravel base material);
2. Forms, expansion joints;
3. Weepholes;
4. Finishing and curing;

and shall be considered as included in the contract unit price bid per CUBIC YARD and no additional compensation shall be allowed therefor.

F-35 BAR REINFORCING STEEL

Reinforcing steel shall be Grade 60, hot rolled from new billet steel, conforming to ASTM A615 and ASTM A706, Section 201-2, "Reinforcement for Concrete," of the STANDARD SPECIFICATIONS, OC Public Works Standard Plan 1803, and these Special Provisions.

All reinforcing steel shall be placed on supports to maintain the distance between the reinforcing steel and the subgrade, as required by the plans and specifications. Under no circumstances shall the reinforcing steel be placed on the subgrade and pulled during placement of concrete. The CONTRACTOR shall not place concrete until the ENGINEER has inspected the reinforcing steel placement and integrity of the steel reinforcement.

No splices in transverse steel reinforcement will be permitted other than shown on the plans. No lapped splices will be permitted at locations where the concrete section is not sufficient to provide a minimum clear distance of two inches (2") between the splice and the nearest adjacent bar.

Splicing of reinforcing bars shall be by mechanical butt splicing or contact lap splicing at the option of the CONTRACTOR. Splicing of reinforcing bars by butt welding shall not be permitted. Mechanical butt splicing shall be performed per Section 52-1.08B(1), "Mechanical Splices," of the CALTRANS STANDARD SPECIFICATIONS.

No more than one splice will be permitted in any longitudinal bar between transverse joints and the splices shall be staggered.

Full compensation for conforming to the requirements of BAR REINFORCING STEEL including furnishing all labor, materials, tools, equipment and incidentals involved in placing the reinforcing bars as detailed on the plans shall be included in the CONTRACT price bid per CUBIC YARD for STRUCTURE CONCRETE, and no additional compensation shall be allowed therefor.

F-36 MISCELLANEOUS CONCRETE

Miscellaneous Concrete shall conform to the provisions in Subsection 303-5, "Concrete Curbs, Walks, Gutters, Cross Gutters, Alley Intersections, Access Ramps, and Driveways," OC Public Works (RDMD)Standard Plan 1803, these Special Provisions, and as directed by the ENGINEER.

MISCELLANEOUS CONCRETE shall include:

1. Flared despressed driveway approach on Haster Street

Portland Cement Concrete shall be Class 520-C-2500, as specified in Section 201-1.1.2, "Concrete Specified by Class," of the STANDARD SPECIFICATIONS.

Full compensation for conforming to the requirements of MISCELLANEOUS CONCRETE including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.
2. Earthwork required to establish subgrade.

shall be considered as included in the CONTRACT unit price bid per CUBIC YARD and no additional compensation will be allowed therefor.

F-37 REINFORCED MASONRY BLOCK RETAINING WALL

Construction for the reinforced masonry block retaining wall shall conform to the details as shown on the plans Section 202, "Masonry Material," and Subsection 303-4, "Masonry Construction," of the STANDARD SPECIFICATIONS, and these Special Provisions.

The CONTRACTOR shall maintain the security of property owners adjacent to the proposed masonry concrete block wall by protecting the existing fence until construction of the reinforced masonry block wall is completed.

F-37.1 MASONRY UNITS

Masonry units shall be 12" x 8" x 16" and 8" x 8" x 16" precision light-gold color concrete blocks, Grade N, Type I units, conforming to ASTM C-90 and having a 28-day minimum compressive strength of l500 psi, and to the Quality Control standards of the Concrete Masonry Association as manufactured by Orco Block or an ENGINEER approved equal.

All masonry units shall be sound, free of cracks or other defects that would interfere with the proper placing of the unit or impair the strength of the construction.

CONTRACTOR shall furnish to the ENGINEER, prior to delivery of the masonry units, four certified copies of the tests specified for the units.

F-37.2 MORTAR

Mortar shall be Class "E" as specified in Subsection 201-5.l of the STANDARD SPECIFICATIONS. The quantity of water to be used in the preparation of mortar shall be only that required to produce a mixture sufficiently workable for the purpose intended.

Mortar shall be used as soon as possible after mixing and shall shown no visible signs of setting prior to use. Retempering of mortar will not be permitted.

Mortar droppings shall be kept out of the grout space.

If it is necessary to move a block so as to open a joint, the block shall be removed from the wall, cleaned, and set in fresh mortar.

Grout for pouring shall be of fluid consistency and mixed in the ratio by volume of 1 part Portland Cement to 2-1/4 parts minimum to 3 parts maximum damp loose sand.

Grout for pumping shall be of fluid consistency and shall not have less than seven sacks of cement in each cubic yard of grout. The mix design shall be approved by the ENGINEER.

All grout shall be puddled or vibrated in place.

Reinforcing steel shall be placed as indicated on the plans. Placement shall be inspected by the ENGINEER prior to placing grout. Reinforcing steel shall be in conformance with Section F- > of these Special Provisions.

During construction operations all adjoining work shall be protected from mortar droppings. Concrete block masonry shall be protected from the sun and rain. When approved in advance by the ENGINEER, complete masonry construction may be protected with a curing compound. Except in hot weather when it may be fogsprayed sufficiently to dampen the surface, finish concrete block masonry shall not be wetted.

All exterior walls shall be waterproofed with Chem-Trete RSM by Trocal, Polyglycoat Construction Products, Inc. or an ENGINEER approved equal a minimum of 2 weeks following completion of the laying. Masonry surface shall be dry and free of dust, mortar, holes, and cracks; all shrinkage cracks larger than .01 inch shall be carefully patched with a color-matching material.

Application will consist of a very light mist coat, following immediately by flood coat. Spray head will be held about 8 to 20 inches from the surface. The flood coat shall be allowed to run down the surface a distance of 6 to 8 inches. Spray shall be applied in a lapped fashion. Procedure shall be repeated where absorbed into surface. Material shall be applied at the rate of 60 to 70 square feet per gallon.

Waterproofing materials shall be applied by a low pressure material pump, pressure not to exceed 25 psi. Pump shall not atomize, but shall flow the material on the wall at a minimum rate of 1-1/2 gallons per minute.

Full compensation for conforming to the requirements of MASONRY BLOCK RETAINING including:

Full compensation for conforming to the requirements of Payment including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

shall be considered as included in the CONTRACT unit price bid per SQUARE FOOT and no additional compensation will be allowed therefor.

F-38 BRICK AND MORTAR PLUG

The CONTRACTOR shall furnish all labor, equipment, material, excavation and backfill required to construct brick and mortar plugs complete in place where shown on the plans and as specified herein.

The pipe shall be securely closed by a tight-fitting brick wall not less than 1.33 foot thickness with cement mortar joints.

Full compensation for conforming to the requirements of BRICK AND MORTAR PLUG including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

shall be considered as included in the CONTRACT unit price bid per EACH and no additional compensation will be allowed therefor.

F-39 CHAIN LINK FENCE

Fence construction shall be in accordance with details shown on the plans and OC Public Works Standard Plan 600-0 and 600-0-OC.

Chain link fence shall have a fabric width and height of six (6) feet, except as otherwise shown on the plans, or as directed by the ENGINEER. Chain link fence shall conform to the provisions in Subsection 304-3, " Chain Link Fence," of the STANDARD SPECIFICATIONS and these Special Provisions.

Full compensation for conforming to the requirements of CHAIN LINK FENCE including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

shall be considered as included in the CONTRACT unit price bid per Lineal Foot and no additional compensation will be allowed therefor.

F-40 CHAIN LINK GATE

CHAIN LINK GATE shall be in accordance with details shown on the plans and OC Public Works (RDMD) Standard Plan 1412.

Chain link gate shall be a fabric width as shown on the plans, or as designated by the ENGINEER. Chain link gate shall conform to the provisions in Subsection 304-3, "Chain Link Fence," of the STANDARD SPECIFICATIONS and these Special Provisions.

Measurement and payment for CHAIN LINK GATE shall be in accordance with Section 304-3.4, "Measurement and Payment," of the STANDARD SPECIFICATIONS, except as noted in these Special Provisions.

Full compensation for conforming to the requirements of Chain Link Gate including:

1. Mounting fixtures.

2. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.
3. Concrete footings.

shall be considered as included in the CONTRACT unit price bid per EACH for CHAIN LINK GATE and no additional compensation will be allowed therefore.

F-41 GUARD CABLE FENCE

Guard cable fence shall be furnished and installed in accordance with OC Public Works Standard Plan 1413, where shown on the plans. Guard Cable Fence shall be installed above the Oertly and East Garden Grove Wintersburg Channel outlet structures into the basin.

Full compensation for conforming to the requirements of Guard Cable Fence including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

shall be considered as included in the CONTRACT unit price bid per LINEAR FOOT and no additional compensation will be allowed therefor.

F-42 FLAP GATE

The CONTRACTOR shall furnish flap gates as shown on the plans. Flap Gates shall be cast iron Waterman Model F-l0 Automatic Drainage Gate with stainless steel links, bolts, and bushings (rubber seal shall not be used), or an ENGINEER-approved equal.

Full compensation for conforming to the requirements of Flap Gate including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

shall be considered as included in the CONTRACT unit price bid per EACH and no additional compensation will be allowed therefor.

F-43 REINFORCED CONCRETE PIPE

Reinforced Concrete Pipe shall conform to Subsection 207-2, "Reinforced Concrete Pipe," and Subsection 306-1, "Open Trench Operations," of the STANDARD SPECIFICATIONS, these Special Provisions, and as directed by the ENGINEER.

Reinforced Concrete Pipe shall be of the size and strength designated as shown on the plans and as listed in the Proposal.

All work necessary for any given length of pipe placed, including excavation, bedding, pipe placement, backfill and temporary resurfacing, shall be accomplished during the same working day.

Bedding for the reinforced concrete pipe shall conform to OC Public Works Standard Plan 1319, and as specified on the plans.

Bedding placed in excess of the limits shown on OC Public Works Standard Plan 1319 and for the convenience of the CONTRACTOR shall not be subject to any additional compensation.

Compaction equipment or methods which may cause excessive displacement or may damage structures, such as sleeve tapers or other drop-weight type equipment, shall not be used.

Full compensation for conforming to the requirements of REINFORCED CONCRETE PIPE including:

1. excavation
2. furnishing and laying pipe
3. collars
4. bedding per OC Public Works Standard Plan 1319
5. backfill
6. bracing and protecting existing utilities
7. placing and removal of temporary A.C. surfacing in roadway areas
8. all other labor, equipment and material incidental to the pipe

shall be considered as included in the CONTRACT unit bid price per linear foot and no additional compensation will be allowed therefor.

F-43.1 BEDDING AND BACKFILL FOR REINFORCED CONCRETE PIPE CONDUIT

The CONTRACTOR is referred to Section 306-1.2.1, "Bedding," and Section 306-1.3, "Backfill and Densification," and to OC Public Works Standard Plan 1319.

Placing backfill uniformly on all sides shall mean limiting the differential fill level to two feet or less.

Full compensation for conforming to the requirements of BEDDING AND BACKFILL FOR REINFORCED CONCRETE PIPE CONDUIT shall be considered as included in the CONTRACT unit price bid for REINFORCED CONCRETE PIPE and no additional compensation will be allowed therefor.

F-44 AGGREGATE BASE MATERIAL

Aggregate Base Material shall conform to the requirements of Subsection 400-2, "Untreated Base Materials," and Section 301-2, "Untreated Base" of the STANDARD SPECIFICATIONS, Standard Plan 1804, and these Special Provisions.

Aggregate base material shall be placed as shown on the plans and as directed by the ENGINEER.

The provisions in Subsection 301-2.2, "Spreading," of the STANDARD SPECIFICATIONS are amended as follows:

A. At the time the aggregate base material is spread, it may have a moisture content sufficient to obtain the required compaction. Such moisture shall be uniformly distributed throughout the material.

Full compensation for conforming to the requirements of Aggregate Base Material including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place

shall be considered as included in the CONTRACT unit price bid per cubic yard and no additional compensation will be allowed therefor.

F-45 RIPRAP MATERIAL

This work shall consist of placing riprap protection to the lines and grades as shown on the Plans, conforming to the requirements of Subsection 200-1.6, "Stone for Riprap," of the STANDARD SPECIFICATIONS, OC Public Works Standard Plan 1809, and as described in these Special Provisions.

Where the rock (revetment) thickness and rock gradation differs between the Plans, Special Provisions and Standard Plan 1809, the revetment thickness and gradations as specified on the Plans and then in the Special Provisions shall prevail. The revetment thickness and gradations as specified by Standard Plan 1809 shall only be referenced if no thickness and gradations are furnished on the Plans or within the Special Provisions.

Broken concrete, asphalt pavement, and other non-rock materials may not be used as riprap unless otherwise directed by the ENGINEER.

Rocks shall be of such shape as to form a stable protection structure of the required section. Flat or needle shapes will not be accepted unless thickness of the individual pieces is greater than 1/3 the length.

Saturated surface dry (as described in ASTM C 127, 5.1.2, "Bulk Specific Gravity"), specific weight or unit weight of stone for riprap material shall be a minimum of 155 pounds per cubic foot.

Riprap material shall be placed directly against the finished grade of the earthen basin bank at the two outlets into the basin and at each side of the pump station intake apron.

Riprap material shall be placed directly on top of the filter fabric material in such a manner that damage to or displacement of fabric shall not occur. Any damage or displacement to the filter fabric material shall be replaced or repaired by the CONTRACTOR, shall conform to the overlap and pinning provisions as set forth in these Special Provisions, and shall be completed at the CONTRACTOR's expense.

Quantities shall be determined from the dimensions shown on the plans and verified by measurements in the field or as directed by the ENGINEER. CONTRACTOR shall furnish ENGINEER with and ENGINEER will use copies of CONTRACTOR's weigh tickets to verify total weight of riprap material delivered to jobsite. Material placed in excess of those dimensions as shown on the plans will not be paid for.

All riprap material in excess of what is required to fulfill the requirements of the Plans and these Special Provisions shall become the property of the CONTRACTOR and shall be disposed of off-site. Or, CONTRACTOR may coordinate with the ENGINEER for disposal/donation of excess riprap material on DISTRICT property.

CONTRACTOR shall take special care to protect in place existing and proposed structures during the excavation for and placement of riprap.
Full compensation for conforming to the requirements of RIPRAP MATERIAL including:

1. Placement of riprap material,
2. Transportation,
3. Furnishing all labor, tools, equipment, materials, and incidentals necessary for accomplishing the work complete and in place,

and shall be considered as included in the CONTRACT unit price bid per CUBIC YARD and no additional compensation will be allowed therefor.

F-46 GRAVEL BASE MATERIAL

Gravel Base Material shall conform to Subsection 303-1.2, "Subgrade for Concrete Structures," of the STANDARD SPECIFICATIONS, OC Public Works Standard Plan 1803, and to these Special Provisions.

Gravel base material shall be placed as shown on the plans and as directed by the ENGINEER.

Gravel base material grading shall be per Standard Plan 1803, Type D3, with an approximate composition of No. 3 rock.

Measurement of gravel base material shall be in tons of material in place and will be determined by the ENGINEER on the basis of volume computed from the lines and grades shown on the plans or staked in the field.

Weight tickets signed by a certified public weighmaster will be used as a basis of verification. Gravel base material placed in excess of the volume shown on the plans will not be paid for unless its placing is directed in writing by the ENGINEER. Material delivered on the site but not incorporated in the completed work shall not be compensated.

Full compensation for conforming to the requirements of Gravel Base Material including:

1. Furnishing all labor, tools, equipment, and materials necessary for accomplishing the work complete and in place.

shall be considered as included in the CONTRACT unit price bid per CUBIC YARD and no additional compensation will be allowed therefor.

F-47 FILTER FABRIC

The geotextile shall be woven or non-woven and shall consist of long chain, polymeric filaments of polypropylene, polyester, or nylon. The fabric shall be a stable network of fibers which retain their positions relative to each other. The geotextile shall be ultraviolet stabilized and shall meet all requirements listed in OC Public Works Standard Plan 1808.

Geomembrane underliner shall be non-woven type I for application under concrete structures and non-woven type II for application under the riprap channel lining and gabion structures as specified by OC Public Works Standard Plan 1808.

The CONTRACTOR shall place filter fabric below all gravel base material, aggregate base material and extend it around the gravel gallery of the weep holes.

Geotextiles shall be furnished in rolls wrapped with a protective covering to protect it against ultraviolet radiation and abrasion. Each roll of fabric shall be marked or tagged to identify the manufacturer, type, length, width, and production identification number.

Sampling and test compliance shall conform to Subsection 213-1.3, "Sampling and Test Compliance," of the STANDARD SPECIFICATIONS and Standard Plan 1808. The CONTRACTOR shall submit to the ENGINEER copies of the manufacturer's specifications for the product including placement specifications. CONTRACTOR shall not place any filter fabric until written authorization from the ENGINEER is received.

Storage and handling of the filter fabric shall conform to Subsection 213-1.4, "Storage and Handling," of the STANDARD SPECIFICATIONS.

Once the subgrade along a particular segment has been prepared to the satisfaction of the ENGINEER, the geotextile shall be unrolled along the prepared surface. The fabric shall not be dragged across any surface, and the entire fabric shall be rolled out as smoothly as possible. All filter fabric exposed to ultraviolet radiation (the sunlight) for more than three days shall be rejected by the ENGINEER and replaced with new filter fabric.

Parallel rolls of fabric shall be overlapped a minimum of 18 inches, under concrete structures and roadway sections, 30 inches, under riprap material or gabion structures, or sewn if required or as specified by the manufacturer's specifications. All overlaps shall not be included in the quantity of filter fabric paid to the CONTRACTOR, and the CONTRACTOR's bid should be adjusted accordingly.

The fabric shall be secured in place where required with pins placed on six (6) foot centers, at the midpoints of all overlaps, and at the edges to maintain them during construction activities. Before covering the fabric, the condition of the fabric shall be inspected by the ENGINEER to determine that no holes exists in the fabric. All such occurrences shall be repaired by placing a new layer of fabric extending beyond the defect in all directions a distance equal to the minimum overlap requirement.

Riprap, gravel base, aggregate base, asphalt material, etc. shall not be placed or dropped on the fabric in any way that may damage or displace the fabric. Riprap material shall be placed upon the geomembrane underliner in manner consistent with manufacturer's recommendations, and gravel base, aggregate base, or asphalt material shall not be dropped onto the fabric from a height greater than three feet, nor shall the CONTRACTOR drive or operate any machinery on or across the fabric that will damage or displace the fabric.

Full compensation for conforming to the requirements of FILTER FABRIC shall include furnishing all labor, tools, equipment, materials, and incidentals necessary for completing the work and shall be considered as included in the CONTRACT unit price paid per SQUARE FOOT and no additional compensation will be allowed therefor.

F-100

SHOP DRAWINGS, SAMPLES, AND RECORD DRAWINGS

100.1 GENERAL

1.1 DESCRIPTION

A. CONTRACTOR shall furnish detailed shop drawings, catalog cuts, and samples where necessary In order to verify compliance with the plans and specifications.

B. CONTRACTOR shall maintain record drawings (as-builts) on the jobsite and update on a regular basis.

1.2. SYSTEM NOT USED

1.3. STANDARD SPECIFICATIONS

A. Unless otherwise indicated on the drawings or specified, only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the CONTRACTOR to be incorporated in the work shall be subject to the inspection and approval of the DISTRICT. No material shall be processed for, fabricated for, or delivered to the work site without prior approval of the DISTRICT.

1.4. SUBMITTALS

A. Within ten days after the Notice to Proceed, the CONTRACTOR shall submit to the DISTRICT a shop drawing schedule including the names and addresses of the manufacturer and suppliers of all materials and equipment he proposes to incorporate into the work.

B. As requested, the CONTRACTOR shall also submit data relating to the materials and equipment he proposes to incorporate into the work. This data shall be submitted with sufficient detail to enable the DISTRICT to identify the particular product in question, and to form an opinion as to its conformity to the contract requirements. Such data shall be submitted in a manner similar to that specified for shop drawings.

1.5. SHOP DRAWINGS

A. The CONTRACTOR shall submit for review seven sets of shop drawings of equipment and materials to be used on this contract. Shop drawings shall be bound in three ring binder, pages larger than 11” x 17” shall be folded and inserted into appropriate plastic holders for easy removal. A table of contents shall be supplied at the front of the binder. The reproducible copy will be returned to the CONTRACTOR.

B. Such drawings shall show the principal dimensions, weight, structural and operating features, performance characteristics and wiring diagrams, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawings. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for this contract.

C. When so specified or if considered by the DISTRICT to be acceptable, manufacturer's specifications, catalog data, descriptive matter, illustrations, etc. may be submitted for approval in place of a shop drawing. In such case, the requirements shall be as specified for shop drawings, insofar as applicable.

D. The CONTRACTOR shall be responsible for the prompt submission of all shop drawings in accordance with the shop drawing schedule so that there shall be no delay to the work due to the absence of such drawings.

E. No material shall be purchased or fabricated especially for this contract until the required shop drawings have been submitted, reviewed, and approved as conforming to the contract requirements. All materials and work involved in the construction shall then be as represented by said drawings.

F. Only shop drawings, which have been checked and corrected by the fabricator, shall be submitted to the CONTRACTOR by his Subcontractors and vendors. Prior to submitting shop drawings to the DISTRICT, the CONTRACTOR shall check thoroughly all such drawings to satisfy himself that the subject matter conforms to the drawings and specifications in all respects. Shop drawings, which are correct, shall be marked with the date, checker's name and indication of the CONTRACTOR'S approval, and then shall be submitted to the DISTRICT; other drawings shall be returned for correction. The CONTRACTOR'S stamp of approval on shop drawings and samples shall constitute a representation to the DISTRICT that the CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers and similar data, or he assumes full responsibility for doing so, and that he has reviewed or coordinated each shop drawing and sample with the requirements of the contract documents. **Shop drawings submitted without CONTRACTOR'S stamp of approval will be rejected.**

G. The DISTRICT'S review of shop drawings will be only for conformance with the design concept and functional result of the project and compliance with the information given in the contract documents. The CONTRACTOR shall be responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication processes or to techniques of construction; and for coordination of the work of all trades.

H. The CONTRACTOR shall make any corrections required by the DISTRICT and shall return the required number of corrected copies of shop drawings or resubmit new samples for review until no further exceptions are noted.

I. At the time of each submission or resubmission, the CONTRACTOR shall direct specific attention, in writing, to deviations that the shop drawings or samples may have from the requirements of the contract documents or corrections required by the DISTRICT on previous submissions.

J. The reviewing Engineer's marking of "no exceptions noted" on shop drawings and samples shall not relieve the CONTRACTOR from his responsibility for any deviations from the requirements of the contract documents, nor shall

any such review by the DISTRICT'S representative relieve the CONTRACTOR from responsibility for errors and omissions in shop drawings. Any changes or deviations from the requirements of the contract documents shall be permitted only by change orders.

1.6. SAMPLES

A. If the DISTRICT so requires, either prior to beginning or during the progress of the work, the CONTRACTOR shall submit, samples of materials for such special tests as may be necessary to demonstrate that they conform to the Specifications.

B. All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented, the name of the building or work and location for which the material is intended, and the name of the CONTRACTOR submitting the sample.

C. To insure consideration of samples, the CONTRACTOR shall notify the DISTRICT in writing that the samples have been shipped and shall properly describe the samples in the letter. In no case shall the letter of notification be enclosed with the samples.

D. The CONTRACTOR shall submit data and samples, or place his orders, sufficiently early to permit consideration, inspection, testing, and approval before the materials and equipment are needed for incorporation in the work. Delay resulting from his failure to do so shall not be used as the basis of a claim against the DISTRICT.

E. In order to demonstrate the proficiency of workmen, or to facilitate the choice among several textures, types, finishes, surfaces, etc., the CONTRACTOR shall, at his own expense, provide such samples of workmanship on wall, floor, finish, etc., as may be required.

F. When required, the CONTRACTOR shall furnish to the DISTRICT triplicate sworn copies of manufacturer's shop or mill tests (or reports from independent testing laboratories) relative to materials, equipment performance ratings, and concrete data.

1.7. RECORD DRAWINGS (as-builts)

A. The CONTRACTOR shall maintain one record copy of all specifications, drawings, addenda, change orders, and shop drawings at the site. The documents shall be kept in good order and annotated to show all changes made during the construction process.

B. The CONTRACTOR shall submit to the DISTRICT, within ten days after the completion of contract, one set of redlined prints of the construction plans, which have been marked "RECORD PRINTS" and shall contain all changes, additions or deviations from the original set of drawings that have been incorporated into the work.

100.2 MATERIALS NOT USED

100.3 EXECUTION NOT USED

100.4 PAYMENT

Full compensation for **SHOP DRAWINGS, SAMPLES, AND RECORD DRAWINGS** shall be considered as included in the various CONTRACT items of work involved and no additional compensation will be allowed therefore.

F-101

PIPING LESS THAN 54-INCHES, VALVES AND ACCESSORIES

101.1 GENERAL

1.1 DESCRIPTION

A. CONTRACTOR shall of furnishing, installing and testing of all piping, including fittings, valves, supports, and accessories as shown on the Drawings, described in the Specifications and as required to completely interconnect all equipment with piping for complete and operable systems.

B. The piping under this section shall include the 6” backflow preventer and all utility piping downstream from it including the engine auxiliary heat exchanger water, wash down water, pump sump water, and right angle gear drive heat exchanger cooling water

C. The piping under this section shall include the LP gas piping starting at the storage tanks and continuing through the vaporizer and the pressure reducing valves to the three natural gas pump engines and the emergency generator.

D. The piping under this section shall include the air piping extending from the air compressor to the locations within the engine room shown on the drawings.

E. Whenever the word "piping" is used in this section, it shall be understood to refer to all exposed and buried pipes, fittings, valves, flanges gasketing, hangers and supports or bedding comprising any given system, plastic piping and instrument tubing included.

F. All piping shall be installed to the lines and grades shown on the Drawings or as required for the mechanical equipment. All piping shall be properly supported and provisions shall be made for expansion and contraction.

G. Dissimilar metals shall be properly insulated with the use of insulating bushings, dielectric unions, isolation gasket sets or wrappings.

1.2 SYSTEM

A. The piping system facilitates the conveyance of storm water, cooling water, utility water, natural gas, LP gas, and compressed air throughout the project.

1.3 STANDARD SPECIFICATIONS

A. Pipe and valve sizes are nominal inside diameter unless otherwise noted.

B. All materials delivered to the job site shall be new, free from defects, and marked to identify the material, class, and other appropriate data such as thickness for piping.

C. Acceptance of materials shall be subject to strength and quality testing in addition to inspection of the complete product. Acceptance of installed piping systems shall be based on inspection and leakage tests as specified hereinafter.

D. Provide 316 stainless steel wall sleeves at all wall penetrations they shall be 3/8" thick waterstop / anchor collar 2-1/2" larger than the sleeve O.D. Where required or indicated on drawings Use Link type seals with stainless steel hardware to seal pipe penetrations.

E. Flexible Sealant: Flexible sealant for pipe joints, where shown on the Drawings, shall be a two-component polysulfide, non-sag; Sikaflex 412, Dualthane, or equal.

F. All ductile iron pipe shall be new and shall conform to all requirements of Federal Specification WW-P-421C, ANSI A21.51 (latest revision) and AWWA C151 (latest revision).

G. Steel Pipe 4" and Smaller SCH 80 Seamless

Pipe	SCH 80 Seamless, Conforming to ASTM A106 B
Joints	Welded 3000# socketweld or threaded ASTM / ANSI B1.20.1
Flanges	ASTM A 105 / ASME B16.5
Fittings	ASTM A 105 / ASME B16.11

1.4 SUBMITTALS

A. Within ten days after the Notice to Proceed, the CONTRACTOR shall submit to the DISTRICT a shop drawing schedule including the names and addresses of the manufacturer and suppliers of all materials and equipment he proposes to incorporate into the work.

1.5 SHOP DRAWINGS

A. Verify by excavation, inspection, and measurement all installation conditions for shop fabricated pipe before preparation of Shop Drawings. Submit field measurements and photos with Shop Drawings where exposed conditions are significantly different than indicated on the Drawings.

B. Layouts and Schematics: Submit detailed installation drawings of all piping. Schematics may be submitted for piping 4-inches and smaller. The drawings shall include pipe support locations, and types if different than shown on the Drawings and specifications, all fittings, valves, and other appurtenances.

Submit data to show that the following items conform to the Specification requirements:

1. Pipe, fittings, and accessories.
2. Fabricated pipe supports and other pipe supports as required herein.
3. Flexible couplings and flanged adapters.
4. Thrust blocks and harness restraints
5. Gaskets
6. Bolts
7. Valves.

C. Submit certified test reports as required herein and by the referenced standard

specifications.

1. Weld procedures for welded steel pipe.

2. Joint fabrication details for welded Pipe and fittings

3. Affidavits: The CONTRACTOR shall furnish affidavits from the manufacturers for valves.

101.2 MATERIALS

2.1 STEEL PIPE 4” AND SMALLER SCH 80 SEAMLESS

Pipe	SCH 80 Seamless
Joints	Welded 3000# socketweld or threaded
Flanges	150# Raised face socketweld
Fittings	3000# Forged steel socketweld or threaded

A. Underground fuel Piping shall have protective coatings per IAPMO Installation Standard 13-84 They shall be of an approved type, machine applied. Field wrapping shall provide equivalent protection and is restricted to those fittings and short sections where the factory wrap has been damaged. Double wrap a minimum 10 mil tape around fitting, thread and other unprotected areas to provide a minimum 40 mil thickness..." [this is saying there has to be at least 2 wraps & the tape thickness has to be at least 10 mil...but when you're all done...it has to be at least 40 mils of protection.

2.2 STAINLESS STEEL PIPE

A. Stainless steel pipe conform to ASTM A312 with stainless steel threaded fittings, or with stainless steel welded fittings, where indicated on drawings.

1.	Pipe	Type 316, SCH 40S Screwed Type 316L, SCH 40S Welded
2.	Joints	Threaded, ASTM / ANSI B1.20.1
3.	Fittings	Type 316, SCH 40 Screwed Type 316L, SCH 40S Welded
4.	Ball Valves	One piece, conventional port, 400 psi CWP, 316 SS Body, PTFE Seats, Non Blow-Out Stem
5.	3-Way Valves	Threaded ends, T Arrangement flow pattern (Triac Series 33 or Equal)

2.3 DUCTILE IRON PIPE

A. Materials: Pipe, fittings and appurtenances shall conform to the thickness class Ductile Iron Pipe as designated on the Plans.

All pipe and fittings shall be clearly marked with the name of the manufacturer or with a trademark of the size and type which has been approved by and filed with the DISTRICT.

1. Lining and Coating: All ductile iron pipe and fittings, unless otherwise prescribed in another item of the Contract Documents, shall be double thick cement mortar lined with seal coat in accordance with AWWA C104. Pipe coating shall be 1 mil asphaltic material in accordance with AWWA C151.

2. Type of Joints: Ductile iron pipe shall have any of the following types of joints as specified: Push-on, Tyton Joint, Grip-Tite, or flanged.

3. Specials and Fittings: All fittings for ductile iron pipe, unless otherwise required by the Drawings or Specifications, shall conform in all respects to AWWA C110 (latest revision).

4. Delivery and Handling: All pipe and fittings shall be manufactured, handled, loaded, and shipped in such a manner that it is delivered undamaged, in sound condition, and conforming in all respects to these Specifications. Care shall be taken in loading and handling the pipe so as not to injure the pipe coating. No other pipe or material of any kind shall be placed inside any pipe or fitting at any time after the coating has been applied and prior to installation. All pipe and fittings installed on the work shall be new material which has never been previously used for any purpose whatsoever.

B. PVC Pipe 1/4" and Larger (IPS Diameter)

PVC pipe shall meet the following requirements:

Pipe	PVC SCH 80 ASTM D1785 Type 1, Grade 1
Fittings	PVC SCH 80 solvent weld socket ASTM D-2467 threaded
Joints	Solvent Weld Socket ASTM D-2467, Threaded ASTM D-2464
Unions	PVC, SCH 80, Solvent Weld EDPM O-ring
Ball Valves	150 PSI, with TFE true union ends with EDPM O-ring and PTFE seats and seals
Check Valves	150 PSI, true union ball check with EDPM O-ring and PTFE seats and seals

C. PVC Pipe 4" and Larger (DIP Diameter)

PVC pipe shall meet the following requirements:

Pipe	PVC AWWA C900 Plastic ASTM D-2241
Fittings	Ductile Iron Cement Mortar Lined AWWA C110 & C104.F
Joints	Bell and spigot single rubber gasket per ASTM F-477 & 3139

2.4 PIPE COUPLINGS AND FLEXIBLE PIPE PIECES

A. General: For typical pipe joints, refer to pipe material specifications. Other joint devices shall be furnished where called for as specified below.

B. Flexible Couplings and Flange Coupling Adaptors:

1. Sleeve: Fabricated steel.

2. Followers: Cast iron, ductile iron, or steel.

3. Sleeve Bolts: 316 Stainless Steel.

4. Coating: Fusion epoxy line and coat sleeve and followers.

5. Pressure Rating: Pressure rating shall be equal to or greater than that of pipe being connected as determined by Barlow's Formula.

6. Manufacturers:

a. Flexible Couplings:

1. Connecting Pipe with Identical Outside Diameters: Smith Blair 411 or approved equal.

2. Large Diameter Smith Blair, Baker or approved equal

3. Connecting Pipe with Slightly Different Outside Diameters: Smith Blair 413 or 415, or approved equal.

b. Flange Coupling Adaptors: Smith Blair 913 or approved equal.

c. Victaulic Couplings: Style 77 Flexible Coupling with ductile iron housing and grade E gasket or approved equal.

7. Flex Coupling and Flanged Coupling Adapter Gaskets: Buna "N" NSF 61 Rated.

8. Joint Restraint: Provide joint harnesses per AWWA M -11 (tie rod lug or attachment plate assemblies) across all flexible couplings, flange coupling adaptors, and Victaulic couplings, except where specifically indicated otherwise on the Drawings. Design restraint for 1-1/2 times the test pressure of the applicable service.

9. Harness rods shall be 316 Stainless steel.

2.5 METAL FLEXIBLE VIBRATION ELIMINATORS

USE PARAGRAPH BELOW WHEN CONNECTIONS ARE REQUIRED TO BE MADE TO RECIP. AND CENTRIFUGAL WATER CHILLERS, PACK. AIR CONDITIONERS, RECIP. COMPRESSORS, AIR COMPRESSORS, H & C COILS IN CEILING HUNG H & V AND AIR CONDITIONERS.

A. Design for a working pressure of 125 psig, when used in systems operating at pressures up to 125 psig, and for higher working pressures to correspond with the pressure in the piping for pressures over 125 psig.

B. Furnish end fittings to correspond to the end connections of the piping in which installed.

USE PARAGRAPH BELOW ON POWER HOUSE JOBS, FOR CONNECTIONS TO BOILER FEED AND RETURN PUMPS, AND STEAM TURBINES.

C. Fabricate of seamless flexible Type 321 steel tubing, with a stainless steel wire braided outer jacketing of the same material as the tubing, welded to steel end fittings

D. Install eliminators plumb in vertical piping and horizontally true in horizontal runs.

REFER TO PARAGRAPH 3.01 C. OF THIS SECTION BEFORE INCLUDING THE ARTICLE BELE. Do not use eliminators to compensate for misalignment between equipment and piping.

2.6 VALVE AND ACCESSORIES

A. General Requirements for Valves:

1. All valves of each type shall be the product of one manufacturer.

2. All valves shall be furnished with operators, hand wheels, levers, or other suitable type wrench including handles as specified herein or as shown on the Drawings.

   a. Valves 4-inch and larger located more than 7 feet above the floor level shall be furnished with chain operators. Chains shall be galvanized and shall extend to within 3 feet of the floor.

   b. Where the depth of the valve is such that its operating nut is more than 3-feet below finish grade, operating extension stems shall be provided to bring the operating nut to a point between 24 to 36-inches below the surface of the ground and/or box cover. Extension stems shall be steel, and shall be complete with 2-inch-square operating nut. Stem shall be provided with a 1/8-inch center guide to keep stem centered. No pinned couplings are permitted.

3. All threaded stem valves shall open by turning the valve stem counter-clockwise.

4. All valves and valve operators shall have a nonbleeding shop coat.

B. General Requirements for Accessories:

Pressure Gauges: Provide shutoff valves for all pressure gauges. Conform to additional requirements in this Section below.

C. Valves and Accessory Systems:

1. Resilient Wedge Gate Valves 4-12 inches.

   a. All valves shall be new and of current manufacture.

   b. Valves shall be furnished and installed with the type of ends suitable for connecting to the type of pipe shown on the plans or as specified herein.

   c. Valves shall be manufactured to meet all applicable requirements of the latest edition of AWWA C509-80. Flange drilling shall be in accordance with ANSI B16-1 standard for cast-iron flanges. All valves 12 inches and smaller shall be bubble tight at 200-psi water working pressure.

   d. Valves shall have nonrising stems, opening by turning left and provided with a hand wheel. Valves stems shall be cast integral with stem collar and furnished of cast, forged, or rolled bronze. Stem nuts shall be independent of the wedge and shall be made of solid bronze. All body bolts shall be 316 stainless steel.

e. Cast-iron wedge shall have sealing surfaces of the wedge permanently bonded with resilient material to meet ASTM tests for rubber to metal bond ASTM D429.

f. Each valve shall have a smooth unobstructed waterway free from any sediment pockets.

g. Stuffing boxes shall be o-ring seal type with two rings located in stem above thrust collar.

h. Low friction torque reduction thrust bearings shall be located both above and below the stem collar.

i. Valves shall have hydrostatic shell test of 400 psi and shutoff test of 200 psi. At the 200 psi shutoff test the valve must be bubble tight-zero leakage.

j. Valves shall be factory lined and coated with a 10 mil fusion bonded epoxy coating complying with AWWA C550 and NSF 61.

k. Resilient wedge gate valves shall be Mueller or approved equal.

2. Plug valves 1” to 4”

a. Iron bodied

b. 200 PSI CWP 400 PSI test

c. Lubricated with dual ball checks

d. Class 125 ANSI flanges

e. Regular pattern

Manufacturer: Lubricated plug valves shall be Rockwell Nordstrom or approved equal.

D. Drainage (Flap) Valves

1. General

a. The drainage gate shall be designed to allow free outflow and prevent backflow for maximum seating heads up to 55 feet.

b. Gates Construction

c. The frame shall be cast iron of flat back design with machined seating surface inclined from vertical, at minimum of 2-1/2°, to assure positive closure.

d. The cover shall be cast iron, cast in one piece, with reinforcing ribs, designed to withstand the seating head specified.

e. An integral cast on lifting eye shall be provided for manual operation.

f. Seating surfaces for frame and cover shall be: Bronze seats impacted into dovetail grooves on frame and cover

g. All machined seats shall have a minimum 63 micro inch finish.

h. The gate shall be provided with adjustable, double pivoted hinge links so designed to permit complete seating, full opening, and with stops or other arrangements to prevent cover from rotating sufficiently to become wedged in the open position. Pivot lugs mounted to frame shall be adjustable to allow adjustment of hinge links without having to remove cover from gate. The hinge links (arms) shall be bronze-bushed stainless steel.

i. Provide Leaf spring Bumper with rubber cushion block (exclude on trench drains)

j. All assembly hardware and hinge pins shall be Type 18-8 stainless steel.

2. Finish

All cast iron shall be painted with manufacturer's standard shop coat paint (or special paint).

3. Materials:

Frame and Cover	Cast Iron per ASTM A-126, Class B.
Pivot Lug -	Ductile Iron per ASTM A-536, Gr. 65-45-12.
Hinge Link Bronze	
Bushings and Washers	Commercial Bronze.
Assembly Hardware	
and Hinge Pins	18-8 Stainless Steel (Type 304).
Naval Bronze Seats	ASTM B-21, Alloy 482.
Stainless Steel Hinge Link	ASTM A-276, Type 304
Bronze Hardware	ASTM B-98.

Drainage (Flap) Gate Valves shall be Waterman Model F-55 or approved equal.

E. Solenoid Control Valves (Well Pre-Lube, Sump Pit Agitation)

The valve shall be a hydraulically operated, diaphragm-actuated, pilot controlled, globe valve. It shall contain a resilient, synthetic rubber disc, having a rectangular cross-section, contained on three and one-half sides by a disc retainer, and

forming a tight seal against a single removable seat insert. The diaphragm assembly containing a valve stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. This diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm shall consist of nylon fabric bonded with synthetic rubber and shall not be used as a seating surface. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the valve or pilot controls. All necessary repairs shall be possible without removing valve from the line. The pilot control shall be a three-way valve.

The valve shall be equipped with a Y-strainer, opening and closing speed controls, and isolation valves.

The valve will incorporate the following features:

Pattern	Globe
Pressure Class	250
Valve Ends	Screwed
Valve Body	Bronze
Solenoid Voltage	120V AC
Solenoid Position	Energized to Open
Solenoid Enclosure	Nema 1
Pilot System	Stainless Steel

Solenoid valves shall be Cla-Val 136-01 or approved equal.

F. Gas Pressure regulating valves

1. Iron bodied

2. Rated for 160 PSI inlet pressure

3. Outlet pressure range 2” WC. to 100 PSI

4. Shall be Fischer or approved equal

Gaskets: Unless specifically specified otherwise, all gaskets shall be non asbestos synthetic fiber bound by nitrile rubber; Garlock 3000 or equal.

Bolts and Tie Rods: Unless specifically specified otherwise, flange bolts and nuts, tie rods and other flange hardware shall be as follows:

1. Exposed: Type 316 stainless steel.

2. Submerged: Type 316 stainless steel.

3. Encased: Steel.

4. Buried: Type 316 Stainless Steel.

101.3 EXECUTION

3.1 GENERAL PIPING INSTALLATION PRACTICES

A. Any conflict arising during the erection of piping shall be brought to the attention of the DISTRICT. No improvising or field changes shall be permitted without the approval of the DISTRICT.

B. All lifting and hoisting of piping material shall be accomplished in a manner so as to protect both lining and coating from damage, this may include cloth chokers or slings, spreader bars or other devices or methods necessary to maintain the integrity of the piping system. The CONTRACTOR at his own expense shall remove any piping that has been damaged by mishandling from the job site

C. All piping shall be erected in such a manner as to obtain sufficient flexibility and to prevent excessive stresses in materials and excessive bending moments at joints or connections to equipment.

D. Full lengths of pipe shall be used wherever possible. Short lengths of pipe with couplings will not be permitted, except as may be approved by the DISTRICT to eliminate overstressing or misalignment. All pipe shall be cut to exact measurement and shall be installed without forcing or springing.

E. Tool marks and unnecessary pipe threads shall be avoided. Burrs formed when cutting pipe shall be removed by reaming. Before installing any pipe, care shall be taken that the inside is thoroughly cleaned and free of cuttings and foreign matter.

F. Where piping is pitched for drainage, an accurate grade shall be maintained. Piping shall be supported in such a manner as to prohibit deflection due to gravity that would be sufficient to pocket the lines when full of liquid. All changes in direction shall be made by using pipe fittings unless otherwise shown on the Drawings or as approved by the DISTRICT.

G. Unions shall be installed in all piping connections to equipment, regulating valves, and wherever necessary to facilitate the dismantling of piping and removal of valves and other items requiring maintenance. Flanges on equipment may be considered as unions. At least one union shall be provided in every straight run of pipe unless otherwise noted or permitted.

H. Raised face flanges shall not be used for connection to 125-psi cast iron flanges or valves. The raised face shall be removed before use and full face gaskets shall be employed.

I. In general, all service piping shall come off the top of headers, and if possible, service piping shall slope for drainage.

J. Pipe anchors, thrust blocks, harness restraints with tie bolts, expansion joints, loops, and bends shall be installed as indicated on the Drawings, and as required to properly protect the piping against vibration, misalignment and overstressing.

K. Exposed piping shall be neatly arranged, straight, run parallel to or at right angles to walls and shall be so graded that the entire system can be drained. Drain valves shall be installed at the low points of piping. Vent valves shall be installed at all high points of the piping.

L. Installed piping shall not interfere with the operations or accessibility of doors or windows and shall not encroach on aisles, passageways, and equipment and shall not interfere with the servicing or maintenance of any equipment. Adjacent piping shall be grouped in the same horizontal or vertical plane.

M. All buried bolts, nuts, lugs, rods, brackets, etc., except stainless steel, shall be given one coat of coal tar epoxy prior to backfilling. All exposed steel pipe supports and hangers shall be cleaned and painted similar to structural steel items as specified under Section 09900.

N. When a pipe joint is made at the intersection of a pipeline with a pump nozzle, all bolts, and nuts shall be installed loose until after the entire pipeline has been installed, aligned, and checked.

O. All piping shall be installed in such a manner that it shall be free to expand and contract without injury to itself, structural steel or anchors. On all piping, self-equalizing type expansion joints of an approved make and quality shall be installed in all straight runs of 90 feet or more, unless otherwise shown on the Contract Drawings.

P. All piping on jobsite shall be stored off ground on blocks or skids

Q. All piping shall have open ends covered to prevent contamination and or lining damage

R. When pipe is cut in the field, the cut end shall be tapered back approximately 1/8 inch, at an angle of 30 degrees with the centerline of the pipe, with a coarse file or grinder to remove any rough edges, which might injure a gasket, where applicable.

S. Dissimilar metals shall be properly insulated to preclude galvanic corrosion.

T. All pipe threads shall be NPT (National Pipe Taper) conforming to ASTM / ANSI B1.20.1

U. Use a thread sealant on all NPT (National Pipe Taper) Threads & fittings. The type of thread sealant / lubricant shall be selected for compatibility with the piping material and with the material that the pipe will be conveying. Excess thread sealant shall not be allowed inside the pipe. All excess sealant on the exterior threads shall be removed after installation.

3.2 BURIED PIPING INSTALLATION PRACTICES

A. Installation shall be in accordance with AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances, AWWA C600-93, AWWA C900-89 and WPCF Manual of Practice No. 9, Design and Construction of Sanitary and Storm Sewer, except as otherwise noted in the Specifications.

B. Joining Push-On, Mechanical Joint, and Restraint Joint Piping: After placing a length of pipe in the trench, the spigot end shall be centered in the socket and the pipe forced "home" and brought to correct line and grade. The pipe shall be secured in place with approved backfill material tamped under and around it. Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, the amount of deflection allowed shall not exceed that required for making a satisfactory joint and shall be subject to the approval of the DISTRICT.

C. Where it is necessary to join pipes of different types, the CONTRACTOR shall furnish and install the necessary adapter. Adapters shall have ends conforming to specifications for the appropriate type of joint to receive the adjoining pipe.

D. The CONTRACTOR shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner at the lines and grades indicated on the Drawings or as directed by the DISTRICT.

E. Where required, bends, tees, and other fittings in pipelines buried in the ground shall thrust restrained with concrete thrust blocks, as specified in Section 03300, thrust blocks shall be placed against undisturbed earth where firm support can be obtained. If the soil does not provide firm support, then suitable bridle rods, clamps and accessories to brace the fitting properly shall be provided. Such bridle rods, etc. shall be coated thoroughly and heavily with an approved bituminous paint after assembly or, if necessary, before assembly.

F. All buried ductile iron pipe shall be polyethylene wrapped in accordance with ANSI/AWWA C105/A21.5.

G. All buried non metallic piping shall be installed with detection tape placed above the pipe zone. Plastic metallic type consisting of a color coded polyethylene or melinex film, a solid core aluminum foil detection layer and other layers as required. Type shall be resistant to acids, alkalines, and other components likely to be encountered in soils. Tape shall be imprinted with “CAUTION ***type of pipeline*** BELOW”. Tape shall be Terra Tape “D” by Griffolyn Company, Detectatape by Allen Systems, or approved equal.

3.3 WELDED PIPE

A. All welding of steel piping shall be in accordance with the AWWA Standard for Field Welding of Steel Water Pipe, AWWA C206-91, latest edition. All welders and machine operators shall be certified as qualified under the above code.

B. All other metallic pipe welding shall be in accordance with the ANSI Code for Pressure Piping, ANSI B31.1 Power Piping, latest edition. All welders and

welding machine operators shall be certified as qualified under the above code. The CONTRACTOR shall submit a list of welding personnel with certification to the DISTRICT for approval.

C. CONTRACTOR shall submit his proposed welding procedures to the DISTRICT for review. Proposed procedures shall be in accordance with the above codes and the recommendations of the manufacturers of the piping and welding materials. The DISTRICT shall have the right at any time to call for and witness the making of test specimens by any welder, in accordance with the above, and to observe the physical testing of specimens. Materials shall be furnished and all tests shall be made by and at the expense of the CONTRACTOR.

Welding of fusion bonded epoxy lined and/or coated pipe shall not be allowed after the application of the fusion bonded epoxy.

3.4 PUSH-ON TYPE JOINTS

A. Inspect gasket, socket and spigot for cleanliness. Remove any foreign matter and excessive coating. When cast iron or ductile iron pipe is cut in the field, the cut end can be readily conditioned so that it may be used to make up the joint. The outside of the cut end should be tapered back approximately 1/4 inch, at an angle of about 30 degrees with the centerline of the pipe, with a coarse file or a portable grinder. All sharp or rough edges which otherwise might injure the gasket shall be removed.

B. Insert the gasket in the socket, bulb end toward the inside. Heel of gasket shall be uniformly seated around the inside of the socket.

C. Lubricate the exposed face of the gasket and the spigot using push-on joint lubricant. Do not use lubricant other than that furnished with pipe and fittings.

D. The fittings and the pipe shall be aligned and the spigot entered into the socket until it just makes contact with the gasket. Joint assembly shall be completed by forcing the spigot of the entering pipe past the gasket (which is thereby compressed) until it makes contact with the bottom of the socket.

E. If assembly is not accomplished with the application of reasonable force by the methods indicated, the spigot end of the pipe shall be removed to check for the proper positioning of the gasket. The joint shall be kept in straight alignment during assembly.

3.5 MECHANICAL JOINT PIPING

Spigot ends and bells of pipe and the rubber gaskets shall be washed thoroughly with soapy water to remove all foreign matter which may damage the gaskets. The gaskets shall be plain rubber, metal tipped, duck tipped, polysulfide rubber tipped, or other special type. The gland shall be placed on the pipe with its raised lip facing the spigot end and at least 3-1/2 inches from that end. The spigot shall be inserted in the socket until it is "home". The gasket shall be pushed into position with the fingers, making sure that it is evenly seated in the socket. Place the gland against the face of the gasket, insert the tee head bolts and tighten the nuts on all bolts by opposite pairs until they are

finger-tight. The bolts shall then be tightened in a similar manner until they are snug and bearing evenly against the gland around the circumference of the pipe.

3.6 RESTRAINED JOINT PIPING

Restrained joint piping shall be integrally restrained joint ductile iron pipe of the push-on type with low steel alloy bolting. Installation shall be in accordance with the manufacturer's recommended procedures.

3.7 PVC AND CPVC PIPING

PVC and CPVC piping shall be installed in accordance with the manufacturer's recommended procedures.

3.8 COPPER PIPING

A. Solder joints for copper tubing shall be prepared by cleaning the ends of the tubing and the inner surfaces of the fittings with steel wool until they are bright. The cleaned surfaces shall be given a thin coating of approved soldering flux, and the tubing end inserted into the fitting as far as possible. Heating and finishing of the joint shall be done in accordance with the recommendations of the manufacturer of the fittings, using solid string or wire of lead free solder. The use of cored solder will not be permitted. All joints shall be allowed to self-cool to prevent chilling of solder.

B. Flared joints for copper tubing shall be cut and deburred. The sleeve nut shall be slipped on the tubing and the end flared with a flaring tool. Care shall be taken in flaring not to crack or slit the flared portion. If inspection reveals such damage, the flare shall be cut off and a new flare made. The flared end shall be squarely seated on the fitting and the nut tightened.

C. All changes in direction shall be made by using fittings unless other means are approved by the DISTRICT.

3.9 PIPE HANGERS

A. The CONTRACTOR shall furnish all necessary hangers including all clamps, rods, angles, channels, plates, etc., for supporting the various piping installed by him under this Contract. The CONTRACTOR shall obtain the DISTRICT'S approval of the method of supporting the piping before installation. Drawings shall be referenced for standard pipe hanger design and material.

B. Pipes close to the floor may be supported from the floor by structural shapes or by poured concrete blocks or piers as approved by the DISTRICT. In such cases, care shall be taken to avoid blocking floor drainage.

C. Building steel, as indicated on the structural drawings, shall be used wherever possible for supporting pipe hangers. Structural members shall not be drilled or welded for hangers without the approval of the DISTRICT.

D. Expansion bolts shall be used only upon the approval of the DISTRICT.

E. All vertical piping shall be properly supported with suitable steel brackets to prevent swinging or sagging, per the latest edition of UBC, UPC and UMC. A minimum of two supports shall be provided on all vertical piping. Spacing shall be no more than 6 feet on centers.

F. Heavy valves or fittings shall be supported by hangers, poured concrete blocks or other special provisions that may be necessary to avoid undue line deflection.

G. A minimum of two hangers shall be provided for steel and cast iron piping.

The maximum spacing of hangers for steel and cast iron piping shall be in accordance with the following table, except where otherwise indicated on the Contract Drawings.

Pipes 1/2" and 3/4"	not more than 6' - 6" on centers
Pipes 1" and 1-1/4"	not more than 8' - 0" on centers
Pipes 1-1/2" and 2"	not more than 10' - 0" on centers
Pipes 3" and 4"	not more than 14' - 0" on centers
Pipes 6" and 8"	not more than 16' - 0" on centers
Pipes 10" and larger	not more than 20' - 0" on centers

The maximum hanger spacing for all sizes of soil, waste, and vent piping is five (5) feet.

H. Hose and plastic tubing shall be continuously supported in stainless steel or steel (per Contract Drawings) angle, channel, or tray.

I. The maximum spacing of pipe supports for PVC piping shall be in accordance with the following table:

Pipes 1" and 1-1/2"	not more than 5' - 0" on centers
Pipes 2"	not more than 6' - 0" on centers
Pipes 3"	not more than 7' - 0" on centers
Pipes 4"	not more than 7' - 0" on centers
Pipes 6"	not more than 9' - 0" on centers
Pipes 8"	not more than 9' - 0" on centers

J. Hanger Material

1. Hangers for steel, ductile and cast iron pipe and flanges, shall be clevis type, with adjustable rods or bolts, material, hardware and coating or plating per Contract Drawings.

2. Hangers for PVC drainage, waste, and vent piping (DWV) shall be stainless steel with adjustable stainless steel rods and hardware per Contract Drawings.

3. Hangers for copper tubing shall be copper-plated or isolated by thermoplastic elastomer, PVC or felt inserts with adjustable rods or bolts, material, hardware and coating or plating per Contract Drawings.

4. Hangers for stainless steel pipe and tubing shall stainless steel with stainless steel rods and hardware per Contract Drawings.

5. Hangers for chromium-plated pipes shall be chromium-plated cast brass, hardware per Contract Drawings.

All thread rods shall not be allowed for rods longer than 8", all threaded rods shall have a minimum of 1" of free adjustment up or down

3.10 APPURTENANCES

A. The CONTRACTOR shall furnish and install all valves and piping not mentioned in the piping classification, but shown on the Contract Drawings.

B. All valves and drains not mentioned in the classification of piping material specifications and furnished under this specification shall be as specified on the Contract Drawings.

C. Flanged joints shall be made up with approved full-face gaskets and carbon steel ASTM A307 bolts and heavy hex nuts except where otherwise noted in the Specifications or Contract Drawings.

D. All joints shall be made drop tight under all pressures up to the specified field test pressure of the line in which installed.

3.11 FIELD TESTING

A. All pressure piping shall be subjected to hydrostatic pressure equal to 1.5 times the normal operating pressure, (or the pump shut-off pressure) but not exceeding the maximum allowable working pressure of the piping. The normal operating pressures shall be defined by the DISTRICT. No air testing shall be permitted.

B. Pressure mains shall be tested at 200 psi. Gravity lines shall be subjected to hydrostatic pressure 150 percent of the maximum head that can be imposed upon the piping during operation as defined by the DISTRICT.

C. Test of buried piping shall be made only after completion of partial or complete backfill as specified and not until at least 36 hours after the last joint to be tested has been made, and at least 36 hours after the last concrete thrust or reaction blocking has been cast with high early strength cement, ASTM C150 Type III. Joints shall be left clear for examination during tests on pressure pipe.

D. Each section of pipeline shall be slowly filled with water and the specified test pressure measured at the point of lowest elevation. Pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the DISTRICT. The pump, pipe connection, calibrated gauges, pipe taps and all necessary apparatus, shall be furnished by the CONTRACTOR. The

CONTRACTOR shall provide all necessary assistance for conducting the test. The duration of the test shall be 2 hours, unless otherwise directed by the DISTRICT. All air must be expelled from the pipeline prior to the test period.

E. During the test, all pipes, fittings, valves, hydrants and joints shall be carefully examined. If found to be cracked or defective, they shall be removed and replaced by the CONTRACTOR with sound material in the manner prescribed. The test shall then be repeated until satisfactory to the DISTRICT.

F. No pipe installation will be accepted until or unless the leakage for the section of line tested is less than the rate of leakage specified below:

Flanges, welded or screwed piping – No measurable leakage

Push-on, mechanical joints or caulked – In accordance with AWWA Standard for Installation of Cast-Iron Water Mains, AWWA C600, Sect. 13.7.

G. Should any test of a section of pipeline disclose leakage greater than that permitted, the CONTRACTOR shall, at his own expense, locate and repair the defective joints, and/or pipe until the leakage is within the permitted allowances.

3.12 DISINFECTING

Prior to placing in service, all potable water piping shall be disinfected and flushed in accordance with AWWA Standard for Disinfecting Water Mains, AWWA C651.

(Concentrated chlorine solution shall be legally disposed of)

3.13 PIPE SUPPORT DETAILS

Pipe supports shall be selected and furnished as required for proper installation.

101.4 PAYMENT

Full compensation for conforming to the requirements in **PIPING LESS THAN 54-INCHES, VALVES AND ACCESSORIES**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the various contract items of work involved and no additional compensation shall be allowed therefore.

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CEMENT MORTAR LINED AND COATED 54-INCH STEEL PIPE AND ACCESSORIES

102.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall furnish and install cement mortar lined and coated 54-inch steel pipe, mitered fittings and sleeve type couplings required for the basin drain and three pump discharges. This section does not include the flap gates on the 54-inch steel pipe.

1.2 SYSTEM

The piping described herein shall be used for the conveyance of storm water.

1.3 STANDARD SPECIFICATIONS

A. All piping shall conform to the latest edition of ANSI/AWWA standards.

1. Pipe: Cement Mortar lined and Coated steel cylinder pipe.

   a. Pipe shall conform to ANSI/AWWA C200 except as modified herein.

   b. Harness restraints and rods shall be per AWWA M -11.

   c. All lining and coating shall conform to ANSI/AWWA C205.

   d. Coating of ends not encased in concrete shall be per ANSI/AWWA C210-07.

   e. All field welding shall conform to ANSI/AWWA C206.

2. Fittings

   a. Mitered 90 Degree Elbows: Four pieces minimum.

   b. Mitered 45 Degree Elbows: Three pieces minimum.

   c. Outlets shall be extra heavy half couplings in accordance with AWWA M-11.

3. Accessories

   a. Sleeve-Type Couplings for Plain-End Pipe shall conform to ANSI/AWWA C219-01.

b. Sleeve-Type Couplings shall be lined and coated per ANSI/AWWA C213.

B. Drainage (Flap) Valves

1. General

a. The drainage gate shall be designed to allow free outflow and prevent backflow for maximum seating heads up to 55 feet.

b. The frame shall be cast iron of flat back design with machined seating surface inclined from vertical, at minimum of 2-1/2°, to assure positive closure.

c. The cover shall be cast iron, cast in one piece, with reinforcing ribs, designed to withstand the seating head specified.

d. An integral cast on lifting eye shall be provided for manual operation.

e. Seating surfaces for frame and cover shall be: Bronze seats impacted into dovetail grooves on frame and cover

f. All machined seats shall have a minimum 63 micro inch finish.

g. The gate shall be provided with adjustable, double pivoted hinge links so designed to permit complete seating, full opening, and with stops or other arrangements to prevent cover from rotating sufficiently to become wedged in the open position. Pivot lugs mounted to frame shall be adjustable to allow adjustment of hinge links without having to remove cover from gate. The hinge links (arms) shall be bronze-bushed stainless steel.

h. Provide Leaf spring Bumper with rubber cushion block (exclude on trench drains)

i. All assembly hardware and hinge pins shall be Type 18-8 stainless steel.

2. Finish

All cast iron shall be painted with manufacturer's standard shop coat paint (or special paint).

3. Materials:

Frame and Cover	Cast Iron per ASTM A-126, Class B.
Pivot Lug	Ductile Iron per ASTM A-536, Gr. 65-45-12.
Hinge Link Bronze	

Bushings and Washers	Commercial Bronze.
Assembly Hardware	
and Hinge Pins	18-8 Stainless Steel (Type 304).
Naval Bronze Seats	ASTM B-21, Alloy 482.
Stainless Steel Hinge Link	ASTM A-276, Type 304
Bronze Hardware	ASTM B-98.

Drainage (Flap) Gate Valves shall be Waterman Model F-55 or approved equal.

1.4 SUBMITTALS

A. The CONTRACTOR shall submit for approval detailed shop drawings of the steel pipe, and all fabricated fittings to be incorporated in the pipeline and structures, together with erection profile drawings showing:

1. The location, length, plate thickness, location of welded seams, and designation by number of each steel pipe section and fabricated fitting to be furnished and installed;

2. The pipe axis station and elevation at all changes in gradient or horizontal alignment;

3. The station and invert elevation to which the end of each pipe, within the limits of a horizontal or vertical curve, will be laid;

4. All elements of curves and bends, both in horizontal and vertical alignment, including elements of the resultant true angular deflections in all cases of combined curvature, and inside, outside, and centerline chords;

5. Locations of longitudinal and circumferential joints in the pipe, fabricated fittings.

6. Locations and details of harness restraint systems and rods

7. Details, locations, and calculations for bulkheads for hydrostatic testing of the pipe

8. Catalog cut sheets for sleeve type couplings

9. Catalog cut sheets for flap drainage (flap) gate valves

102.2 MATERIALS

2.1 NEW MATERIALS

A. Only new materials and equipment shall be incorporated in the work. All materials Material shall not be incorporated into the work without prior approval of the DISTRICT.

1. Steel plates for the steel pipe and appurtenances and for fabricated fittings, except as otherwise specified shall conform to the requirements of ASTM Standard A36,

2. Minimum steel cylinder thickness shall be 1-inch.

3. Nominal inside diameter shall be 54” (the minimum net inside clear lined diameter).

4. Minimum thickness of reinforced cement-mortar coating 1-inch.

5. Minimum thickness of cement-mortar lining ½ -inch, cement shall be Type II.

6. The length of shop fabricated sections of pipe shall be not greater than 40 feet unless otherwise approved by the DISTRICT,

7. Lumber for stulls and braces shall be Construction Grade Douglas Fir

102.3 EXECUTION

A. All piping under this section shall be shop fabricated for field installation

1. Fit up

a. The edges of the plates having been prepared and the plates formed as hereinbefore specified, special care shall be taken in the layout of joints to insure the fusion of the weld metal at the bottom of the fillet.

b. The edges of butt joints shall be tack welded or clamped firmly in place in proper alignment and so held throughout the welding process. The use of dogs, clips, lugs, or equivalent devices welded to the steel plate for the purpose of forcing it into position will not be permitted.

c. Removal of temporary attachments shall be carried out by air gouging or grinding. No hammering will be allowed and the part shall be inspected to verify the absence of base metal tears. The area of temporary attachment shall be ground flush and the base metal restored to its original shape.

B. Aligning

1. Where butt welded joints are used, particular care shall be taken in aligning the edges to be joined so that complete penetration and fusion at the bottom of the joint will be assured. The offset in abutting edges shall not exceed 1/16 inch at circumferential seams and shall not exceed 1/32 inch at longitudinal seams.

C. Quality of Welds

1. All the welds shall be 100 percent visually inspected for all deficiencies in materials and workmanship in accordance with the requirements ANSI/AWWA C200 and C206 There shall be no evidence of oxidation in the metal of the weld. All welded joints shall be of a type that will produce complete fusion of the plates and shall be free from unsound metal, pinholes, cracks, slag entrapment/inclusions, and undercuts.

a. The finish of welded joints shall be reasonably smooth and free from grooves, depressions, burrs, and other irregularities, and there shall be no valley or undercut in the center or edges of any weld.

D. Field Joints

1. Field joints shall be double butt welded at the locations shown on the drawings,

E. Limits of Coating

1. Unless otherwise indicated, exterior surfaces of pipe or fittings passing through structure walls shall be cement-mortar coated from the center of the wall or from the wall flange to the end of the underground portion of pipe or fitting.

F. CONTRACTOR’S Equipment

1. The CONTRACTOR'S equipment for all welding and flame cutting shall be designed and maintained in such condition, at all times, as to permit qualified welding operators to fulfill the requirements prescribed in these specifications, and shall be approved by the DISTRICT.

G. Welders

1. All welding shall be done by skilled welders who have had adequate experience in the method and materials to be used. All welding operators shall be qualified under AWWA C200 or C206 any welder or welding operator performing work under this contract shall have been qualified for the process involved within the past 6 months. Welding performed prior to approval of procedures, qualifications, or required submittal approvals will be sufficient cause for rejection of the work.

a. The CONTRACTOR, when required by the DISTRICT, shall conduct tests of his welders to determine their ability to produce welds that are in compliance with these specifications. Tests shall be made in accordance with the above named qualification procedure using machines and electrodes similar to those that are to be used on the work and in the presence of the DISTRICT, who shall determine the quality of the work done. Instead of tests conducted in the presence of the DISTRICT, the DISTRICT may require that welders be qualified by a testing agency approved by the DISTRICT. The specimens shall be welded in the same position in which the welder is qualifying to work, and the same number of passes shall be used as specified herein.

b. The sequence of welding and all welding procedures shall be subject to approval by the DISTRICT.

H. Shop Testing

1. In order that the DISTRICT may arrange for mill or factory testing/inspection, the CONTRACTOR shall notify the DISTRICT, 15 calendar days prior to start of fabrication.

2. The CONTRACTOR, at his own expense, shall furnish and attach suitable dished heads for making the tests. The CONTRACTOR shall perform Hydrostatic pressure tests, in accordance with Section 3.4 of AWWA C200. Specials shall be tested in accordance with Section 4.3 of the AWWA C200.

3. completion of the tests, he shall remove the heads and properly restore the ends of the sections in accordance with the applicable requirements of these specifications or shall provide other satisfactory means for making the required tests.

I. Internal Bracing or Stulling

1. Prior to transporting the pipe, the CONTRACTOR shall install bracing or stuffing in the pipe. Stuffing and bracing shall be sufficient to prevent all distortion of the pipe during transport and due to loads imposed by backfill.

J. Protection of Pipe Lining/Interior

1. For all pipe and fittings with plant-applied or cement-mortar linings, the CONTRACTOR shall provide a polyethylene or other suitable bulkhead on the ends of the pipe and on all special openings to prevent drying out of the lining. All bulkheads shall be substantial enough to remain intact during shipping and storage until the pipe is installed.

K. Transportation and Delivery of Pipe

1. Every precaution shall be taken to prevent injury to the pipe and steelwork during loading, transporting, and unloading. For pipe to be installed in trenches, the internal braces placed inside the mortar lined pipe sections as shown on the drawings, shall remain in place until the pipe is installed and backfilled or encased.

    a. Pipe shall be stored on dunnage with fixed angle blocks or chocks to prevent rolling.

L. Handling

1. After the application of the internal or external coating, the pipe shall be handled only by means of belt slings utilizing a two-point pick system.

    a. Trucks or trailers used for the transportation of the pipe shall be provided with padded bolsters curved to fit the outside of the pipe.

M. Cleaning of Joints

1. Before the installation of any section of pipe or steelwork, all foreign matter of every nature and all protective material shall be removed from the surfaces that are to be in contact at joints, so as to leave thoroughly clean surfaces for metal to metal contact in the field joints

N. Field Welding

1. All field welding shall conform to ANSI/AWWA C206.

102.4 PAYMENT

Full compensation for conforming to the requirements in **CEMENT MORTAR LINED AND COATED 54-INCH STEEL PIPE AND ACCESSORIES,** including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract price paid per Linear Foot and no additional compensation shall be allowed therefore

F-103

BUILDING PLUMBING AND SANITARY FACILITIES

103.1 GENERAL

1.1 DESCRIPTION

A. The CONTRACTOR shall furnish and install all plumbing required for the project including both inside the Pump Station building and external to the Pump Station. Building Plumbing and Sanitary Facilities, water pipeline for the restroom, hose bibs, roof drains, sewer pipeline, sewer clean-out and vents for the restroom, water closet, lavatory, mirror, hand towel and toilet paper holder, on-demand water heater, ball valves, gate valves, globe valves, , 2" backflow preventer, pipe hangers and supports, bolts and tie rods, and fire extinguishers.

B. Building Plumbing and Sanitary Facilities shall include the pipeline and connection to City of Garden Grove water meter near Aspenwood Avenue and the ductile iron pipeline and connection to the City of Garden Grove sewer main in Aspenwood Avenue.

1.2 SYSTEM

A. Furnishing, constructing, flushing, testing, disinfecting and placing into service the plumbing system for the project. The plumbing system includes the excavation, bedding and backfill for the pipelines; however, this section does not include pavement.

1.3 STANDARD SPECIFICATIONS

A. Plumbing shall be installed per the latest editions of the following codes.

1. Standard Specifications for Public Works Construction (SSPWC), also known as the "Green Book"

2. Uniform Plumbing Code

3. International Association of Plumbing and Mechanical officials (IAPMO)

B. All plumbing material shall per the following specifications.

1.	ASTM B 88	Copper Tubing Type K
2.	ASTM A312	Seamless and Welded Austenitic 316 Stainless Steel Pipe
3.	ASTM A182/	A351 Cast threaded fitting 316 Stainless Steel
4.	ASTM A888	No Hub Cast Iron Soil Pipe and fittings
5.	ASTM C 1277	No Hub Couplings

6. ASTM C 1540 No Hub Couplings

7. ASTM A 74 Service Weight (SV) Hub and Spigot Cast Iron Soil Pipe and Fittings

8. ASTM C 564 Service Weight (SV) Hub and Spigot Gaskets Cast Iron Soil Pipe and Fittings

9. ASTM D1784 Drainage pipe and fittings, PVC SCH 40 DWV

10. ASTM C 700 Vitrified Clay Pipe,

11. ASTM D2467 SCH 80 PVC pipe and fittings

12. AWWA C900 Plastic Water service Pipe

13. AWWA C151 Cement Mortar Lined Ductile Iron Pipe Class 350

14. AWWA C110 Ductile Iron Fittings Cement Mortar Lined

15. AWWA C104.F Cement Mortar Lining of Ductile Iron Fittings shall be "Double Thickness

16. ASTM A193 Bolts and Nuts 316 Stainless Steel

17. SSPWC 200-1.5 Sand used for pipe bedding

18. ASME A112.19.2M Vitreous china fixtures

1.4 SUBMITTALS

A Shop Drawings

1. Verify by excavation, inspection and measurement all installation conditions. Prepare Shop Drawings for prefabricated pipe, Submit field measurements and photos with Shop Drawings where exposed conditions are significantly different than indicated on the Drawings.

2. Layouts and Schematics: Submit detailed installation drawings of all piping. Schematics may be submitted for piping 4-inches and smaller. The drawings shall include pipe support locations, and types if different than shown on the Drawings. Submit specifications/cut sheets for all fittings, valves, and other appurtenances.

3. Submit data to show that the following items conform to the Specification requirements:

   a. Pipe, fittings, and accessories.

   b. Fabricated pipe supports and other pipe supports as required herein.

   c. Flexible couplings and flanged adapters.

   d. Valves.

e. fixtures

4. Submit certified test reports as required herein and by the referenced standard specifications.

B. Affidavits: The CONTRACTOR shall furnish affidavits from the manufacturers for valves.

103.2 MATERIALS

2.1. VALVES AND APPURTENANCES

A. Backflow Preventer,6" Febco 880C with Valve setter or other device approved by the foundation for cross connection control and hydraulic research Per City of Garden Grove standard Plan B-771 and Specification section 5 Backflow Prevention.

B. Backflow Preventer, 2" Febco 825 Y - BV or other device approved by the foundation for cross connection control and hydraulic research Per City of Garden Grove standard Plan B-771 and Specification section 5 Backflow Prevention.

C. Valves 3-inch and larger shall have flanged ends.

D. Gate Valves shall be 125 pound class, all bronze, wedge disc, Stockham B-100 or an Engineer-approved equal.

E. Globe Valves shall be 125 pound class, all bronze, swivel disc, Stockham B-16 or an Engineer-approved equal.

F. Ball Valves shall be 400 Pound class, all 316 stainless steel Stockham S-217SSMO-R-T or an Engineer-approved equal.

G. Hose Bibs 3/4-inch size shall be Crane No. 58, bronze or Engineer-approved equal. Angle valves, I-inch and 1-1/2-inch size, shall be Class 125 bronze Stockham B-216 or Engineer-approved equal.

H. Water Hammer Arresters shall be furnished and installed on all branch lines to fixtures and to locations in the pipe system near the solenoid valves. The water hammer arresters shall be "Hydrotrol", as manufactured by Jay R. Smith Mfg. Co., Shoktrol by Zurn Industries, Inc., or Engineer-approved equal.

I. Water closet shall be white vitreous china, elongated bowl, 12" rough, high efficiency (1.28 gpf), American Standard Cadet 3 Flo Wise # 2832.128 with Elongated Champion seat # 5325.010 or DISTRICT approved equal

J. Lavatory shall be white vitreous china, wall hung, with concealed arms, 20"x 18-¼ American Standard Comrade # 0124.131 with chrome finish American Standard Tropic # 7038.201 two handle centerset faucet with pop up, or DISTRICT approved equal, installation shall Be ADA compliant.

K. Recessed paper towel holder shall be 18-8 S type 304 satin finish Stainless Steel, all welded construction, lockable (provide 6 keys) capable of dispensing "C" fold or multi fold paper towels, Minimum 350 towel capacity as manufactured by Bobrick Washroom Equipment Inc. Model B-359 or DISTRICT approved equal.

L. Recessed toilet tissue dispenser shall be single roll, 18-8 S type 304 satin finish Stainless Steel, all welded construction, as manufactured by Bobrick Washroom Equipment Inc. Model B-6677 or DISTRICT approved equal.

M. Mirror shall be 18"x 30", 18-8 S type 304 satin finish Stainless Steel, as manufactured by Bobrick Washroom Equipment Inc. Model B-1651830 or DISTRICT approved equal.

N. Water Heater shall be electric, demand type with 1/2" IPS connections, 64degree rise at 1.0 gallon per minute flow, heat exchanger shall be brass, 240 volt single phase sized to operate on a 50 amp breaker with a 5 year warranty on heat exchanger as manufactured by Bosch Inc. Power Star 9.5 or DISTRICT approved equal.

O. Roof Drains, Downspout piping shall be Sch 80 PVC, all hangers and clamps shall be 316 Stainless Steel. Roof Drainage accessories shall be shall be Zurn Z-100C, Smith, Wade or Engineer-approved equal.

P. Pipe Hangers and Supports

1. The CONTRACTOR shall furnish all brackets, hangers and supports or other approved devices for all piping to be supported from the Pump Station structures.

2. Items shall be as manufactured by Grinnell, Tolco, or Engineer-approved equal.

3. Brackets, hangers and supports shall be 316 Stainless Steel.

4. Fire Extinguishers

Six dry chemical fire extinguishers shall be provided at convenient locations on the walls of the pump room, one shall be in the office, and one shall be in the Hazard house. And one shall be on the inside of the fence adjacent to the LPG area. For a total of nine extinguishers required for the facility. The dry chemical extinguishers shall be of the portable type suitable for use in Class B and Class C fires (electrical equipment, flammable liquids, liquefied petroleum gas and other hazards). The unit shall be UL rated, and shall be 20 pound size, and shall be wall mounted on heavy duty wall brackets at the locations indicated on the project drawings, or as directed by the Engineer.

2.2. PIPE SCHEDULE

A. Water meter and service 4" Cement Mortar Lined Ductile Iron Pipe

B.	Building Supply 6”	C900 Plastic With ductile iron fittings
C.	Building Supply 2”	316 SS pipe and Fittings
D.	Restroom Supply1/2”- 2”	316 SS pipe and Fittings
E.	Roof Drains	SCH 80 PVC pipe and fittings
F.	Building Sewer 4”	PVC SCH 40 DWV

2.3. BOLT AND TIE ROD SCHEDULE

Unless specifically specified otherwise, flange bolts and nuts, tie rods and other flange hardware shall be as follows:

A. Exposed: Type 316 stainless steel.

B. Submerged: Type 316 stainless steel.

C. Encased: Type 316 Stainless Steel 4.

D. Buried: Type 316 Stainless Steel.

103.3 EXECUTION

3.1. PLUMBING SHALL BE INSTALLED PER THE FOLLOWING CODES

A. Standard Specifications for Public Works Construction (SSPWC) also known as the “Green Book”

B. Uniform Plumbing Code

City of Garden Grove Department of Public Works Standard Plans

3.2. WATER METER

A. Water Meter shall be installed according to the City of Garden Grove standards.

3.3. BUILDING SUPPLY 6”

A. All potable water piping shall have ends securely covered at all times to exclude dirt and animals.

B. Water piping downstream of the meter shall-be constructed along the alignment shown on the drawings.

C. Pipe shall be bedded per SSPWC section 306-1.2.1 Trench backfill shall not be placed over pipe until after the pipe has been inspected by the Engineer. Compact bedding in accord with requirements shown on the Contract Drawings.

D. Install thrust blocks at all required locations per IAPMO standards.

E. Place one sack sand cement slurry over the compacted pipe zone Per City of Garden Grove Standards Section 5-01.

F. Detection tape shall be placed on top of the sand slurry. A plastic metallic type consisting of a blue color coded polyethylene or melinex film, a solid core aluminum foil detection layer and other layers as required. Type shall be resistant to acids, alkalines and other components likely to be encountered in soils. Tape shall be imprinted with “CAUTION WATER PIPELINE BELOW”. Tape shall be Terra Tape “D” by Griffolyn or approved equal.

G. Trench backfill material shall be in vertical lifts and shall not exceed the thickness specified for various types of equipment (SSPWC Section 306-1.3.2 (uncompacted lifts) horizontal lifts. The difference in compacted backfill material on each side of pipe shall not exceed 4-inches.

3.4. BUILDING SUPPLY 2”

A. All potable water piping shall have ends securely covered to exclude dirt and animals.

B. 2” water supply piping shall-be constructed along the alignment shown on the drawings.

C. Pipe shall be bedded per SSPWC section 306-1.2.1 Trench backfill shall not be placed over pipe until after the pipe has been inspected by the Engineer.

D. Detection tape shall be placed on top pipe zone, a plastic metallic type consisting of a blue color coded polyethylene or melinex film, a solid core aluminum foil detection layer and other layers as required. Type shall be resistant to acids, alkalines and other components likely to be encountered in soils. Tape shall be imprinted with “CAUTION WATER PIPELINE BELOW”. Tape shall be Terra Tape “D” by Griffolyn or Detectatape by Allen Systems or approved equal

E. Trench backfill material shall be in vertical lifts and shall not exceed the thickness specified for various types of equipment (SSPWC Section 306-1.3.2 (uncompacted lifts) horizontal lifts. The difference in compacted backfill material on each side of pipe shall not exceed 4-inches.

3.5. RESTROOM SUPPLY 1/2”- 2”

A. 2” water supply piping shall-be constructed along the alignment shown on the drawings.

B. Pipe penetrations through walls shall cast in place sleeves and link seals

C. Pipe supports clamps and hangers shall use a elastomeric cushion to isolate the pipe

D. All angle-stop valves and fixture supply tubing shall be 316 stainless steel

3.6. WASTE AND VENT

A. All Waste and Vent pipe and fittings shall be PVC specifically designated (DWV) Drainage Waste and Vent

B. Pipe shall be bedded per SSPWC section 306-1.2.1 Trench backfill shall not be placed over pipe until after the pipe has been inspected by the Engineer

1. Detection tape shall be placed on top pipe zone, a plastic metallic type consisting of a Green color coded polyethylene or melinex film, a solid core aluminum foil detection layer and other layers as required. Type shall be resistant to acids, alkalines and other components likely to be encountered in soils. Tape shall be imprinted with “CAUTION SEWER BELOW”. Tape shall be Terra Tape “D” by Griffolyn or Detectatape by Allen Systems or approved equal.

2. Trench backfill material shall be in vertical lifts and shall not exceed the thickness specified for various types of equipment (SSPWC Section 306-1.3.2 (uncompacted lifts) horizontal lifts. The difference in compacted backfill material on each side of pipe shall not exceed 4-inches.

C. Frequency and depth of all compaction tests will be as determined by the Engineer.

D. Unless otherwise stated on the Contract Drawings or in these Specifications, the DISTRICT will employ a qualified materials testing organization (laboratory) for performing all compaction and sand equivalent sampling and testing.

E. Cost for all passing compaction and sand equivalent sampling and testing will be paid by the DISTRICT, unless otherwise stated on the Contract Drawings or in these specifications. The CONTRACTOR shall be responsible for the cost of all failing sampling and testing. The DISTRICT will determine the costs of all failing sampling and testing and will deduct the cost from the CONTRACTOR’S progress payments.

103.4 PAYMENT

Full compensation for conforming to the requirements in **BUILDING PLUMBING AND SANITARY FACILITIES**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F -104

BRIDGE CRANE

104.1 GENERAL

1.1 DESCRIPTION

A. A complete single girder under hung bridge crane shall be furnished and installed by the CONTRACTOR in the pump room. Crane shall be equipped with electric power, longitudinal and lateral travel and shall have electric powered hoist of 5-ton capacity. Pendant pushbutton control shall be operable from pump room floor level.

B. All equipment shall be of type suitable for Service Class C and shall be products of nationally recognized equipment manufacturers. Hoist shall be a model which has been on the market for a period of at least five years. Crane shall be powered by 480 volt, 3-phase, 60 hertz.

C. The crane supplier shall furnish and install the rail support beam, rails and wheel stops complete in place, including all fasteners and incidental materials as shown on the design drawings. The rail beam shall be painted the same as the crane.

1.2 SYSTEM

A. Design, furnish, install, and test a five ton single girder under hung bridge crane to facilitate repair and maintenance of the pump station mechanical system in an expeditious and safe manner.

1.3 STANDARD SPECIFICATIONS

A. All equipment furnished shall meet or exceed C.M.A.A., H.M.I., N.E.C., O.S.H.A. and all other applicable State and Local Codes. Where there is a conflict between these specifications and any state requirements, whichever provides the largest safety factor shall be used.

1. Bridge crane shall be CraneVeyor Corp Z-10 series and hoist shall be Yale Model CEW5X-54RT19D2 or Engineer-approved equal.

B. Manufacturing Requirements

1. Design Safety Factors and Other Requirements

a. Calculations of all structural members shall include allowance for vertical impact of 25% of live load and for lateral impact of 20% of combined weight of hoist, trolley, and live load.

b. Live load deflection of bridge girder shall not exceed 1/800 of the span.

c. All equipment utilizing structural steel or supporting structures shall be designed in accordance with the specifications of the American Institute of Steel Construction, current edition, and where welding is employed, such work shall be designed in accordance with the standards of the American Welding Society.

1.4 SUBMITTALS - SHOP DRAWINGS

The CONTRACTOR shall submit shop drawings for the bridge crane as required in the specifications. The submittals shall show general arrangement and control diagrams for the Engineer's approval. The CONTRACTOR shall also submit for Engineer's approval, six copies of structural calculations, load ratings, and manufacturer's data clearly defining the equipment. Both the drawings and the calculations shall be signed by a State of California registered Civil or Structural Engineer.

A. Maintenance and Operation Manuals

1. The CONTRACTOR shall furnish six operating manuals, repair and parts catalogs bound together as required by the specifications.

1.5 MANUFACTURER'S QUALIFICATIONS

Equipment provided shall be designed, fabricated, and installed in accordance with best industry standards and shall be a standard design of manufacturer. The CONTRACTOR shall provide evidence that the selected manufacturer has made other satisfactory installations of equipment of the size and type proposed.

104.2 PART 2 - MATERIALS

Material not definitely specified shall be of the best quality used for the purpose in commercial practice. Material shall be free from all defects and imperfections that may affect the finished product. Structural steel shall conform to ASTM A36.

2.1 BRIDGE DRIVES

Bridge shall be equipped with dual bridge drive arrangement (one drive at each end truck). Helical type gearbox shall be mounted directly to extended rotating drive wheel axle. Drive motor shall be directly coupled to gearbox providing a totally enclosed drive system. This direct drive arrangement shall eliminate axles without dismantling of end truck. Each bridge drive motor shall be furnished with a direct acting brake.

2.2 BRIDGE CONTROL

Bridge traversing shall be 2-speed (7.5 to 69 FPM) utilizing adjustable frequency control. This feature shall permit time controlled acceleration and deceleration to smooth stops. This control shall offer fine and accurate positioning of Crane Bridge.

2.3 BRIDGE ELECTRIFICATION

Cross bridge electrification shall consist of flat cable festooning system for both power and control conductors supported from a full span track and trolley arrangement. Three (3) main line runway collectors with mounting pole shall be provided with crane bridge.

2.4 HOISTING UNIT

A. Electric wire rope hoist shall be rated H4 (per H.M.I.) heavy duty service. Unit shall be four part double revved (right & left hand drum grooving) permitting true vertical plumb lift. Hoist shall be equipped with an adjustable upper & lower switch plus a plugging type upper limit switch, all to prevent hook over-travel and shall also be equipped with a self-actuating mechanical load brake and AC disc motor brake. Hoisting and lowering control shall be 2-speed at 6.3 to 19 FPM, adjustable frequency control.

1. Hoist shall also be furnished with an overload limit device to guard against accidental overloading of unit. This safety feature shall help prevent any severe damage to hoist components.

2.5. TROLLEY

A. Bottom running double girder trolley shall have the same type of drive arrangement as bridge drive (as described above). Drive motor shall be equipped with a disc-type electric brake. Trolley traversing shall be 2-speed at 15 to 45 FPM utilizing adjustable frequency control.

1. Trolley Stops

   To prevent any part of the crane trolley projecting beyond the end of the crane bridge, rubber bumper trolley stops shall be provided on the bridge or rail.

2.6. HOOK HEIGHTS AND LIMITS OF TRAVEL

The required upper limit of hook height and the required limits of travel longitudinally and laterally are shown on the drawings. All equipment proposed to be furnished and installed shall be capable of safely operating at full crane rated capacity within the limits shown. The maximum lift shall not be less than sixty (60) feet.

2.7. GIRDER SECTIONS

The bridge structure shall be designed and fabricated as a complete integral structure comprised of girder, end trucks, and drive unit with only such parts removable as required to facilitate the erection or maintenance of equipment.

2.8. WHEELS, GEARS, BEARINGS

A. All wheels and gears shall be mounted so that they may be removed without disassembling any major part of the crane.

1. Wheels shall be of the double flanged type made from steel and shall have deeply treated (chilled) treads and ground to equal diameters in matched pairs to fit the rails on which they are to operate.

2.9. BEARINGS

Bearings shall be high grade, heavy duty, ball or roller bearings suitable for the required loads and speeds. All bearings shall be equipped with grease fittings.

2.10. HOISTING TACKLE AND HOOK

A. The hoisting tackle shall consist of a safety type lower block and hook with necessary sheaves and hoisting rope. The lower block shall be a heavy steel housing to support the sheaves and hook. The hook shall be forged steel and shall be supported on a ball bearing thrust. The hook shall have a safety clasp, spring loaded, to protect the load from being released from the hook when the tension on the cables are released. Sheaves shall be of a heavy pattern, have deep flanges, and be properly grooved to fit the rope and properly guarded.

1. Hoisting Rope

The hoisting rope shall be of an extra flexible construction and of a proper size to give a safety factor of at least five when loaded to its maximum rating.

2.11. PENDANT CONTROLLER

A. Control of all motions shall be from a reduced voltage (115 VAC) pendant station. The pendant shall be suspended from a full span track and trolley system and shall be operable from motor room floor. This “floating push-button” arrangement permits operator to control any and/or all motions from any point along bridge span regardless of hoist or load location. This system shall be ideally suited for safe handling of large bulky loads, or plants having numerous floor obstructions. The pendant shall be grounded and shall be shock-proof and suspended by a chain.

1. Pendant controller shall also include a magnetic main line contact or to disconnect power to all motions, operated from pendant control station (“On-Off’ buttons).

2.12. CONTROL ENCLOSURE

All controls will be housed in NEMA-12 rated enclosures.

2.13. NAME PLATES

Name plates shall be permanently attached to the bridge and load block showing capacity in short tons (1 short ton = 2000 lbs.).

104.3 EXECUTION

3.1 INSTALLATION

A. The manufacturer shall supervise the installation and testing of the overhead bridge crane and hoists. Ensure adequate clearances to other equipment, piping, electrical wiring or structures.

B. Provision shall be made to provide suitable clearances overhead and at each end of the crane so there will be no interference between the crane and any parts of the building or building obstructions. The minimum overhead clearance between any part of the bridge crane and the lowest overhung obstruction shall be 3 inches. The minimum lateral clearance between any bridge crane part and the pump station shall be 2 inches. Stops shall be installed on the bridge and trolley beams so as to keep the bridge wheels and trolley wheels at least one foot from the end of the beams.

3.2 PAINTING

All exposed ferrous metal surfaces except those in rolling or sliding contact shall be thoroughly cleaned and given one coat of primer followed by two coats of machinery enamel. The hook and the supporting load block shall be painted safety yellow. All painted surfaces shall be touched up as necessary after installation.

3.3 OPERATING TESTS AND ADJUSTMENTS

Upon completion of installation, the entire system shall be thoroughly lubricated, aligned, and adjusted. The bridge crane installation shall be inspected and proof load tested by an agency accredited by the State of California. The crane shall be tested according to the provisions of Sections 5021 through 5023 of the State Industrial Safety Orders. The testing agency shall provide a State certificate that the bridge crane meets all the requirements of the State Division of Industrial Safety. The certificate shall be mounted on a glass frame and posted adjacent to the crane power disconnect and padlock lockout.

104.4 PAYMENT

Full compensation for conforming to the requirements of **BRIDGE CRANE**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

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ROOF TRUSSES

105.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall design, fabricate and install roof trusses including anchor bolts, grout and all other appurtenances required to provide a complete roof truss system.

1.2 SYSTEM

The system shall be composed of steel beams, angles, bolts and plates configured in a manner to safely support the roofing system and the attached five-ton bridge crane. The roof trusses shall be attached to and supported by the reinforced concrete walls.

1.3 STANDARD SPECIFICATIONS (Latest Edition)

A.	AISC	"Specification for the Design, Fabrication and Erection of Structural Steel for Buildings"
B.	ASTM A36	"Standard Specification for Structural Steel"
C.	ASTM A307	"Standard Specification for Low-Carbon Steel Externally and Internally Threaded Standard Fasteners"
D.	ASTM A325	"Standard Specification for High Strength Steel Bolts for Structural Steel Joints Including Suitable Nuts and Plain Hardened Washers"
E.	ASTM A500	“Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes”
F.	ASTM A501	“Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing”
G.	AWS A5.1	"Specifications for Mild Steel Covered Arc-Welding Electrodes"
H.	AWS D1.1	Structural Welding Steel in Structures
I.	CBC 97	California Building Code

1.4 ALLOWABLE TOLERANCES

Tolerances shall comply with AISC "Code of Standard Practice for Steel Buildings and Bridges", Section 7(h).

1.5 SUBMITTALS

A. Shop drawings shall be submitted prior to fabrication of structural steel. Prepare shop drawings in accordance with AISC "Manual of Steel Detailing". Shop drawings shall clearly distinguish between shop and field bolts and welds. Shop drawings shall include member identifications marks and marks shall appear on structural steel members to facilitate field erection.

B. Submit two certified copies of mill reports covering chemical and physical properties of structural steel used in this project.

1.6 DELIVERY, STORAGE AND HANDLING

Deliver structural steel to job site in sequence required. Store structural steel members on timbers and blocking to prevent contact with ground and provide proper drainage. Handle structural steel to prevent damage to members and to shop paint coat and to prevent accumulation of mud, dirt or other foreign materials capable to interfering with field paint application.

105.2 PRODUCTS

2.1 MATERIALS

A. Structural steel shall conform to ASTM A36.

B. Structural tubing columns shall conform to ASTM A500.

C. Structural pipe columns shall conform to ASTM A501.

D. High strength bolts, nuts and washers shall conform to ASTM A325.

E. Anchor bolts shall conform to ASTM A307.

F. Stainless steel bolts shall conform to ASTM A320, Type 316.

G. Welding electrodes shall conform to AWS A5.1, E-70XX series.

2.2 FABRICATION

A. Fabrication shall comply with AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", Section AISC M2.

B. Connections shall be as shown on Drawings. Where details are not shown, connections shall be designed to transfer full strength of member to be supported.

C. Structural steel shall be cleaned and shop primed.

105.3 EXECUTION

3.1 INSPECTION

A. All shop welding shall be performed by a fabricator registered and approved by the building agency in accordance with Chapter 17 of CBC.

B. All field welding shall be performed by a certified welder, and welds shall be visually inspected by a special inspector for approval prior to covering, painting, or coating the weld.

C. Prior to erection, inspect anchor bolts and foundations to ensure proper elevations and locations.

3.2 ERECTION

A. Erection procedures and methods shall comply with AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", Section M4, and with "Code of Standard Practice for Steel Buildings and Bridges", Section 7.

B. Structural steel shall be as erected accurately to line and elevations indicated on Drawings.

C. Field connections shall be as indicated on Drawings. Where details are not shown, connections shall be bolted using 3/4-inch diameter high strength bolts.

D. No final bolting or welding shall be completed until structural steel is properly aligned and plumbed.

E. No field cutting or drilling of structural members will be permitted without DISTRICT'S approval.

F. Column base plates and bearing plates shall be set on leveling nuts or steel shims to true and level plane. Area under base plates and bearing plates shall be grouted utilizing NON-METALLIC GROUT.

3.3 ADJUSTMENT AND PAINTING

Shop paint coat damaged during handling or erection shall be touched up in the field with prime coat and shall be finish painted after all adjustments are finalized.

105.4 PAYMENT

Full compensation for conforming to the requirements in **ROOF TRUSSES**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-106

MISCELLANEOUS METALWORK

106.1 GENERAL

1.1. DESCRIPTION

The CONTRACTOR shall furnish all labor, materials, equipment and incidentals required and install all miscellaneous metal complete as shown on the Drawings and as specified herein.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Carbon steel

1.	Hot rolled shapes	ASTM – A36
2.	Hot rolled bars	ASTM – A36
3.	Hot rolled Sheet	ASTM – A36

B. Stainless Steel

1.	Bolted or clamped	ASTM A240 Type 316
2.	Welded	ASTM A240 Type 316L
3.	Bolts nuts and washers	ASTM A320 Type 316

C. Aluminum

1.	Shapes	ASTM B209 Type 6061
2.	Bars	ASTM B209 Type 6061
3.	Sheet	ASTM B209 Type 6061

D. Welding shall be performed by qualified welders and shall conform to the applicable AWS welding code.

1.	Welding of steel shall conform to	AWS D1.1,
2.	Welding of stainless steel shall conform to	AWS D1.1
3.	Welding of aluminum shall conform to	AWS D1.2./D1.2M

E. Chemical Anchors

1. Two component type	ASTM C881
2. Bolts nuts and washers	ASTM A320 Type 316
F. Wedge Anchors	ASTM A320 Type 316

1.4 SUBMITTALS

A. Quality Assurance

Shop drawings shall be submitted prior to fabrication of miscellaneous metalwork Prepare shop drawings in accordance with AISC "Manual of Steel Detailing". Shop drawings shall clearly distinguish between shop and field bolts and welds. Shop drawings shall include member identifications marks and marks shall appear on miscellaneous metalwork to facilitate field erection.

a. Submit two certified copies of mill reports covering chemical and physical properties of miscellaneous metal used in this project.

b. The work of this Section shall be completely coordinated with the work of other Sections. Verify, at the site, both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.

c. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver items to be incorporated into the work of other trades in sufficient time to be checked prior to installation.

B. Repair items which have become damage or corroded to the satisfaction of the Engineer prior to incorporating them into the work.

1.6. PROJECT/SITE REQUIREMENTS

Field measurements shall be taken at the site, prior to fabrication of items, to verify or supplement indicated dimensions and to ensure proper fitting of all items.

106.2 MATERIALS

2.1 GENERAL

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

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

2.2. ANCHORS, BOLTS AND FASTENING DEVICES

A. Unless otherwise noted, all bolts, concrete anchors, anchor bolts, nuts, and washers shall be ASTM A320 Type 316 stainless steel. Unless otherwise noted. Threads shall be coarse thread series conforming to the requirements of the American Standard for screw threads for all bolts and nuts.

B. Adhesive capsule anchors shall be a two-part stud and capsule chemical resin anchoring system. Capsules shall contain premeasured amounts of polyester or vinyl ester resin, aggregate and a hardener contained in a separate vial within the capsule. Stud assemblies shall consist of an all-thread anchor rod with nut and washer. Adhesive capsule anchors shall be Hilti, HIT HY Adhesive Anchor; Molly, Parabond; Rawlplug, Rawl Chem-Stud or equal.

2.3. MISCELLANEOUS ALUMINUM

A. All miscellaneous metalwork shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitively shown or specified.

B. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Welding shall be on the unexposed side as much as possible in order to prevent pitting or discoloration of the aluminum exposed surface. Provide holes for temporary field connections and for attachment of the work of other trades.

C. Miscellaneous aluminum items shall include: beams, angles, closure angles, grates, hatches, floor plates, stop plates, stair nosing, and any other miscellaneous aluminum called for on the Drawings and not otherwise specified.

D. Angle frames for hatches, beams, grates, etc, shall be complete with welded strap anchors attached.

2.4. MISCELLANEOUS STEEL

A. All miscellaneous metalwork shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability. Holes shall be drilled or punched. Edges shall be smooth and without burrs. Fabricate supplementary pieces necessary to complete each item though such pieces are not definitively shown or specified.

B. Connections and accessories shall be of sufficient strength to safely withstand the stresses and strains to which they will be subjected. Exposed joints shall be close fitting and jointed where least conspicuous. Threaded connections shall have the threads concealed where practical. Welded connections shall have continuous welds or intermittent welds as specified or shown. The face of welds shall be dressed flush and smooth. Provide holes for temporary field connections and for attachment of the work of other trades.

C. Miscellaneous steel items shall include: beams, angles, lintels, metal stairs, support brackets, base plates for other than structural steel or equipment, closure angles, bridge crane rails, monorail hoist beams, hold down straps and lugs, door frames, splice plates, sub framing at roof openings and any other miscellaneous steel called for on the Drawings and not otherwise specified.

D. All steel finish work shall be thoroughly cleaned, by effective means, of all loose mill scale, rust and foreign matter and shall be given one shop coat of primer compatible with the finish coat after fabrication but before shipment. Paint shall be omitted within 3-in of proposed field welds. Paint shall be applied to dry surfaces and shall be thoroughly and evenly spread and well worked into joints and other open spaces.

E. Galvanizing, where required, shall be the hot-dip zinc process after fabrication. Coating shall be not less than 2 oz/sq ft of surface.

106.3 EXECUTION

3.1. GENERAL

A. Fabrication and Erection. Except as otherwise indicated, the fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction “Manual of Steel Construction.”

B. General. Fieldwork, including cutting and threading, shall not be permitted on galvanized items. Dissimilar metals shall be protected from galvanic corrosion by means of pressure tapes, coatings, or isolators.

1. Drilling of bolts or enlargement of holes to correct misalignment will not be allowed.

2. Metalwork to be embedded in concrete shall be placed accurately and held in correct position while the concrete is placed, or if indicated, recessed, or block outs shall be formed in the concrete. The surfaces of metalwork in contact with or embedded in concrete shall be thoroughly cleaned. Recessed may be neatly cored in the concrete after it has attained its design strength and the metalwork grouted in place.

3. Holes shall be punched 1/16 inch larger than the nominal size of the bolts, unless otherwise indicated. Whenever needed, because of the thickness of the metal, holes shall be sub punched and reamed or shall be drilled.

C. Where aluminum contacts a dissimilar metal, apply a heavy brush coat or zinc, chromate primer followed by two (2) coats of aluminum metal and masonry pain to the dissimilar metal.

D. Where aluminum contacts masonry or concrete, apply a heavy coat of Alka 1 resistant paint to the masonry.

3.2. INSTALLATION OF CAST-IN-PLACE ANCHOR BOLTS

After anchor bolts have been embedded, their threads shall be protected by grease and the nuts run on.

3.3. INSTALLATION OF ADHESIVE ANCHOR BOLTS

A. Installation of adhesive, capsule and expansion anchors shall comply with the following:

1. Use shall be limited to applications where exposure to fire or exposure to concrete or rod temperature above 120 degrees F is not indicated. Overhead applications (such as pipe supports) shall not be allowed.

2. Anchor diameter and grade of steel shall comply with the plans and specifications. Anchor shall be threaded or deformed full length of embedment and shall be free of rust, scale, grease, and oils.

3. Adhesive capsules of different diameters may be used to obtain proper volume for the embedment, but not more than two capsules per anchor may be used. When installing different diameter capsules in the same hole, the larger diameter capsule shall be installed first. Any extension or protrusion of the capsule from the hole is prohibited.

4. Holes shall have rough surfaces, such as can be achieved using a rotary percussion drill.

5. Holes shall be blown clean with compressed air and be free of dust or standing water prior to installation.

6. Anchor shall be left undisturbed and unloaded for full adhesive curing period.

3.4. INSTALLATION OF SEAT ANGLES, SUPPORTS, AND GUIDES

Seat angles shall be set flush with the floor.

3.5. INSTALLATION OF GRATING, FLOOR, AND COVER PLATES

Grating, floor, and cover plates shall be field measured for proper cutouts and proper sizes.

106.4 PAYMENT

Full compensation for conforming to the requirements of MISCELLANEOUS METALWORK, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the various contract items of work involved and no additional compensation shall be allowed therefore.

F-107

METAL STAIRS

107.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall furnish and install metal stairs including grating treads, hand railings, and metal landings.

1.2 SYSTEM

Metal stairs will be used to provide access to the forebay sump, wash down platform, and roof.

1.3 STANDARD SPECIFICATIONS

A. Metal stairs shall comply with the following specifications

1. American Society for Testing and Materials (ASTM)

a.	A36/A36M-04.	Structural Steel
b.	A53-04	Pipe, Steel, Black and Hot-Dipped Zinc-Coated Welded and Seamless
c.	A307-04	Carbon Steel Bolts and Studs, 60000psi Tensile Strength
d.	A563-04	Carbon and Alloy Steel Nuts
e.	A1011-04	Steel, Sheet and Strip, Strip, Hot-Rolled Carbon, Structural, High-Strength, Low-Alloy

2. American Welding Society (AWS)

a.	D1.1-00	Structural Welding Code-Steel
b.	D1.3-98	Structural Welding Code-Sheet Steel

3. The National Association of Architectural Metal Manufactures (NAAMM) Manuals

a.	Metal Bar Gratings	(ANSI/NAAMM MBG 531-93)
b	2nd Edition-1985.	Pipe Railing Manual, Including Round Tube

4. American Iron and Steel Institute (AISI)

5. Welding

   a. Structural Steel, AWS D1.1 and Sheet Steel, AWS D1.3.

B. Design Criteria

1. Design stairs to support a live load of 500 kg/m^2 (100 pounds per square foot).

2. Structural design, fabrication and assembly in accordance with requirements of NAAMM Metal Stairs Manual, except as otherwise specified or shown.

3. Design Grating treads in accordance with NAAMM Metal Bar Grating Manual.

4. Design pipe railings in accordance with NAAMM Pipe Railing Manual for 900 N (200 pounds) in any direction at any point.

C. Fabrication General

1. Fasteners.

2. Conceal bolts and screws wherever possible.

3. Use countersunk heads on exposed bolts and screws with ends of bolts and screws dressed flush after nuts are set.

D. Welding

1. Structural steel, AWS D1.1 and sheet steel, AWS D1.3.

2. Where possible, locate welds on unexposed side.

3. Grind exposed welds smooth and true to contour of welded member.

4. Remove welding splatter.

5. Remove sharp edges and burrs.

6. Fit stringers to head channel and close ends with steel plates welded in place where shown.

7. Fit face stringer to newel post by tenoning into newel post, or by notching and fitting face stringer to side of newel where shown.

E. Shop Prime Painting

1. Prepare surface and apply primer as specified for ferrous metals.

2. After installation apply finish paint as specified for ferrous metals.

1.4 RAILINGS

A. Fabricate railings, including handrails, from steel pipe with flush.

1. Connections may be standard fittings designed for welding, or coped or mitered pipe with full welds.

2. Return ends of handrail to wall and close free end.

3. Provide standard terminal castings where fastened to newel.

4. Space intermediate posts not over six feet on center between end post or newel post.

5. Fabricate handrail brackets from cast malleable iron.

6. Provide standard terminal fittings at ends of post and rails.

1.5 INDUSTRIAL STAIRS

A. Provide treads, platforms, railings, stringers and other supporting members as shown.

B. Treads and platforms of checkered steel floor plate:

1. Turn floor plate down to form nosing on treads and edge of platform at head of stairs.

2. Support treads and platforms with angles welded to plate.

3. Do not leave exposed fasteners on top of treads or platform surfaces.

4. Provide flat sheet steel risers for stairs with steel plate treads where shown.

C. Treads and platforms of steel grating

1. Fabricate steel grating treads and platforms in accordance with requirements of NAAMM Metal Bar Grating Manuals.

2. Provide end banding bars, except where carrier angle are used at tread ends.

3. Support treads by use of carrier plates or carrier angle. Use carrier plate end banding bars on exterior stairs.

4. Provide abrasive nosing on treads and edge of platforms at head of stairs.

5. Provide toe plates on platforms where shown.

1.6 SUBMITTALS

A. Shop drawings shall be submitted prior to fabrication of miscellaneous metalwork. Prepare shop drawings in accordance with AISC "Manual of Steel Detailing". Shop drawings shall clearly distinguish between shop and field bolts and welds. Shop drawings shall show design, fabrication details, installation, connections, material, and size of members, member identifications marks, and marks shall appear on miscellaneous metalwork to facilitate field erection.

1. Submit two (2) certified copies of mill reports covering chemical and physical properties of miscellaneous metal used in this project.

2. The work of this Section shall be completely coordinated with the work of other Sections. Verify, at the site, both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.

3. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver items to be incorporated into the work of other trades in sufficient time to be checked prior to installation.

B. Repair items which have become damage or corroded to the satisfaction of the Engineer prior to incorporating them into the work.

1.8 PROJECT/SITE REQUIREMENTS

Field measurements shall be taken at the site, prior to fabrication of items, to verify or supplement indicated dimensions and to ensure proper fitting of all items.

107.2 MATERIALS

A. Material not definitely specified shall be of the best quality used for the purpose in commercial practice. Material shall be free from all defects and imperfections that may affect the finished product.

1. Structural steel shall conform to ASTM A36.

2. Structural tubing columns shall conform to ASTM A500.

3. Structural pipe columns shall conform to ASTM A501.

4. High strength bolts, nuts and washers shall conform to ASTM A325.

5. Anchor bolts shall conform to ASTM A307.

6. Stainless steel bolts shall conform to ASTM A320, Type 316.

B. Welding electrodes shall conform to AWS A5.1, E-70XX series.

107.3 EXECUTION

3.1 STAIR INSTALLATION

A. Provide hangers and struts required to support the loads imposed.

B. Perform job site welding and bolting as specified for shop fabrication.

C. Set stairs and other members in position and secure to structure as shown.

D. Install stairs plumb, level and true to line.

E. Provide steel closure plate to fill any gap between the stringer and surrounding shaft wall. Weld and finish with prime and paint finish of adjoining steel.

3.2 RAILING INSTALLATION

A. Install standard terminal fittings at ends of posts and rails.

B. Secure brackets, posts and rails to steel by welds, and to masonry or concrete with expansion sleeves and bolts, except secure posts at concrete by setting in sleeves filled with commercial non-shrink grout.

C. Set rails horizontal or parallel to rake of stairs to within 1/8-inch in 12-feet.

D. Set posts plumb and aligned to within 1/8-inch in 12-feet.

3.3 FIELD PRIME PAINTING

A. When installation is complete, clean field welds and surrounding areas to bright metal, and coat with same primer paint used for shop priming.

B. Touch-up abraded areas with same primer paint used for shop priming.

3.4 FINISH PAINTING

A. When installation is complete, clean previously primed areas, and coat with finish paint.

107.4 PAYMENT

Full compensation for conforming to the requirements of **METAL STAIRS**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-108

TRENCH GRATING

108.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall furnish and install metal grating over trenches and other opening in the pump house floor. Metal trench angles shall be embedded in the edges of the concrete trench to support the metal grating.

1.2 SYSTEM

Metal trench grating allows easy access to utilities located underneath the concrete floor.

1.3 STANDARD SPECIFICATIONS

A. All trench grating shall comply with:

1. ANSI/NAAMM Metal Bar Grating Manual
2. All material shall be 316 Stainless Steel
3. Welded bearing bars
4. All edges, holes and cutouts shall be banded

1.4 SUBMITTALS

A. Submit manufacturer's product data showing loads and deflection.

B. Shop Drawings: CONTRACTOR is to verify by field inspection and measurement, installation requirements for shop-fabricated trench angles and grating. Submit manufacturer's shop drawings of metal fabrications. Shop drawings shall specify, dimensions, fastening, welding and installation details.

108.2 MATERIALS

A. Material that is not definitely specified shall be of the best quality used for the purpose in commercial practice. Material shall be free from all defects and imperfections that may affect the finished product.

1. All material shall be 316L Stainless Steel
2. Anchor bolts shall be 316L

B Manufacturers

1. Grating Pacific

2. Golden State Grating

3. Approved equal

108.3 EXECUTION

3.1 INSTALLATION

A. Deliver materials to site with labels clearly identifying size and location.

B. Store materials off ground on pallets or skids.

C. Use care during handling and installation to prevent damage.

D. Install trench angles with straight lines and on a precise grade.

E. Ensure that non embedded exposed surfaces of trench angle are protected from concrete.

F. Ensure all wire brushes and power brushes used in cleaning and slag removal are stainless steel and free from carbon steel contamination.

G. Clean all concrete splatter from exposed surfaces of trench angle.

H. Install grating panels and check for edge clearance to allow easy removal without tools.

108.4 PAYMENT

Full compensation for conforming to the requirements of **TRENCH GRATING**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-109

METAL ROOF DECKING

109.1 - GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall install the metal roof decking as shown on the plans and as specified in these specifications.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Metal roof decking shall conform to the latest edition of the following:

1. AISI "Standard Specification for the Design of Cold-Formed Steel Structural Members".

2. ASTM A25 "General Requirements for Steel Sheet Zinc-Coated by the Hot-Dip Process".

3. ASTM C423 "Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method, Test Method for".

4. AWS D1.1 "Structural Welding Code, Steel".

5. AWS D1.3 "Welding Sheet Steel in Structures".

6. SDI "Design Manual for Composite Deck, Form Decks and Roof Decks".

7. SDI "Diaphragm Design Manual".

1.3 SUBMITTALS

A. Shop Drawings: Submit the shop drawings for all deck units and accessories before work is started. The drawings shall show a large-scales cross-sectional detail of the decking, various connections, and bearing on structural supports, methods of anchoring, attachment of accessories, roof layout(s), placement directions, and other pertinent details.

B. Certificates of Conformance: Submit certificates from the manufacturer certifying to the yield strength, design thickness and section properties of the metal deck. Certification shall include diaphragm shear values for the deck supplied using the welding pattern shown on the plans and shop drawings. Submit an ICBO Evaluation Report of Steel Roof Deck.

1.4 DELIVERY AND STORAGE

Deliver, store and handle steel deck in a manner to protect it from corrosion, deformation and other types of damage. Exercise care not to damage the material or overload the decking during the construction period. The maximum uniform distributed storage load shall not exceed the design live load. All damaged material shall be replaced by the CONTRACTOR.

109.2 MATERIALS

A. Material not definitely specified shall be of the best quality used for the purpose in commercial practice. Material shall be free from all defects and imperfections that may affect the finished product.

1. Metal Deck: Metal deck shall be manufactured from steel conforming to ASTM A653, having a minimum yield strength of 38,000 psi.

2. All deck units shall be zinc-coated with a G-90 galvanized coating in accordance with ASTM A924.

3. Accessories: Provide accessories of the same material as the deck and not lighter than 20-gage, unless specified otherwise herein, or on plans.

a. Adjusting Plates: Provide adjusting plates or segments of roof units in locations too narrow to accommodate full-size roof units. As far as practicable, provide plates of the same gage and configuration as the roof units. Factory cut plates of predetermined sizes.

b. End Closures: Provide end closures of minimum 20-gauge to close the open ends at parapets and openings through the roof.

c. Miscellaneous Accessories: Provide cant strips, ridge and valley plates, and various types of plates and closures as indicated or as necessary to complete the work. Provide all accessories required for a finished installation.

B. FABRICATION

1. Steel roof deck shall be manufactured by Verco Type B Formlok or approved equal, 16 gauge, 36” wide, 1 ½” deep, wide rib deck having minimum I = 0.377 in^4, + S = 0.411 in^3 and –S = 0.417 in^3. Deck shall be capable of withstanding a diaphragm shear load of 2,140 plf and a vertical live and dead load of 178 psf when spanning 10’-0” between supports.

2. All decking shall span 3 or more supports with butted or nested 2” end laps and interlocking side laps formed with standing seam weld.

109.3 EXECUTION

A. INSPECTION OF SUPPORT STRUCTURE

Prior to starting installation of any steel roof deck and accessories, inspect the support structure to verify that the structure will permit the indicated field installation of the steel roof deck system without modification.

B. INSTALLATION

1. Install steel roof deck units in accordance with approved shop drawings. Place units on structural supports, properly adjusted, leveled, and aligned at right angles to supports. Locate end laps over supports only, with minimum lap of 2 inches. Do not use unanchored deck units as a work or storage platform. Permanently anchor all units placed by the end of each working day.

2. Immediately after placement and alignment, and after inaccuracies have been corrected, permanently fasten steel roof deck units in place. Length of side and end laps of deck and intervals of fastening shall be as shown on the plans and recommended by the steel deck manufacturer. Clamp or weight deck units to provide firm contact between deck units and structural supports while welding or fastening is being performed.

3. Welding: Location, size and spacing of steel roof deck welding shall be as indicated on plans. Perform all welding in accordance with AWS D1.3 using methods and electrodes as recommended by the manufacturers of the base metal alloys being used. Welds shall be made only by operators previously qualified by test prescribed in AWS D1.3 to perform the type of work required. Clean welds immediately by chipping and wire brushing, and coat with zinc dust type primer paint. All field welding shall be inspected by a special inspector in accordance with Chapter 17 of the CBC.

4. Accessories: Install cover plates, adjusting plates, finish strips, closures and closure sheets as necessary to complete the work. Install finish strips and closure sheets so as to lap one support a minimum of 2 inches.

5. Openings: Reinforce and frame openings through roof as necessary for rigidity and load-carrying capacity. Holes or other openings required for the work of other trades shall be drilled or cut and adequately reinforced by the respective trade; such holes or other openings larger than 6 inches in diameter shall be approved by the engineer.

6. Inspection: Inspect the decking top surface for flatness after installation. The top flanges of each sheet must be flat with no concavity or convexity which exceeds 1/16 inch (1.58 mm). A straight edge placed across any three-contact surfaces shall not leave a gap of more than 1/16 inch between the straight edge and any point of the contact surface; corrective measures or replacement shall be provided. Reinspect the decking after corrective measures or replacement has been performed.

109.4 PAYMENT

Full compensation for conforming to the requirements in **METAL ROOF DECKING**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-110

FLASHING AND SHEET METAL

110.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall provide all labor, materials, tools and equipment and perform all work required to fabricate and install the sheet metal flashing and the gutters and downspouts as shown on the plans and specified herein.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

Roof flashing materials and workmanship shall conform to Chapter 15 of the UBC and these specifications.

1.4 SUBMITTALS

Submit manufacturer's catalog cuts, specifications and shop drawings for the gutters and downspouts and their accessories and fastenings for approval by the DISTRICT.

110.2 MATERIALS

2.1 FLASHING

A. Use minimum 20 GA 304 stainless steel for flashing and for cleats.

1. Machine bend and cut to neat, straight lines to the required dimensions as much as possible. Field cutting and bending by hand shall be kept to a minimum and shall be done to the same standards as appearance, smoothness and quality as in the shop.

2. Use as few seams as possible. All seams shall be made watertight.

3. Hem all exposed edges.

4. Protect all flashing from dissimilar metals with a heavy coat of asphaltic paint.

2.2 FASTENERS

A. Fastening to Wood

1. Use corrosion resistant nails of same material as connected material.

2. Use minimum 1" long.

3. Provide neoprene washers under heads for nails penetrating roofing membrane or flashing in exposed locations.

B. Fastening to Masonry or Concrete

1. Use flat head screw, minimum 3/16" diameter, either self tapping or driven in pre-drilled holes using shields or self cutting threads.

110.3 EXECUTION

3.1 FLASHING

A. General

1. Install per UBC requirements and recommendations of manufacturers of roofing or other applicable manufacturer, as described herein, shown on the plans and as needed to provide a watertight installation.

2. Thoroughly counter flash and make all counter flashing plugged, pointed and secure.

B. Ventilation and Other Curbed Openings

1. At sides extend flashing at least 6" up vertical surfaces and at least 4" under roofing and turn up edge 1½” and thoroughly counter flash.

2. At lower sides extend flashing at least 3" up vertical surface and 4" over top of roofing and thoroughly counter flash.

3. At upper sides, extend flashing under roofing at least 12" and up vertical surfaces at least 6".

3.2 FINISHING

All exposed surfaces of the flashing shall be painted.

110.4 PAYMENT

Full compensation for conforming to the requirements in **FLASHING AND SHEET METAL**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-111

MEMBRANE ROOFING & INSULATION

111.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall provide and install the insulation, roofing, leaderheads and downspouts for the building. This includes all cant strips, flashing, nailers, fasteners, sealant and caps required for a complete, weathertight roofing system.

1.2 SYSTEM

Built-up roofing system shall be shall be 4-ply felt and gravel with a rigid insulation below.

1.3 Standard Specifications

A. Roofing

1. Asphalt Primer: ASTM D41.
2. Asphalt, steep grade, shall comply with ASTM D312, Type III. or IV.
3. Asphalt, dead-level grade, shall comply with ASTM D312, Type I.
4. Asphalt Roof Cement: ASTM D2822, Type I.
5. Coal tar pitch shall comply with ASTM D450, Type A.
6. Tarred felts shall comply with ASTM D227.
7. Asphalt-Saturated Felt: ASTM D226, Type I.
8. Asphalt-Saturated Felt Base Sheet: ASTM D2626.
9. Asphalt-Coated Glass Felt: ASTM D2178, Type IV.
10. Wood fiberboard Overlayment: ASTM C208.
11. Roofing gravel shall be screened gravel conforming to ASTM D1863.

B. Insulation

1. Roof insulation shall be one or more of the following materials:

a. Mineral fiberboard: ASTM C726.

b. Expanded perlite board: ASTM C728.

c. Cellular glass boards: ASTM C552, Type IV.

d. Polyurethane or polyisocyanurate board: Fed. Spec. HH-I-1972/2, Class 1 or 2.

e. Phenolic foam board: Phenolic insulation shall be closed-cell, thermoset, phenolic foam board with density in excess of 2.5 pounds per cubic foot. The top and bottom surfaces shall be covered with a membrane bonded to the phenolic foam during manufacture.

f. Composite boards: Fed. Spec. HH-I-1972/3, Style 1 or 2; Fed. Spec. HH-I-1972/5; or polystyrene board, factory bonded between outer layers of expanded perlite. Polystyrene shall conform to ASTM C578, Type I, II or IV. The perlite component shall conform to ASTM C728.

g. Insulation Thickness: R-19 or as necessary to provide a thermal conductance C value of 0.19 Btu/hr/sq.ft./°F, or less. Insulation thickness shall also satisfy the minimum thickness for width of rib opening recommended in insulation manufacturer's published literature. Roof insulation shall be thickened and sloped to roof drain as indicated on the drawings.

h. Fire Safety Requirements: Roof insulation shall have a flame spread rating not greater than 75 and a smoke developed rating not greater than 150, exclusive of covering, when tested in accordance with ASTM E84. Insulation bearing the UL label and listed in the UL Building Materials Directory as meeting the flame spread and smoke developed ratings will be accepted in lieu of copies of certified test reports. Compliance with flame spread and smoke developed ratings will not be required when the insulation has been tested as a part of a roof construction assembly of the type used for this project and the construction is listed as Fire-Classified in the UL Building Materials Directory, or listed as Class I roof deck construction in the FM Approval Guide. Insulation tested as a part of a roof construction assembly shall be provided with UL or FM labels attesting to the ratings specified herein.

1.4 SUBMITTALS

A. Submit manufacturer's brand name and product literature to DISTRICT for approval.

B. Submit manufacturer's Certificate of Compliance with reference standards for materials to be used in project including that for: roofing felt, asphalt and cement, and insulation.

C. Submit for each asphalt or pitch shipment manufacturer's certificate stating asphalt or pitch type and compliance with reference standard.

D. Certified Test Reports: Flame spread and smoke developed ratings for insulation in accordance with ASTM E84.

E. Manufacturer's Recommendations: Two current copies of insulation manufacturer's recommendations for the following:

1. Location and spacing of wood nailers.

2. Spacing of fasteners for portion of vapor retarder in contact with rigid insulation.

3. Minimum thickness of insulation for steel decks.

4. Fastener pattern and insulation board pattern for insulation on steel decks.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in original containers bearing manufacturer's name and type of material. Materials used in roof membrane shall have Underwriter's Laboratories, Inc. labels.

B. Supply and maintain materials dry.

C. Store roll goods on end on clean floors in dry covered storage or on platforms with waterproof coverings.

D. Store cartons and drums on level floors, standing in upright position. Do not stack cartons. Protect top containers from dirt and precipitation.

E. Store solvent bearing materials in dry, cool storage and keep lids tight on partially used containers to prevent escape of solvents.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not apply bituminous materials when ambient air temperature is below 40^{o} F.

B. Do not install roof insulation during inclement weather or when air temperature is below 40^{o} F, or when there is ice, frost or moisture visible on the roof deck.

1.7 GUARANTEE

A. Provide DISTRICT with written guarantee stating CONTRACTOR shall promptly repair or replace, at no additional cost to DISTRICT, defects in roofing, fabric base flashing or sheet metal work for a period of 5 years from date of final acceptance by DISTRICT.

B. Roof shall be subject to approval as an acceptable 20-year bondable roof. DISTRICT shall have option of obtaining 20-year bond directly from manufacturer.

111.2 MATERIALS

2.1 MATERIALS

A. Roofing

1. Roofing materials shall be supplied by one manufacturer.

2. Cants and Tapered Edge Strips: Preformed cants and tapered edge strips shall be of the same material as the roof insulation; or, if roof insulation material is unavailable, provide pressure preservative treated wood, wood fiberboard, or rigid perlite board cants and edge strips as recommended by roofing manufacturer.

B. Insulation

1. Roof insulation shall be one or more of the following materials:

a. Mineral fiberboard

b. Expanded perlite board

c. Cellular glass boards

d. Polyurethane or polyisocyanurate board

e. Phenolic foam board: Phenolic insulation shall be closed-cell, thermoset, phenolic foam board with density in excess of 2.5 pounds per cubic foot. The top and bottom surfaces shall be covered with a membrane bonded to the phenolic foam during manufacture.

f. Insulation Thickness: R-19 or as necessary to provide a thermal conductance C value of 0.19 Btu/hr/sq.ft./°F, or less. Insulation thickness shall also satisfy the minimum thickness for width of rib opening recommended in insulation manufacturer's published literature. Roof insulation shall be thickened and sloped to roof drain as indicated on the drawings.

g. Fire Safety Requirements: Roof insulation shall have a flame spread rating not greater than 75 and a smoke developed rating not greater than 150, exclusive of covering, when tested in accordance with ASTM E84. Insulation bearing the UL label and listed in the UL Building Materials Directory as meeting the flame spread and smoke developed ratings will be accepted in lieu of copies of certified test reports. Compliance with flame spread and smoke developed ratings will not be required when the insulation has been tested as a part of a roof construction assembly of the

type used for this project and the construction is listed as Fire-Classified in the UL Building Materials Directory, or listed as Class I roof deck construction in the FM Approval Guide. Insulation tested as a part of a roof construction assembly shall be provided with UL or FM labels attesting to the ratings specified herein.

C. Nails and Fasteners

1. Flush-driven through flat discs or hexagonal plates of not less than 1.375-inch diameter. Discs or plates may be omitted when one-piece, composite nails or fasteners with heads not less than 1 inch of diameter are used. Minimum withdrawal resistance of nails or approved fasteners from the deck shall be 120 pounds each in steel deck.

a. Fasteners for Steel Decks: Approved, hardened, penetrating fasteners or screws for securing insulation to steel decks. Design fasteners to driven through roof deck. Fasteners shall be approved and listed in the FM Approval Guide for Class I roof deck construction. Length of fasteners shall be governed by thickness of insulation. Fasteners shall withstand an uplift pressure of 60 pounds per square foot when tested in accordance with the Uplift Pressure Test described in the FM Loss Prevention Data Sheet 1-28.

b. Discs and Plates: Steel or Plastic.

Steel Discs or Plates: Flat discs not less than 1-3/8-inch diameter or hexagonal plates of zinc-coated steel not lighter than 28-gauge. Disc or plate shall be formed to prevent dishing. Do not use bell or cup-shaped discs.

c. Plastic Discs: High-density, molded thermoplastic with smooth top surface, reinforcing ribs and not less than 3 inches in diameter. Fastener head should recess fully into the discs after driving.

111.3 EXECUTION

3.1 INSTALLATION

A. Insulation

1. Keep roof insulating materials dry before, during and after installation. Keep insulation ½ inch clear of vertical surfaces penetrating and projecting from the roof surface.

a. Insulation Installation: Install insulation directly to roof deck surface primed as specified herein for the specific deck. Apply insulation in multiple layers if over ½ inch in thickness. Lay insulation so that end joints of each course break with those of

adjoining courses. When using multiple layers of insulation, joints of each succeeding layer shall be parallel and staggered in both directions with respect to the layer below. Firmly embed each layer in a solid asphalt mopping; mop only sufficient area to provide complete embedment of one board at a time. Use 15 to 25 pounds of asphalt per 100 square feet of roof deck for mopping each layer of insulation in place, except for the layer of insulation in contact with steel deck which shall be secured only with penetrating type fasteners or screws. On projects where polystyrene insulation is provided, apply 6-inch wide, 15-pound, asphalt-saturated felt strips or glass-fiber roofing tape centered over joints and edges of board. Apply joint strips with a taping machine or by solid back-mopping of strips and, while the asphalt temperature is at 225^{o} F to 290^{o} F, flop the strips into position.

b. Temperature of Asphalt: When installing insulation, apply asphalt when temperature of asphalt is within 25^{o} F above or below the equiviscous temperature (EVT). Do not heat asphalt to or above flash point (FP). Do not heat asphalt above the finish blowing temperature (FBT) for longer than 4 consecutive hours. Use thermometers to check temperatures during heating and application. Have kettlemen in attendance at all times during heating process to ensure that maximum temperatures specified are not exceeded.

c. Insulation on Steel Decks: Secure insulation to deck with piercing or self-drilling, self-tapping fasteners. Engage fasteners by driving them through insulation into top flange of steel deck. Insulation joints parallel to ribs of deck shall occur on solid bearing surfaces only, not over open ribs. When multiple layers of insulation are used, mop in the second layer and all succeeding layers of insulation in place. Space fasteners as recommended in FM Loss Prevention Data Sheet 1-28.

d. Protection of Applied Insulation: Completely cover each day's installation of insulation with finished roofing. Do not permit phased construction. Protect open ends of each day's work with temporary water cut-offs and remove when work is resumed. Protect open spaces between insulation and parapets or other walls and spaces at curbs, scuttles and expansion joints, until permanent roofing and flashing is applied. Do not permit storing, walking, wheeling or trucking directly on insulation or on roofed wheeling or trucking directly on insulation or on roofed surfaces. Provide smooth, clean board or plank walkways, runways and platforms near supports, as necessary, to distribute weight to conform to indicated live load limits of roof construction.

e. Wood Nailers: Pressure-preservative-treated for securing insulation or for nailing of roofing felts with preservation meeting UBC and APWA requirements. Verify prior to the installation of insulation that nailers the same thickness as insulation have been

provided at eaves, edges, curbs, walls and roof openings for securing cant strips, gravel stops, gutters and flashing flanges.

2 Cant Strips: Where indicated, provide cant strips at intersections of the roof with walls, parapets and curbs extending above the roof. The face of cant strips shall have an incline of 45^{o}. Wood cant strips shall bear on and be anchored to wood nailers. Cant strips shall fit flush against vertical surfaces. Where possible, nail cant strips to adjoining surfaces. Where cant strips are installed against non-nailable materials, install cant strips in a heavy mopping of asphalt or set-in-asphalt roof cement.

a. Tapered Edge Strips: Where indicated, provide edge strips in the right angle formed by the junction of the roof and wood nailing strips that extend above the level of the roof. Edge strips shall be tapered from top of wood nailing strips to approximately 1/8 inch at a slope of 1 to 1.5 inches per foot. Install edge strips flush against vertical surfaces of wood nailing strips. Where possible, nail edge strips to adjoining surfaces. Where installed against non-nailable materials, install edge strips in a heavy mopping of asphalt or set-in-asphalt roof cement.

3. Roofing

a. Built-up roofing shall be 4-ply felt and gravel installed in strict accordance with manufacturer's recommendations.

b. Do not proceed with roofing until vents, drains, curbs, cants, blocking, nailing strips and projections through roof deck have been installed.

c. Install insulation and roofing to complete each area, except for top surfacing and flashings, at the end of each day. Protect edges and incomplete flashings against water entry. Remove cut-offs and temporary protection prior to work resumption.

d. If in-place roofing felts are to be left without final surfacing longer than the day following application or if precipitation is predicted, glaze top of felts with light coating of steep grade asphalt.

e. Maintain asphalt in kettles and handling equipment within following temperature ranges.

Bitumen	Max. Kettle **Temp., F.***	Handling Equipment **Temp., F. Min.**
Dead-level asphalt	450	350
Steep grade asphalt	475	375
Coal tar pitch	425	325

*Note: Provide kettles with accurate working thermometers or provide kettle operator with hand thermometer and instructions for use. With hand thermometer, measure kettle temperature at farthest point from burner stacks or at drawoff spigot.

f. Prime masonry surfaces to receive hot asphalt or bituminous cements. Use approximately 1 gallon of primer per 100 square feet of surface. Allow primer to dry before applying cements.

g. Use steep grade asphalt for applying insulation.

h. Use following minimum bitumen quantities.

Base Ply	60 lbs/100 sq ft
Asphalt Pitch Mopping	100 lbs/100 sq ft
Asphalt Flash Coating	75 lbs/100 sq ft
Gravel Surface	400 lbs/100 sq ft

i. Hand-broom felts to insure no voids exist underneath and felt edges are cemented.

4. Inspection:

Surface on which insulation is to be installed shall be clean, smooth and dry. Check roof deck surfaces, including surfaces sloped to roof drains and outlets, for defects before work is started; correct defects and inaccuracies in roof deck surface to eliminate poor drainage, and hollow and low spots. Examine steel decks to assure that panels are properly secured to structural members and to each other and that surfaces of top flanges are flat or slightly convex, and are without stiffening grooves.

111.4 PAYMENT

Full compensation for conforming to the requirements in **MEMBRANE ROOFING & INSULATION**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-112

ROOF AND FLOOR HATCHES

112.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide all labor, materials, tools, and equipment and perform all work to install the roof and floor hatches and related hardware as indicated on the drawings and specified herein. This includes but is not limited to ladder extension posts, safety railings, safety grating, and safety nets.

1.2 SYSTEM

Provide easy access to equipment and areas above the roof and below the floor by means of hinged covers.

1.3 STANDARD SPECIFICATIONS NOT USED

1.4 SUBMITTALS

A. Submit manufacturer's product data, shop drawings, installation instructions, and guarantee information for review by the DISTRICT prior to ordering any product.

B. Manufacturer shall guarantee against defects in materials and workmanship for a period of five years. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

112.2 MATERIALS

2.1 MANUFACTURERS

Roof hatch specified herein may be provided by the Bilco Company, P.O. Box 1203, New Haven, CT., or Nystrom Building Products 9300 73rd Ave. N. Brooklyn Park MN 55428. A product of another manufacturer may be acceptable for use in the work provided it is equal to or better in every respect as judged by the DISTRICT.

2.2 DESCRIPTION

A. Equipment hatches shall be double-leaf mill finish aluminum construction.

Haster Basin Pump Station
Equipment Hatches

Qty	Size of Clear Opening
3	9'-0" x 10'

1. Performance Characteristics

a. Covers shall be reinforced to support a minimum live load of 40 psf with a maximum deflection of 1/150th of the span or 20 psf wind uplift.

b. Operation of the covers shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.

c. Operation of the covers shall not be affected by temperature.

d. Entire hatch shall be weather tight with fully welded corner joints on covers and curb.

2. Covers

a. Covers: Shall be 11-gauge aluminum cover with 18-gauge aluminum liner and a 3” beaded flange with formed reinforcing members. Covers shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.

b. Cover insulation: Shall be fiberglass of 1” thickness, fully covered and protected by a metal liner 18 gauge aluminum.

3. Curb

a. Curb: Shall be 12” in height and of 11-gauge aluminum. The curb shall be formed with a 3-1/2” flange with 7/16” holes provided for securing to the roof deck. The curb shall be equipped with an integral metal cap-flashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® or equal flashing system, including stamped tabs, 6” on center, to be bent inward to hold single ply roofing membrane securely in place.

b. Curb insulation: Shall be rigid, high-density fiberboard of 1” thickness on outside of curb.

c. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.

4. Hardware

a. Heavy pintle hinges shall be provided.

b. Covers shall be equipped with an enclosed two point spring latch with interior and exterior turn handles.

c. Roof hatch shall be equipped with interior and exterior padlock hasps.

d. The latch strike shall be a stamped component bolted to the curb assembly.

e. Covers shall automatically lock in the open position with a rigid hold open arm equipped with a 1” diameter red vinyl grip handle to permit easy release for closing.

f. Compression spring tubes shall be Type 316 stainless steel material and all other hardware shall Type 316 stainless steel Springs shall have an electro coated acrylic finish for corrosion resistance.

g. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

h. Finishes: Factory finish shall be mill finish aluminum.

i. All hardware shall be 316 stainless steel.

j. Safety railings shall be provided per OSHA.

B. Roof Service Stair Access hatch shall be single-leaf mill finish aluminum construction.

Haster Basin Pump Station
Roof Service Stair Access Hatch

Qty	Size of Clear Opening
1	4’-0” x 12’

1. Performance Characteristics

a. Covers shall be reinforced to support a minimum live load of 40 psf with a maximum deflection of 1/150th of the span or 20 psf wind uplift.

b. Operation of the covers shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.

c. Operation of the covers shall not be affected by temperature.

d. Entire hatch shall be weather tight with fully welded corner joints on covers and curb.

2. Covers

a. Covers: Shall be 11-gauge aluminum with a 3” beaded flange with formed reinforcing members. Covers shall have a heavy extruded

EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.

b. Cover insulation: Shall be fiberglass of 1” thickness, fully covered and protected by a metal liner 18 gauge aluminum.

3. Curb

d. Curb: Shall be 12” in height and of 11-gauge aluminum. The curb shall be formed with a 3-1/2” flange with 7/16” holes provided for securing to the roof deck. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® or equal flashing system, including stamped tabs, 6” on center, to be bent inward to hold single ply roofing membrane securely in place.

e. Curb insulation: Shall be rigid, high-density fiberboard of 1” thickness on outside of curb.

f. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.

4. Hardware

a. Heavy pintle hinges shall be provided.

b. Covers shall be equipped with an enclosed two point spring latch with interior and exterior turn handles.

c. Roof hatch shall be equipped with interior and exterior padlock hasps.

d. The latch strike shall be a stamped component bolted to the curb assembly.

e. Covers shall automatically lock in the open position with a rigid hold open arm equipped with a 1” diameter red vinyl grip handle to permit easy release for closing.

f. Compression spring tubes shall be Type 316 stainless steel material and all other hardware shall Type 316 stainless steel Springs shall have an electro coated acrylic finish for corrosion resistance.

g. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

h. Finishes: Factory finish shall be mill finish aluminum.

i. All hardware shall be 316 stainless steel.

j. Safety railings shall be provided per OSHA.

C. Floor hatches shall be single or double-leaf mill finish 304 stainless steel.

Haster Basin Pump Station
Floor Hatches

Qty	Size of Clear Opening	Number of Leafs	Ladder Assist Post
1	4' x 6'	2	No
1	4'x 8'	2	No
3	3'x 2'-6"	1	Yes

1. Door Leaf

a. Door leaf / leaves shall be ¼" type 304 stainless steel diamond pattern plate reinforced to support a minimum live load of 300 psf with a maximum deflection of 1/150th of the span.

b. Operation of the door leaf / leaves shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.

c. Operation of the cover shall not be affected by temperature.

2. Channel Frame

a. Channel frame shall be ¼" type 304 stainless steel with an full anchor frame / flange around the perimeter and shall have a minimum cross sectional area of 7 ½ square inches to allow for adequate water drainage.

3. Hardware

a. Hinges: Heavy-duty 316 stainless steel hinges, each having a minimum 3/8" diameter Type pin, shall be provided, and shall pivot so the cover does not protrude into the channel frame.

b. Lifting mechanisms: Manufacturer shall provide the required number and size of compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled door operation throughout the entire arc of opening and to act as a check in retarding downward motion of the cover when closing.

c. Door hold-open arm: The door shall automatically lock in the vertical position by means of heavy stainless steel hold-open arm with release handle.

d. Door latch: A Type 316 stainless steel snap lock with a gasketed cover plug and removable turn handle a fixed handle shall be mounted on the underside of the cover.

e. Drain Coupling: Provide a 1-1/2" drain coupling located in the right front corner of the channel frame.

f. Hardware: all hardware shall be Type 316 stainless steel throughout.

g. Fall protection grating shall be provided per OSHA.

h. Ladder assist posts shall be provided where indicated.

112.3 EXECUTION

3.1 PREPARATION

A. Review manufacturer's installation instructions and examine roof structure and hatch to verify dimensions and conditions so that installation can proceed without delay.
B. Correct all faulty conditions before beginning installation.

3.2 INSTALLATION OF ROOF HATCHES

A. Installation shall be in accordance with manufacturer's instructions.

B. Carefully lift and place hatch on roof to prevent twisting, warping, and damaging unit and roof deck surface.
C. Carefully align hatch over roof opening to match opening edges neatly and uniformly all around.

D. Securely attach hatch to roof deck with corrosion resistant fasteners to fit the number and size of holes provided in the curb flange and extend into roof deck a minimum of 1-1/2 inches.

3.3 INSTALLATION OF FLOOR HATCHES

A. Installation shall be in accordance with manufacturer's instructions.

B. Carefully lift and place hatch in floor to prevent twisting, warping, and damaging unit and forms.
C. Carefully align hatch over preformed opening to match opening edges neatly and uniformly all around.

D. Securely attach hatch to forms, align top of hatch flush with finish concrete surface.

E. Shield hatch and operating mechanism from concrete over pour and splatter.

3.4 ADJUSTING AND CLEANING

A. Inspect installation and test operation of doors prior to beginning installation of flashing and roofing.

B. Lubricate moving parts as recommended by manufacturer.

C. Clean all surfaces and remove any protective film or coverings that may interfere with installation of adjoining work.

D. Correct all malfunctions and repair all damage to the satisfaction of the DISTRICT. Correction and repair shall include complete replacement if said repairs can not correct the deficiency to a satisfactory level as judged by the DISTRICT. All repairs and replacements shall be made at no additional cost to the DISTRICT.

3.5 PROTECTION

Protect the installed hatch from damage due to any source during the remaining work of the contract by leaving protective films or coverings in place or providing additional protective coverings until the work is completed.

112.4 PAYMENT

Full compensation for conforming to the requirements in **ROOF AND FLOOR HATCHES**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-113

METAL DOORS AND FRAMES

113.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall furnish and install acoustically rated metal framed side hinged swinging metal doors as shown on the plans and according to these specifications. The CONTRACTOR shall also furnish and install two (2) horizontally segmented insulated metal roll up doors. Locking devices for the doors shall be paid under Finish Hardware. The roll up doors shall include an automatic door opener.

1.2 SYSTEM

Sound deadening lockable entry, interior, and rollup doors to provide access to pumping facility for operations and maintenance personnel and their vehicles.

1.3 STANDARD SPECIFICATIONS

A. General

Doors, frames and connections shall be designed to resist a 100 mph maximum wind velocity.

1. Door face plates shall be 16-gauge stretcher-leveled, cold-rolled sheet steel. Vertical door stiffeners shall be 16-gauge channels or bars.

2. Door edge stiffeners shall be 16-gauge channels.

3. Door louvers shall be 16-gauge steel.

4. Frames shall be 16-gauge steel for interior use, 14-gauge for exterior use, and 12-gauge for labeled frames.

5. Hardware reinforcing for doors and frames shall conform to the following minimum gauges:

    a. 3/16 inch thick for door and frame hinge plates, closers, holders, and closer and holder arms and brackets.

    b. 12-gauge for lock strike and other hardware reinforcement.

    c. 24-gauge galvanized plaster guards at mortised hardware locations.

    d. 12-gauge reinforcing plates for surface-applied hardware.

B. Sound Doors and Frames

1. Door Assemblies

a. All exterior sound door assemblies shall have a minimum STC rating of 49 dB, and shall provide the following minimum octave band sound transmission loss values.

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
24	28	39	46	50	53	55

b. All interior sound door assemblies shall have a minimum STC rating of 53 dB, and shall provide the following minimum octave band sound transmission loss values.

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
21	40	51	19	25	30	31

and shall comply with ASTM E 90 as determined by a qualified acoustical products testing laboratory.

c. All exterior roll up sound door assemblies shall have a minimum STC rating of 23 dB, and shall provide the following minimum octave band sound transmission loss values when tested in accordance with ASTM 413.87.

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
13	15	14	19	25	30	31

1.4 SUBMITTALS

A. Product Data: Within 10 calendar days after the CONTRACTOR has received the DISTRICT'S Notice to Proceed, submit:

1. Material lists of items provided under this Section.

2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

3. For the required STC ratings, refer to 1.3 of this Section.

4. Shop drawings showing details of each door type, details of openings, and details of construction, installation and anchorage.

5. Manufacturer's recommended installation procedures which, when approved by the DISTRICT, will become the basis for accepting or rejecting actual installation procedures used on the work.

6. Shop drawings shall be approved by the DISTRICT prior to fabrication of the doors.

7. The acoustical door manufacturer will be required to submit acoustical performance data in the form of up-to-date test reports from an independent testing laboratory .

8. Single-Source Responsibility: Provide sound control doors, including frame and sound-absorbing material essential for sound control as an assembly and by a single firm specializing in producing this type of work for a minimum of ten (10) years.

9. Single-Source Responsibility: Provide insulated roll up doors, including frame as an assembly and by a single firm specializing in producing this type of work for a minimum of ten (10) years.

B. Quality Assurance

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

2. DISTRICT may at his option order performance tests of installed door assemblies by an independent consultant to verify compliance with the specifications. Any discrepancies shall be repaired or replaced without cost to the DISTRICT.

113.2 MATERIALS

2.1 STEEL DOORS

A. Flush type hollow metal doors shall be sizes and types shown on the drawings.

B. Doors shall be 1-3/4 inch thick. Reinforce doors with vertical full door height stiffeners spaced on 6-inch centers maximum. Spot weld stiffeners to each inside door face. Reinforce door tops and bottoms with full width channel stiffeners and reinforce door edges with full door height channel stiffeners. Edge joints shall be continuously arc welded and ground smooth to produce door with no exposed seams.

C. Fill door interior with inorganic fireproof insulation approved by Underwriters' Laboratories, Inc.

D. Prepare hollow metal doors to receive specified hardware. Hardware reinforcement shall be spot welded to doors. Accurately drill and tap necessary holes for field installation of hardware using templates furnished by hardware supplier.

E. Provide doors with Underwriters' Laboratories, Inc. label for classes indicated on the drawings.

Steel doors shall be as manufactured by Security Metal Products Corp., or DISTRICT approved equal.

2.2 FABRICATION OF FRAMES

A. Unless noted otherwise, pressed steel door frames shall be combination buck, frame and trim type. Frames shall be sizes and shapes shown on the drawings and shall be supplied by hollow metal door manufacturer.

B. Each head and jamb section shall be fabricated from one sheet of steel. Corners shall be mitered, reinforced, continuously arc welded and ground smooth.

C. Anchors shall be furnished to suit wall conditions. Anchors for labeled frames shall be types tested and approved by Underwriters' Laboratories, Inc. Furnish additional reinforcement where shown on the drawings. Properly design, furnish and install anchoring devices and reinforcement to prevent rotation, twist or other frame movement under operating conditions.

D. Prepare hollow metal frames to receive specified hardware. Hardware reinforcement shall be spot welded to frames. Accurately drill and tap necessary holes for field installation of hardware using templates furnished by hardware supplier. Punch interior door frames except for labeled openings, to receive door silencers. Provide three silencers for jamb for single doors and two silencers per head for pairs of doors.

E. Provide frames with Underwriters' Laboratories, Inc. label for classes indicated on the drawings.

2.3 SOUND DOORS AND FRAMES

A. Door Assemblies

Sound doors and frames shall be factory-fabricated with perimeter compression seals and automatic, door-bottom seals at sill.

B. STC Rating

All exterior Sound door assemblies shall have a minimum STC rating of 49 dB and shall comply with ASTM E 90 as determined by a qualified acoustical products testing laboratory.

2.4 ROLL UP SOUND DOORS

A. Roll-up sound doors shall be located as shown on the contract drawings, they shall be mounted on the interior face of the wall.

B. Roll-up doors shall be designed to withstand a minimum 20 PSF wind load. Service doors are designed to operate a minimum of 20,000 cycles.

C. Roll-up sound doors shall be electrically operated, and equipped with an emergency egress device.

D. Interlocking style slats shall be roll formed from 22 gauge powder coated steel coil. Polyisocyannurate insulation shall be laid in place for complete coverage and concealed by a 24 gauge powder coated steel back slat. Bottom bar shall be reinforced by a double steel 2”x 2”x 1/8” angle foot piece with a vinyl bulb astragal.

E. Steel channels or structural steel angles form curtain guides and shall be bolted to structural steel wall angles. Sizes of guides are as required to retain curtain under wind load. Wind lock bars are provided when wind locks are required to meet wind load.

F. Steel plate brackets shall be bolted to wall angles to support curtain and barrel and provide mounting for hood.

G. A minimum 6-inch diameter steel pipe shall house the torsion spring assembly and support curtain with a maximum deflection of .03 inch per foot of width. Torsion springs shall be mounted on a continuous cold rolled steel shaft, adjustable by a tension wheel outside one bracket.

H. The hood shall be formed from a minimum 24 gage powder coated steel sheet, reinforced with top and bottom flanges to limit deflection. Intermediate support shall be provided when required.

I. Roll up sound doors shall be factory fabricated to meet the minimum noise reduction rating.

J. All exterior roll up sound door assemblies shall have a minimum STC rating of 23 dB.

K. The assemblies shall be well weather stripped around the perimeter (including the bottom) with vinyl compression type gaskets to form an airtight seal

L. Manufacturer:

1. Roll up sound doors shall be Porvene Model 600 Therm Master, or approved equal.

2.5 ELECTRIC DOOR OPERATORS FOR ROLL UP SOUND DOORS

A. Electric door operators shall have the following features:

1. ½ HP three (3) phase continuous motor with instant reverse and overload protection.
2. Three stage drive reduction.
3. Emergency mechanical disconnect shall be electrically interlocked, and at floor level.
4. Emergency egress device.

5. Friction clutch.

6. NEMA 1 electrical box.

7. Push button station for open and close from inside the building.

8. Automatic door locking devices.

9. Self locking mechanical brake system.

10. Obstruction detection on two levels.

11. 3 Channel radio receiver.

12. CONTRACTOR shall furnish ten (10) Security + door opener remotes to the DISTRICT.

Electric door operators shall be Chamberlain Lift Master, Model DJ, industrial duty jackshaft type operator with internal door lock sensor or DISTRICT approved equal

2.6 PAINTING, FINISHING AND COATING

A. Interior and exterior sound doors

1. Interior door and frame surfaces shall be thoroughly cleaned and coated with rust inhibitive paint prior to fabrication. After fabrication, thoroughly clean exterior surfaces, fill surface irregularities with baked-on metallic filler, sand flush with adjacent surfaces, and apply one baked-on rust inhibitive primer coat. Doors and frames for exterior use shall be electro-zinc bonded and bonderized prior to applying prime coat.

2. Service door slats and hoods are pre-finished with a baked on grey polyester primer before forming. Steel footpiece, guides and brackets receive one coat of rust inhibiting grey primer.

B. Roll up sound doors

1. All interior and exterior surfaces shall be powder coated

2. Scratched materials shall be thoroughly cleaned to a smooth surface and repaired per the coating manufacturers recommendations.

3. Components with significant coating damage shall be replaced at the discretion of the DISTRICT

113.3 EXECUTION

3.1 DELIVERY STORAGE AND HANDLING

Protect frames and doors during shipping and handling to prevent damage to paint, coatings and metal. Store frames and doors under cover.

3.2 INSTALLATION

A. Frames shall be installed plumb, rigid and in true alignment, and shall be fastened to retain position and clearance during partition construction. Attach frames to partitions and walls as shown on the drawings.

B. Doors shall be installed plumb and true and in true alignment.

3.2 ADJUSTMENT

Extreme care shall be used to avoid paint and coating damage during adjustment

113.4 PAYMENT

Full compensation for conforming to the requirements of **METAL DOORS AND FRAMES**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid no additional compensation shall be allowed therefore.

F-114

SOUND CONTROL WINDOW

114.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide one (1) sound control window assembly where shown on the drawings, as specified herein, and listed on the Window Schedule. The work includes window assemblies complete with frames, stops, glazing, sound-absorbing material and concealed fasteners factory installed. Glass and glazing material are to be factory assembled in frame and shipped complete as one unit.

1.2 SYSTEM

This window will allow viewing of the mechanical equipment from the office/control room.

1.3 STANDARD SPECIFICATIONS

A. Sound Rating: Provide window assemblies that have been fabricated as sound-retardant units, tested according to ASTM E 90 and have the following certified Sound Transmission Class (STC) rating as determined according to ASTM E 413.

1. STC Rating 57

1.4 SUBMITTALS

A. Comply with Submittal Section of these specifications..

B. Product Data: Within 10 calendar days after the CONTRACTOR has received the DISTRICT'S Notice to Proceed, submit:

1. Material lists of items provided under this Section.

2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

4. Test Reports from a qualified independent testing agency indicating and interpreting test results from Part 3 of this Section relative to compliance of sound ratings with the indicated requirements.

1.5 QUALITY ASSURANCE

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

B. Acoustical Performance

1. The acoustical window manufacturer will be required to submit acoustical performance data in the form of up-to-date test reports from an independent testing laboratory indicating the windows to be provided will have the required Sound Transmission Class Rating (ASTM E-90-90).

2. For the required STC rating, refer to window schedule drawing and these specifications.

3. DISTRICT may at his option order performance tests of installed window assemblies by an independent consultant to verify compliance with the specifications. Any discrepancies shall be repaired or replaced without cost to the DISTRICT.

C. Single-Source Responsibility: Provide sound control windows, including stops, glazing, frame and sound-absorbing material essential for sound control as an assembly and by a single firm specializing in producing this type of work for a minimum of ten (10) years.

1.6 DELIVERY STORAGE AND HANDLING

Use all means necessary to protect the materials of this section before, during and after installation and to protect the installed work and materials of all other trades.

1.7 WARRANTY

Acoustic window materials and associated hardware shall be guaranteed against defective workmanship for one (1) year from date of shipment.

114.2 PRODUCTS

2.1 MANUFACTURERS

Provide double glazed, “Quiet vision” acoustic window and frame with stops, glazing, sound-absorbing material, and concealed fasteners as manufactured by Security Metal Products Corp, Equivalent products may be considered if they meet or exceed the requirements of this specification.

2.2 MANUFACTURED ASSEMBLIES (NOISE LOCK WINDOW)

A. Glass pane(s) minimum thickness:

STC 57 Rating, 1/2” interior, 3/8”– double pane

Glass type shall be: 3/8” Laminated Safety Glass & 1/2” Laminated Safety Glass

B. Frame shall be 1–1/2” thick, fabricated from not less than 14 gauge cold rolled, sheet steel reinforced and filled with sound-absorbing acoustic fill. Inside and outside corners shall be mitered and interlocked to hairline measurements, made square, continuously welded, and ground smooth, flush and invisible. The window assembly can be installed into either existing or new construction openings.

C. Acoustic seals for glazing shall be vibration-isolating resilient gaskets, U-shaped and continuous silicone channel, Self-contained, sound absorptive interior perimeter of not less than 22 gauge (0.76 mm) steel shall be perforated and pre-finished black. Desiccant material shall be incorporated into multiple glazed units.

D. Stops: Provide stops that are 1” (25 mm) high (min) and readily removable, fabricated from not less than 16 gauge (2 mm) rolled steel sections predrilled and aligned with frame to form tight square acoustical joints. Stop fasteners shall be concealed.

E. Assembly: The assembly of the acoustic window unit including frames, stops, glazing, acoustic seals, sound-absorbing material and concealed fasteners shall take place at the factory to insure required noise reduction is achieved. Glazing shall not need to be removed to facilitate fastening or anchoring at the job site.

2.3 FABRICATION

General: Fabricate unit to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Wherever practical, fit and assemble units in the manufacturer’s plant. Identify work that is not permanently factory-assembled before shipment to ensure proper assembly at the Project site. Weld exposed joints continuously: grind, fill dress and make smooth flush and invisible.

2.4 FINISHES (FACTORY)

A. Frame shall receive a shop coat of a rust-inhibitive primer. The primer shall be applied over properly prepared metal, in accordance with the manufacturer’s standard shop prime coat procedure and oven-baked dry.

114.3 EXECUTION

3.1 MANUFACTURER’S INSTRUCTIONS

Compliance: Comply with manufacturer’s product data, including product technical bulletins, product catalog installation instructions and product carton instructions.

3.2 PREPARATION

A. Adjacent Surfaces Protection: Protest adjacent work areas and finish surfaces from damage during product installation.

B. Adjacent Construction: Coordinate window assembly details with details of adjacent work to ensure proper attachments and clean junctions.

3.3 INSTALLATION

A. Install work in accordance with reviewed shop drawings and these specifications using only factory-trained personnel as required by the Manufacturer and approved by the Architect.

1. Install window and shim accordingly to allow for a plumb and square installation without excessive clearances.

2. During installation, solidly pack acoustic insulation around frames that are installed in stud and gypsum-wallboard partitions.

3. Caulk exterior joint prior to painting.

4. Install sound control window assembly during finish phase of construction to protect units from damage.

3.4 FIELD QUALITY CONTROL

Upon completion of this portion of work, and prior to its acceptance by the DISTRICT, secure a visit to the job site by a qualified representative of the manufacturer of the acoustical door system(s) to confirm that installation is in conformance with the manufacturer's recommendations.

3.5 FIELD TESTING

A. Testing Agency: DISTRICT may employ and pay an independent testing agency to perform sound control field testing.

B. Testing Requirements: Conduct field tests according to ASTM E336 with results calculated according to ASTM E413 to confirm that the operating field NIC values are within 5 dB of laboratory STC values.

C. Test results shall be reported promptly and in writing by testing agency to DISTRICT, CONTRACTOR and Architect.

D. Repair or replace components of sound control windows where test results indicate STC rating does not meet requirements.

3.6 DEMONSTRATION

Instruct the DISTRICT'S maintenance personnel regarding the maintenance of acoustic window.

114.4 PAYMENT

Full compensation for conforming to the requirements of **SOUND CONTROL WINDOW**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-115

FINISH HARDWARE

115.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall furnish and install locksets with keys, hinges, closers, panic hardware, door stops and bumpers, lock box, door silencer, surface bolts, etc. to provide complete and operable finish hardware.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATION

Hardware for exterior doors shall be designed to resist a 100 mph maximum wind velocity.

1.4 SUBMITTALS

A. Submit complete hardware schedule to DISTRICT for approval.

B. Coordinate door hardware with acoustical metal door and frame manufacturers.

C. Furnish hardware setting templates to acoustical metal door and frame manufacturers.

1.5 DELIVERY

Each hardware piece shall be separately packed, complete with screws, templates, instructions, keying and markings corresponding to finish hardware schedule.

115.2 MATERIALS

2.1 BUTT HINGES

A. Butt hinges shall be button-tip, ball bearing design, heavy duty template type, and stainless steel with US32D finish. Non-rising pins shall be used for exterior doors. Use 1-1/2 pairs per leaf. Use hinges manufactured by Stanley, Hager, McKinney or equal.

B. For acoustical doors use hinges furnished by door manufacturer.

2.2 LOCKS AND LATCHES

Locks and latches shall be heavy duty cylindrical type, stainless steel with US32D finish, provided with maximum security keying system, and manufactured by Sargent, Russwin, Corbin or equal. Coordinate lockset brand and keying with DISTRICT'S system.

2.3 DOOR STOPS AND BUMPERS

Floor stops shall be used where conditions prevent use of wall type stops. Wall stops shall be 3404 or 3405 by Sargent, 355-1/2 by Russwin, or equal. Floor stops shall be 3380 or 3381 by Sargent, 209-1/2 or 210-1/2 by Russwin, or equal.

2.4 DOOR SILENCERS

Rubber door silencers shall be provided on doorjambs or head as required. Use three silencers per single door and two silencers per head for pairs of doors. Silencers shall be Glynn-Johnson No. 6J64, Russwin No. 33, or equal.

2.5 SURFACE BOLTS

Surface bolts shall be forged brass with US26D finish and furnished with cast bronze dustproof strikes top and bottom.

2.6 KEYS

Provide three change keys for each lock and six master keys for each system. Provide key cabinet to hold present keys plus 20% expansion. Coordinate keying with DISTRICT'S system.

2.7 ACCESSORIES

Furnish proper quantity and size of screws and bolts required to apply finish hardware. Screw and bolt finish hardware. Screw and bolt finish shall correspond to hardware finish.

115.3 EXECUTION

3.1 INSTALLATION

A. Install hardware in accordance with "Recommended Locations for Builders Hardware", published by National Builders Hardware Association.

B. Lock keying shall be set to removable construction core master key. Construction core master key shall be utilized to operate cylinders until permanent cores are installed. Permanent cores shall be set to DISTRICT'S master key system.

115.4 PAYMENT

Full compensation for conforming to the requirements in **FINISH HARDWARE**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work

involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-116

PORTLAND CEMENT PLASTER

116.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall provide all materials, labor and equipment and perform all work necessary to place portland cement plaster on the exterior of the pump station as shown on drawings and described herein.

1.2 SYSTEM Not Used

1.3 STANDARD SPECIFICATIONS

A. Plaster Material

1. Portland Cement: ASTM C150 Type I or II.

2. Portland Cement & Pozzolanic “Fly Ash”: ASTM C150 & ASTM C618.

3. Masonry Cement: ASTM C91.

4. Lime: ASTM C206-Type S.

5. Sand: ASTM C144, type used for cement plaster.

6. Water: Clear and free from substances harmful to plaster.

7. Standards for Workmanship and installation,

   a. All work shall be performed per AWCC Standards Manual Specification in accordance with the Building Codes and manufacturers printed instructions.

1.4 SUBMITTALS

A. Supply mock-up finish samples showing standard range of color and texture for selection by DISTRICT.

B. Do not proceed with lathing or plastering until all products and finish samples are approved.

C. Submit certificates of conformance of materials indicating that they comply with these specifications.

1.5 QUALITY ASSURANCE

A. Qualifications: The CONTRACTOR must be qualified in the workmanship of plastering and must be able to show completed work of equal scope.

116.2 MATERIALS

2.1 BUILDING PAPER

Sheathing paper shall be water repellent breather type membrane conforming to CAN2-51.32M77 Sheathing membrane breather type.

2.2 LATH

A. Expanded Metal Lath

B. Woven Wire Lath: 17 gauge 1 1/2" mesh

C. Welded Wire Lath: 16 gauge

D. Rib Lath

2.3 ACCESSORIES

A. Shapes used as grounds, sized and dimensioned to provide for required plaster thickness.

B. All accessories manufactured of galvanized steel, zinc, aluminum or plastic materials.

C. Configuration of casing beads and control joints to provide lip flange and/or embedment section.

D. Corner beads to be P.V.C. or welded wire.

E. Standard trim items: control joints, casing beads, exterior corner beads, and base screeds.

2.5 MIXES

A. General

1. Accurately proportion materials for each batch using measuring devices of known volume for all materials.

2. Size batches for complete use within maximum of one hour after mixing.

3. Withhold 10% of mixing water until mixing is almost complete then add as needed to produce necessary consistency. Keep water to a minimum.

B. Proportions

Selection of either A, B, or C mix only. Do not inter-mix these three sections or change volume proportions of these sections.

BASECOAT PROPORTIONS PARTS BY VOLUME

Stucco Mixes	Cementitious Materials			Sand (Volume of Sand Per Sum Of Cementitious Materials)	
Symbols	Portland Cement	Lime	Masonry Cement	First Coat	Second Coat
A	1	0 to 1/4	0	2 to 4	3 to 5
B	1	1/4 to 1/2	0	2 to 4	3 to 5
C	0	0	1	2 1/3 to 4	3 to 5

STUCCO BASES - PERMISSIBLE MIXES

Plaster Base	Mixes for Stucco Coats	
	First (Scratch)	Second (Brown)
Low absorption such as dense concretes, dense smooth clay brick, etc.	A	A
High absorption such as concrete masonry porous clay brick or tile etc.	B C	B C
Metal reinforcement	A B C	A B C

2.6 FINISH COAT

A. Mechanically blended compound of white Portland cement, hydrated lime and inert
aggregates and coloring.

B. Texture shall be smooth finish. Color shall be chosen by DISTRICT from manufacturer's standard palette.

116.3 EXECUTION

3.1 DELIVERY STORAGE AND HANDLING

Deliver materials to the jobsite in original containers with labels intact. Store and protect all products from damage and contamination.

3.2 JOB CONDITIONS

A. Cold Weather

Do not use frozen materials

Do not apply cement plaster to frozen surfaces or surfaces containing frost.

Do not mix materials or apply cement plaster when ambient temperature is less than 35°F.

B. Hot Weather

Protect cement plaster from uneven and excessive evaporation during hot, windy, and dry weather.

Moist cure after coat of cement plaster with water if ambient temperature is more than 75 degrees F. Moist cure for 48 hours after application of coats.

On hot, dry or windy days the cement plaster should be moistened down and then covered with a single sheet of polyethylene plastic.

Moist curing is required at the start and end of the work day.

When the humidity is higher than 75%, moist curing is not required.

C. Finish Coat

Do not apply finish coat when there is any form of precipitation.

Protect cement plaster from all forms of precipitation during the application and the setting/curing period of the finish coat. Ensure that the finish is fully set prior to removing protective covering.

Do not apply finish coat to base coat of cement plaster if sun is directly on the wall surface and temperature is above 75°F. Work in the shade whenever possible.

3.3 CONTROL JOINTS

A. It is not required to cut lath behind control joints if flanges of control joint is designed to give a good key to the cement plaster.

B. Panels should be relatively square.

C. No area should exceed 18 lineal feet in length without a contraction joint.

D. Install control joints for surface areas of approximately 150 square feet.

E. Install control joints where dissimilar back-up materials join.

F. Control joints shall be placed at surface penetrations, (windows, doors, etc.) and at areas of structural stress.

3.4 LATH AND ACCESSORIES

A. Attach building paper, lath and accessories per standards and codes.

B. All true, and create a proper screed and depth for the cement plaster.

3.5 CEMENT PLASTER

A. Total thickness of base coats to meet code requirements for fire rated construction (minimum 7/8").

B. Nominal plaster base coat thickness:

First Coat Scratch 3/8" to 1/2"

Second Coat Brown 1/4" to 3/8"

3.6 FINISH COAT

A. General

Must be applied continuously and in one operation to the entire wall area.

A wet edge must be maintained.

Finish to be applied so that there are no scaffold lines or other marks due to the application.

The mixing and application must follow the manufacturer’s recommendations.

B. Condition of Base

Hand application

Prior to the application of exterior stucco finish, the base coat shall be sprayed with clean water to control and equalize water absorption.

Machine Application

Base coat shall be dry. Do not dampen the base coat before application of exterior finish by machine if the compound itself has ample moisture when mixed for this purpose unless otherwise instructed by manufacturer.

C. Mixing

Exterior stucco finish shall be power mixed with clean water for at least 15 minutes, and shall be used within two hours after mixing.

D. Application

Finishes shall be 1/16" to 1/8" thick.

Hand Application

Apply using trowel. Spread on an even coat then rubber float (sand finish) or trowel to a smooth texture as shown on the plans.

Machine Application

Spray first coat over the dry surface and cover base coat completely. After first coat has dried, spray second coat in a thinner consistency and bring to the desired texture. During periods of high humidity, allow one full day between coats.

E. Texture

Sand finish and smooth finish as shown on the plans.

F. Color

Stucco finish coat color shall be determined by the DISTRICT.

116.4 PAYMENT

Full compensation for conforming to the requirements in **PORTLAND CEMENT PLASTER**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-117

SUSPENDED ACOUSTIC CEILING

117.1 GENERAL

1.1.1 DESCRIPTION

The CONTRACTOR shall provide a suspended metal grid ceiling suspension system including acoustical panels and perimeter trim where shown on the drawings and as specified herein.

1.2 SYSTEM

Suspended acoustic ceiling system will be utilized in the office and storage rooms.

1.3 STANDARD SPECIFICATIONS

A. Grid:

1. ASTM C635, heavy duty, non fire rated, exposed “T” components, die cut and interlocking

2. ASTM E580 “Areas Subject to Severe Seismic Disturbance

B. Acoustical panels

1. Comply with the requirements of ASTM E1264, Type I, Type III,, or Type XIII: manufacturers standard thickness , but not less than 5/8” inch thick

2. Light reflectance: LR-1

3. NRC range: 0.95

4. Flame spread/smoke developed: 25/50 or less per ASTM E84

1.4 SUBMITTALS

A. Submit the following in accordance standard submittal procedures:

1. Catalog data and cut sheets on metal grid ceiling suspension system components (including anchor system)

2. Catalog data and cut sheets on ceiling panels (including 12” square sample panel)

3. Manufacturers certification of asbestos and lead free products

4. Manufacturers installation instructions

1.5 QUALITY ASSURANCE

A. Use products of companies specializing in the manufacture of ceiling suspension systems and ceiling panels having satisfactorily performed in at least fifty projects of equivalent nature and scope.

B. Use an installer having performed in at least 50 projects of equivalent nature and scope, and whom the material manufacturers approve.

117.2 MATERIALS

2.1 SUSPENSION SYSTEM

A. Manufacturers

1. Armstrong World Industries

2. Chicago Metallic Corporation

3. USG Interiors

B. Materials

1. Grid materials

a. Commercial quality cold rolled steel with galvanized coating and white painted finish.

2. Accessories

a. Stabilizer bars, clips, splices, edge moldings, and seismic restraints, as required by the system manufacturer and applicable codes.

2.2 CEILING PANELS

A. Manufacturers

1. Armstrong World Industries

2. Chicago Metallic Corporation

3. USG Interiors

B. Materials

1. Acoustical panels water felted rigid mineral fiberboard

2. Size: 24”x 48”, unless indicated otherwise on drawings

3. Light reflectance: LR-1

4. Edge: Square

5. Surface color: White

6. Surface finish: Fissured

7. One layer of R-19 fiberglass insulation shall be placed on top of ceiling tiles

117.3 EXECUTION

3.1 PRE-INSPECTION

A. Verify that existing conditions are conducive for installation, install ceiling panels only after building completely enclosed mechanical and electrical systems installed and dust generating activity has been completed.

B. Verify hanger alignment will not interfere with other work.

C. Beginning of installation indicates acceptance of existing conditions.

3.2 INSTALLATION

A. Install system in accordance with ASTM E580 “Areas Subject to Severe Seismic Disturbance”.

B. Install System capable of supporting imposed loads to a deflection of 1/360 maximum.

C. Locate system on room axes according to suspended ceiling or lighting drawing.

D. Supply hangers or inserts if required by structural materials above.

E. With the exception of wall molding, hang suspension system independent of walls, columns, ducts, pipes and conduits.

F. Where carrying members are spliced, avoid visible displacement of face plane.

G. Where ductwork or other obstruction prevents the regular spacing of hangers, reinforce the nearest affected hangers to span the extra distance.

H. Do not support other building components on suspension system.

I. Install wall molding at intersection of ceiling and vertical surfaces, using the longest practical lengths, miter corners.

J. Fit ceiling panels in place free from damaged edges or other defects detrimental to appearance and function.

K. Install ceiling panel’s level in uniform plane and free from twist, warp and dents.

3.3 EXTRA MATERIAL

Provide one unopened cartons of ceiling tile to DISTRICT.

117.4 PAYMENT

Full compensation for conforming to the requirements in **SUSPENDED ACOUSTIC CEILING**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-118

SOUND ABSORPTIVE PANEL SYSTEM

118.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall furnish and install two inch thick sound absorptive panels on the walls and ceiling of the pump room.

1.2 SYSTEM

Sound absorptive panels (8,422 square feet) shall be installed in the pump room. Panels shall be evenly distributed on the walls and ceiling of the pump room to mitigate machinery noises that would otherwise be transmitted to the exterior of the pump station

1.3 STANDARD SPECIFICATIONS

A. The sound absorptive panel system shall provide the minimum octave band sound absorption.

125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
.35	.65	1.00	1.00	1.00	.92

B. All products furnished shall be tested in accordance with ASTM C-423-90 for Sound Absorption. Test results shall yield an NRC (Noise Reduction Coefficient) of no less than 1.0.

C. All products furnished shall have a flame spread classification of 0-25 for a Class A or Class 1 rating in accordance with ASTM E84.

1.4 SUBMITTALS

A. Submit the following in accordance with the standard submittal section of these specifications.

1. Manufacturer’s Literature and Data

2. Product Data

    a. Submit manufacturer’s technical data and brochures specified system.

3. Shop Drawings

    a. Shop drawings shall show dimensions, sizes, thickness, finishes, joining, mounting attachments, and relationship to adjoining work.

4. Samples

    a. Samples shall include a minimum 12” X 12” nominal piece of each type of metal, finished as specified, and accessories.

5. Certification

    a. Submit certification from manufacturer attesting that products comply with specified requirements including finish as specified.

6. Qualification Data

    a. Firms specified in “Quality Assurance” Article must demonstrate their capabilities and experience by including lists of completed projects with project names and addresses, names and addresses of architects and owners and other information specified.

7. Maintenance Data

    a. CONTRACTOR shall include maintenance instructions for acoustical panels in the operation and maintenance manuals.

8. Warranty

    a. Provide product warranty for one year from date of project acceptance by the DISTRICT.

118.2 MATERIALS

2.1 MANUFACTURERS

Sound Absorptive Paneling Systems shall be manufactured by Industrial Acoustics Company, (718) 931-8000, or approved equal. All panels, perimeter trims, and components including acoustical component shall be provided as a complete package of this work.

2.2 MATERIALS

A. Metal Panels

1. Exposed metal, shall be Aluminum sheet of 3003-H 14 alloy, .032” minimum thickness (ASTM B 209).

2. The metal sound absorptive panels to be placed on the ceiling shall be corrugated, similar to IAC Noise Foil and perforated with 1/8” diameter holes on 21/64” staggered centers, approximately 13% open area.

3. The panels shall be fabricated of smooth aluminum (.032”).

4. Sound Absorption Material:

Provide fiberglass (1.5” thickness X 1.5 # density). The fiberglass panel shall be wrapped in Class A black polyethylene, per ASTM E84

2.3 FINISHES

A. Powder Coat Finish

1. All sound absorptive panels & accessories shall receive a micro-etched pretreatment prior to receiving an electrostatically applied powder coat paint finish.

2. All cut edges, including perforated holes must be coated. Finish shall be cured and oven baked to insure paint adhesion and uniform surface hardness.

3. Paint color to be selected from manufacturer’s standard colors.

2.4 QUALITY ASSURANCE

A. Manufacturer: Firm with manufacturing and delivery capability required for the project, shall have successfully completed at least ten projects within the past five years, utilizing systems, materials, and techniques as herein specified.

B. Fabricator must own and operate its own manufacturing facilities for all metal components. Systems consisting of components from a variety of manufacturers will not be considered or accepted.

C. Manufacturer/Fabricator must own and operate its own painting and finishing facility to assure single source responsibility and quality control.

D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct testing indicated, as documented according to ASTM E 548.

118.3 EXECUTION

3.1 INSPECTION

A. Examine building structure scheduled to receive paneling system for unevenness or irregularities that would affect quality and execution of work.

B. Tolerances:

Install sound absorptive panel system with maximum permissible deflection of L/360 of span maximum surface deviation of 1/8” in 4’-0” (No load applied) ASTM 635-92.

3.2 DELIVERY, STORAGE & HANDLING

All materials shall be protected during fabrication, shipment, site storage, and erection to prevent damage to the finished work from other trades. Store sound absorptive panels inside a well-ventilated area, away from uncured concrete and masonry, and protected from the weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

3.3 INSTALLATION

A. General: Comply with manufacturer's printed instructions, governing regulations for Seismic Codes, and with the Ceiling & Interior Systems Construction Association standards applicable to work.

B. Space Enclosure: Do not install any work until space is enclosed and weatherproofed, wet-work in space is completed and nominally dry, work above ceilings is complete, and temperature and humidity is continuously maintained at values near those of final occupancy.

C. Install paneling around wall mounted equipment as shown on the contract drawings.

3.4 CLEANING

A. Clean all surfaces following installation.

B. Replace material having scratches, abrasions, or other defects, with unblemished panels, or suspension.

C. Maintenance per manufacturer's finish maintenance instructions.

118.4 PAYMENT

Full compensation for conforming to the requirements in **SOUND ABSORPTIVE PANEL SYSTEM**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

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ACOUSTICAL LOUVERS AND SILENCERS

119.1 GENERAL

1.1 DESCRIPTION

Provide and install acoustical louvers, duct silencers, and protective screens and grilles of the types and sizes and at the locations as shown in the drawings and described herein.

1.2 SYSTEM

To provide for fresh air exchange in the pump room, and supply air for the sump ventilation system and to mitigate the machinery noise associated with the pump room from being transmitted to the exterior of the pump station.

1.3 STANDARD SPECIFICATIONS

A. Performance Requirements

Louvers are to comply with specific performance requirements of the Air Movement and Control Association (AMCA) Standard 500.

B. AMCA Certification

Provide louvers with AMCA Certified Ratings Seal evidencing that product complies with above requirement.

C. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.

D. Field Measurements

Verify size, location and placement of louver units prior to fabrication, wherever possible.

E. Shop Assembly

Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 SUBMITTALS

A. Product Data

Submit manufacturer's specifications; certified test data, where applicable; and installation instructions for required products, including finishes for review by the DISTRICT.

B. Shop Drawings

Submit shop drawings detailing fabrication and erection of louver units and accessories for review by the DISTRICT. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.

119.2 MATERIALS

2.1 ACCEPTABLE MANUFACTURERS

Subject to compliance with requirements, manufacturers offering products, which may be incorporated in the work, include, but are not limited to, the following:

L&L Louvers

The Airolite Co.

American Warming and Ventilating Co.

Industrial acoustics Company

2.2 MATERIALS

A. All louvers, duct silencers, and screens shall be of galvanized steel construction.

B. Galvanized sheet steel shall be minimum 16 gauge and conform to ASTM A 526 and A 527, with ASTM A 525, G90 zinc coating, mill phosphatized.

C. Fastenings

Use same material as items fastened, unless otherwise indicated. Fasteners for exterior applications may be hot-dip galvanized or stainless steel. Provide types, gages and lengths to suit unit installation conditions. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

D. Anchors and Inserts

Use stainless steel anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

E. Bituminous Paint

SSPC-Paint 12 (cold-applied asphalt mastic).

2.3 FABRICATION

A. Louvers

1. Provide louvers and accessories of design, materials, sizes, depth, arrangement, and metal thicknesses indicated and as required for optimum performance with respect to: airflow; water penetration; strength; durability; and uniform appearance.

2. Fabricate frames including integral sills to suit adjacent construction with tolerances for installation, including application of sealants in joints between louvers and adjoining work.

3. Include supports, anchorages, and accessories required for complete installation.

4. Provide sill extensions and loose sills made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.

5. Join frame members to one another and to stationary louver blades by welding, except where indicated otherwise or where field bolted connections between frame members are made necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

6. Blades shall be stormproof type, fixed position at a 45 degree angle.

B. Louver Screens

1. Provide removable 1/2" sq x .0625" galvanized steel wire mesh bird screens mounted on interior side.

2. Fabricate rewireable screen frames of formed, galvanized steel and finished to match louver.

3. Frames shall have a removable driven spline or insert for securing screen mesh.

4. Secure screens to louver frames with corrosion resistant machine screws, spaced at each corner and at 12" o.c. between.

C. Metal Finishes

1. Preparation

Clean surfaces of dirt, grease and loose rust or mill scale.

2. Factory-Primed Finish

Apply primer immediately following cleaning and pretreatment. Primer and finish paint coatings shall be in accordance with specifications.

D. Acoustical Performance

The underside of the blades shall be perforated and the inside packed with inert, vermin and moisture-proof mineral fiber to provide acoustical performance not less than indicated in the table below.

Octave Bands	Center Frequency (Hz)							
Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Minimum Octave Band Sound Transmission Loss Values	6	6	8	10	14	18	16	15

CONTRACTOR shall submit manufacturer's certified data, rated in accordance with ASTM Standard E90, substantiating the above specified acoustic performance prior to fabrication.

E. Louver Schedule

The following louvers shall be supplied:

Qty	(W x H) Size	Material	Type
16	4'-0" x 4'-0" x 6"	Shop Primed Galvanized Steel	16-gauge 45° Acoustical Fixed Blade

F. Acoustical louvers shall be Industrial Acoustics Company 6" Slimshield Quiet Vent louvers or DISTRICT approved equal

2.4 FABRICATION

A. Duct Silencers

1. Provide duct silencers and accessories of design, materials, sizes, arrangement, and metal thicknesses indicated and as required for optimum performance with respect to: airflow; strength; durability.

2. Duct silencer blades shall be perforated and the inside packed with inert, vermin and moisture-proof mineral fiber to provide acoustical performance not less than indicated in the table below.

Octave Bands	Center Frequency (Hz)							
Frequency (Hz)	63	125	250	500	1k	2k	4k	8k
Minimum Octave Band Sound Transmission Loss Values	4	7	12	19	23	23	18	11

CONTRACTOR shall submit manufacturer's certified data, rated in accordance with ASTM Standard E 477, substantiating the above-specified acoustic performance prior to fabrication.

B. Duct Silencer Schedule

The following duct silencers shall be supplied:

Qty	(W x H) Size	Material	Type
10	1'-3" x 2' x 3'	Shop Primed Galvanized Steel	16-gauge Acoustical Fixed Blade

D. Acoustical louvers shall be Industrial Acoustics Company, Quiet Duct Silencers, Type 3 MS, forward flow or DISTRICT approved equal.

119.3 EXECUTION

3.1 PREPARATION

Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION

A. Locate and place louver and duct silencer units plumb, level, and in proper alignment with adjacent work.

B. Use stainless steel angle and threaded rod to support duct silencers, and transition fittings to adapt duct silencers to ventilation fans.

C. Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

D. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items, which cannot be refinished in field to shop, make required alterations, and refinish entire unit, or provide new units, at CONTRACTOR'S option.

F. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces, which will be in contact with concrete, masonry, or dissimilar metals.

G. Provide concealed gaskets, flashings, joint fillers, and insulations, and install as work progresses to make installations weathertight.

H. Sealants used in connection with installations of louvers shall conform to ASTM C920.

119.4 PAYMENT

Full compensation for conforming to the requirements in **ACOUSTICAL LOUVERS AND SILENCERS**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-120

PAINTING AND COATING

120.1 GENERAL

1.1 DESCRIPTION

A. It is intended that all ferrous metal items shall be shop primed and field finish coated. Any items that normally come completely coated from the shop shall be reviewed with the ENGINEER, prior to order and delivery, for acceptance of the coating system proposed. The item manufacturer shall supply materials and instructions for the touch-up of all shop applied coatings.

PVC piping shall not be painted. Pipe and fittings are required to be the same color (white or gray) so painting is not required.

B. Prepare surfaces for priming, repair damaged areas and prime, paint, or coat all ferrous metal.

C. Surfaces of equipment items including pumps, motors, blowers, drives, etc., which have a factory finish coating shall be given a minimum of one (1) field coat of the required type and color after installation. Electrical motor control centers, small ventilating fans, water coolers and other small equipment with factory finish are not given a field coat unless specifically stated.

D. Prime coats and surface preparation specified herein will not be required on items delivered with prime or shop coats already applied and still in a condition satisfactory to the DISTRICT and whose prime coating is compatible with the finish coating.

E. All fusion bonded epoxy coated piping shall be field painted.

F. Work not included

Painting or coating will not be required on the following items.

a. Aluminum products, except as noted.

b. Concrete surfaces, except as noted.

c. Plastics including FRP, polypropylene, etc.

d. Stainless steel.

e. Copper products.

1.3 STANDARD SPECIFICATIONS

CONTRACTOR shall fully comply with all federal, state, and local regulations for the use, application, and disposal of the products described by this specification.

1.4 SUBMITTALS

A. The CONTRACTOR shall submit samples, manufacturer's standard color cards, certification, and manufacturer's product literature of all materials prior to commencing work on the site.

B. Varnish samples shall be 12"x12" of the wood to be used in the work.

C. Colors throughout shall be as directed by the DISTRICT. If required by the DISTRICT, paint samples of trim, wall and ceiling colors shall be submitted on samples of those surfaces.

D. The approved manufacturer shall submit on his own letterhead a list of the specific brands of paints and finishes that will be provided, with a statement that the products are suitable for the purpose intended and that they comply with the Specifications.

120.2 PRODUCTS

2.1 MATERIALS

All materials, except specified specialty items, shall be the products of one manufacturer, providing all materials necessary to produce a complete painting job as shown on the schedules and specified.

2.2 MANUFACTURERS

Tnemec Company, Inc. or approved equal

2.3 COLORS

All colors shall be selected by the DISTRICT from a color schedule submitted to the DISTRICT'S representative, unless otherwise specified. No variation shall be made without the DISTRICT'S approval. Color names and/or numbers shall be according to the manufacturer's color chart.

2.4 STORAGE AND PROTECTION

Keep the space used for storage of equipment and material in a clean and orderly condition. Keep all waste and paint rags in metal containers, tightly covered and safely dispose of them at the end of each working day. Take precaution to avoid fire. Provide an approved type of fire extinguisher immediately outside each paint storage area.

2.5 PRODUCT HANDLING

A. Deliver all materials in manufacturer's original unbroken containers, package, or wrappings, bearing the manufacturer's brand and name and a description of the contents.

B. Do not bring to the work or site any paint container bearing the label of any material that has not been approved by the DISTRICT.

120.3 EXECUTION

3.1 SURFACE PREPARATION - NON-METAL SURFACES

A. Cooperate with all trades whose work comes in contact with work to be done under this section, providing such information or applications as may be required by other trades to assure proper project continuity.

B. Examine all surfaces scheduled or specified to be finished under this section, and if any defects or discrepancies are discovered, notify the DISTRICT in writing of the specific conditions. Verify that all such defects have been corrected.

C. Test surfaces for moisture before beginning application with approved moisture meter. No surface shall exceed 13 percent in moisture content.

D. Spackle concrete to the extent that will provide, on application of the specified coats of paint, surfaces which will be free of easily recognizable blemishes.

E. Putty or spackle all open joints and nail holes in woodwork.

F. All concrete surfaces to be coated shall be clean and dry. "Dry" is defined for new concrete as free of moisture and fully cured, which is a minimum of 28 days at 75^{o}F and 50 percent relative humidity or some equivalent cure time at other conditions. All oil, grease, dirt, etc., shall be removed either by steam cleaning with detergent or by scrubbing with a strong commercial type detergent and flushing with water. All chemical contamination shall be neutralized and flushed.

G. Areas where the aggregate is exposed or holes exist shall be filled with iron-free materials compatible with the coating specified. The manufacturer's recommended application instructions shall be observed.

H. Concrete floors shall be thoroughly swept clean and then acid etched. Do not allow the "spent" acid to dry on the floor. Rinse the surface thoroughly with fresh water. Neutralize the surface with a 5 percent solution of soda ash, trisodium phosphate, or ammonium hydroxide in clean water and rinse thoroughly with water. The surface must be clean, dry, sound and neutral or slightly alkaline (pH of 8.0 maximum) prior to coating.

3.2 SURFACE PREPARATION - METAL SURFACES

A. Clean all painted metal surfaces of all dust, grease, rust, and scale, using benzene, steel wool, and wire brushes. Clean damaged areas of factory applied priming coats and repaint with metal primer.

B. Metal surfaces of unprimed material, equipment and items where corrosion is apparent, shall be blast cleaned before being primed or reprimed. Blast cleaning inside of buildings shall be done only within temporary enclosures to confine the dust. All electrical switchgear, instruments, electric motors, etc. must be sealed with masking tape and suitably protected to prevent the entrance of any abrasives or dust from the operation.

C. All welds on hand railing and exposed structural members inside buildings, and any weld of unacceptable workmanship, must be ground smooth and all grindings and other residue resulting from this operation removed completely from all surfaces. Remaining welds shall be thoroughly chipped, brushed, and cleaned using power tools with coarse grade sanding discs and field primed.

D. All cleaned unpainted metal shall be prime coated, as specified, immediately after cleaning to prevent new rusting or oxidation of cleaned surfaces.

E. All steel surfaces shall be prepared as designated by the Steel Structures Painting Council, surface preparation number in the "Coating Systems" of this Specification as outlined below.

F. The CONTRACTOR shall provide at the site a set of commercially prepared metal blast cleaning samples for use in comparing field results with standards of the industry.

1. SSPC-SP1 Solvent Cleaning

   Remove all dirt, oil, grease, and foreign matter with solvents or commercial cleaners using various methods of cleaning such as wiping, dipping, steam cleaning or vapor degreasing.

   Oil and grease removal by solvent cleaning is included in all other SSPC Surface Preparation Specifications. SSPC-SP1 will not be cited separately for the other specifications.

2. SSPC-SP2 Hand Tool Cleaning

   Remove all loose rust and mill scale by hand wire brushing, scraping, chipping or sanding.

3. SSPC-SP3 Power Tool Cleaning

   Remove all loose rust and mill scale by mechanical means such as power sanders, wire brushes, chipping, hammers, abrasive grinding wheels, or needle guns.

4. SSPC-SP5 White Metal Blast Cleaning

   Remove all visible rust, mill scale, paint, and foreign matter by compressed air nozzle blasting, centrifugal wheels or other specified methods, leaving an overall, uniform gray-white-metallic appearance.

5. SSPC-SP6 Commercial Blast Cleaning

   Remove at least two-thirds of all visible rust, mill scale, paint, and other foreign matter from each square inch of surface by compressed air nozzle blasting, centrifugal wheels or other specified methods.

6. SSPC-SP7 Brush-Off Blast Cleaning

Remove all loose rust, mill scale, paint, and foreign matter from the surface by compressed air nozzle blasting, centrifugal wheels or other specified methods.

7. SSPC-SP8 Pickling

   Remove all rust, mill scale and foreign matter by chemical reaction or electrolysis in acid solutions to a degree of cleanliness similar to SP5, White Metal Blast Cleaning.

8. SSPC-SP10 Near-White Metal Blast Cleaning

   Remove approximately 95 percent of all visible rust, mill scale, paint, and other foreign material from each square inch of surface by compressed air nozzle blasting, centrifugal wheels or other specified methods.

3.3 APPLICATION

A. Use all material in accordance with the directions of the manufacturer, subject to the approval of the DISTRICT. Use of thinners at any time must have the approval of the DISTRICT. All coatings shall be applied in accordance with the most recent written application instructions from the manufacturer, by conventional or airless spray wherever possible. The application shall leave no sags, brush marks or other defects.

B. Employ only experienced and competent mechanics. Assume all responsibility for the work, and repair all damage to the painting work by whomsoever caused.

C. Do no interior painting until the building has been enclosed, ventilated, and thoroughly dried out as approved by the DISTRICT. Do no exterior painting in rainy,, damp, or frosty weather, nor until surfaces are thoroughly dry.

D. Maintain interior temperature of rooms at 70^{o}F or higher where varnish, lacquer or enamel are being applied and at 50^{o}F or higher during other painting and finishing. Do exterior painting only when air temperature is 40^{o}F or higher and only during dry weather.

E. Apply material under adequate illumination.

F. Provide fans where natural ventilation is insufficient. Do not use the building fans without the written consent of the DISTRICT.

G. Mix only in a designated space at the site. Provide galvanized steel pans in which all mixing pails or barrels shall be kept. No mixing will be permitted outside the pans.

H. Allow exterior paints and finishes to dry at least 48 hours between coats. Allow interior paints to dry at least 24 hours between coats. Allow enamels, lacquers, and varnishes to dry at least 48 hours between coats. Sand lightly between coats with No. 00 sandpaper and dust well before succeeding coat is applied. Allow additional drying time if conditions warrant, to assure that all coats are perfectly dry before applying succeeding coats.

I. It shall be the responsibility of the CONTRACTOR to coordinate work so that shop primed items are primed and painted with compatible coatings from the same manufacturer.

J. All equipment shop primed shall be cleaned of grease, oil and other contaminants prior to field topcoating.

K. In addition, at no cost to the DISTRICT, a representative of the manufacturer shall make in the presence of the DISTRICT an inspection at the completion of all painting work.

L. Hardware, trim and other items shall be removed as required for proper application of coatings.

M. Cleaning and painting shall be scheduled so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

N. All painting shall conform to the following general conditions:

1. The dry film thickness of each coat and of the entire system shall follow the manufacturer's recommendations. Number of coats specified shall be a minimum to achieve the film thickness.

2. Coverage rates are theoretical as calculated by the coating manufacturer and are, therefore, the maximum allowable.

3. All equipment shall be maintained in good working order and shall be comparable to that described in the manufacturer's most recent Application Instructions. Equipment shall be thoroughly cleaned and inspected daily. Worn spray nozzles, tips, etc. shall be replaced regularly. Effective oil and water separators shall be used and serviced on all airlines.

4. Except where otherwise specified, thinning shall be done only if necessary for the workability of the coating material and then only in accordance with the manufacturers most recent printed Application Instructions.

3.4 UNDERCOATS

Primer and undercoat shall be of approximate shade of final coat, but each shall be of slightly different tint. Each coat shall be inspected and approved before application of the succeeding coats. Otherwise, no credit for coat applied will be given and the work in question shall be recoated.

3.5 FINISH

A. Finished surfaces shall be uniform in finish and color and free of brush marks, sagging, crazing and other imperfections.

B. Edges of paint or finish adjoining other materials or colors shall be sharp and clean without overlapping. Should workmanship be found defective, proper preparatory work shall be done and additional coats applied as necessary to give a finish in accordance with specified requirements.

C. Finish matching adjacent work, all returns, edges, and recesses which will be exposed in the finished work and which will be seen from any angle. Finish with flat gray-black paint all surfaces situated behind grilles or any other form of construction, which will permit the surface to be seen from any angle, including interior duct surfaces.

3.6 PROTECTION AND CLEANUP

A. The CONTRACTOR shall be responsible for the cleanliness of his operations, using covers and masking tape to protect the work wherever such covering is necessary, or if so requested by the DISTRICT. Any paint spoiling unpainted surfaces or surfaces painted a different color shall be carefully removed without damage to any finished paint. If damage does occur, the entire surface adjacent to and including the damaged area shall be repainted without visible lap marks and without additional cost to the DISTRICT.

B. All work not to be coated or previously coated shall be carefully protected during the coating of adjacent work.

C. Any coatings which are found on inspection to be unspecified shall be thoroughly cleaned and the original finish restored at the CONTRACTOR'S expense.

D. Name and data plates on equipment shall not be painted and shall be left clean and legible upon completion of the project.

E. The CONTRACTOR shall insure that all glass throughout that portion of the facility in which he worked is cleaned of dirt and paint before he leaves the job site.

3.7 INSPECTION

During and after final application of protective coatings, all metal surfaces shall be checked mechanically with Elcometer, Mikrotest or other approved dry film thickness gauge to ensure that the specified dry film thickness has been attained. All submerged or intermittently submerged metal surfaces shall be electrically tested for film continuity by means of an approved low voltage flaw detector such as Tinker-Rasor's M1 or K-D's "Bird-Dog". The CONTRACTOR shall provide at the site certified dry film thickness (D.F.T.) gauge and flaw detector for use by the DISTRICT.

3.8 COLOR AND IDENTIFICATION OF PIPING

A. Furnish and install pipe identification markers and flow arrow markers on all pipelines. The markers shall conform to ASA Specification A13. Markers shall be applied every 50 feet on long lines, at T joints and at every entry and exit through walls. Markers shall be applied where view is unobstructed.

B. All exposed piping shall be color painted as selected by the DISTRICT.

C. OSHA safety colors in accordance with ANSI Z53.1 shall be used for marking physical hazards and safety equipment and locations. The following OSHA Safety Color Usage Guild will be used in determining the coating color and type of marking required.

D. OSHA

1. SAFETY RED
    a. Fire protection equipment, fireboxes, extinguishers, exit signs, sprinkler piping.
    b. Danger - Portable containers of flammable liquids (identified by striping or lettering in yellow against red background).
    c. Stop - Emergency stop bars or switches.

2. SAFETY ORANGE
    a. Gear box housings.
    b. Exposed edges of pulleys, gears, etc.
    c. Safety starting buttons.

3. SAFETY YELLOW - Physical Hazard Caution (Generally used with Black in checks or stripes).
    a. Unguarded edges of platforms.
    b. Elevator door edges.
    c. Pulley blocks.
    d. Material handling equipment.

4. SAFETY GREEN - Safety Equipment and Locations
    a. First aid kits, stretchers, safety showers.
    b. First aid signs, dispensaries, drinking water stations.

5. SAFETY BLUE - Equipment under Repair Caution

    Blue flags, barriers, or signs located at control valves or power switches of equipment being repaired.

6. BLACK AND WHITE - Traffic and Housekeeping Areas (Either may be used alone or in check or stripe combinations).
    a. Aisle ways.
    b. Directional signs.
    c. Floor areas around safety equipment.
    d. Location of refuse areas.

e. Drinking water and food dispensing equipment.

7. SAFETY PURPLE - Radiation Hazards

a. Storage areas.

b. Containers or equipment.

3.9 COATING SYSTEMS

Surface preparation, prime coatings, and finish coatings for the various coating systems are specified herein. Other manufacturers listed have similar acceptable coating systems.

A. Coating System 1, ferrous, Metal Interior and Exterior, Non-Immersion, exposed.

Surface Preparation: All metalwork previously given a shop prime coat approved by the DISTRICT shall be touched up as required in the field with a comparable prime coat after preparing damaged areas in accordance with SSPC-SP1 and SSPC-SP2. All unprimed metal shall be prepared in accordance with SSPC-SP6. All fusion bonded epoxy coated pipe shall be prepared in accordance with SSPC-SP7.

Coatings:

Prime Coat - #66 Color Hi-Build Epoxoline, 3.0-5.0 mils d.f.t.

Finish Coat - #73 Color Endura-Shield, 3.0-5.0 mils d.f.t.

B. Coating System 2, Metal, Interior/immersion, severe exposure. (Chlorine Room)

Surface Preparation: All metalwork previously given a shop prime coat approved by the DISTRICT shall be touched up as required in the field with a comparable prime coat after preparing damaged areas in accordance with SSPC-SP1 and SSPC-SP2.

All unprimed metal shall be prepared in accordance with SSPC-SP5.

Coatings:

Prime Coat – Series 120-5002 Vinester, 12.0-18.0 mils d.f.t.

Finish Coat – Series 120-5001 Vinester, 12.0-18.0 mils d.f.t.

C. Coating System 3, Metal, Immersion.

Surface Preparation: All metalwork previously given a shop prime coat approved by the DISTRICT shall be touched up as required in the field with a comparable prime coat after preparing damaged areas in accordance with SSPC-SP1 and SSPC-SP2. All unprimed metal shall be prepared in accordance with SSPC-SP6.

All unprimed metal shall be prepared in accordance with SSPC-SP10.

Coatings:

Prime Coat - #66 Hi-Build Epoxoline, 3.0-5.0 mils d.f.t.

Finish Coat - #66-2000 Hi-Build Epoxoline, 4.0-6.0 mils d.f.t.

D. Coating System 4, Galvanized, Aluminum, Copper or Brass, Interior, Exterior

Surface Preparation: All metalwork previously given a shop prime coat approved by the DISTRICT shall be touched up as required in the field with a comparable prime coat after preparing damaged areas in accordance with SSPC-SP1 and SSPC-SP2.

All unprimed metal shall be prepared in accordance with SSPC-SP6.

Coatings:

Prime Coat - #66 Color Hi-Build Epoxoline, 2.0-3.0 mils d.f.t.

Finish Coat - #70 Color Endura-Shield, 2.0-3.0 mils d.f.t

E. Coating System 5, Buried Metal, which includes valves, bolts, nuts, structural steel, and fittings.

Surface Preparation: All metalwork previously given a shop prime coat approved by the DISTRICT shall be touched up as required in the field with a comparable prime coat after preparing damaged areas in accordance with SSPC-SP2.

All unprimed metal shall be prepared in accordance with SSPC-CP10.

Coatings:

Prime, Intermediate, and Finish Coat - 46H-413 Tneme-Tar @ 8-10 mils d.f.t. per coat.

F. Coating System 6, Interior, Concrete, and Masonry.

Surface Preparation: Care must be exercised to assure that the surface is free of dust, form oils, curing compounds and any foreign matter that would interfere with the bond of the materials.

Floors shall be etched until a granular effect is obtained. Steel troweled surfaces or concrete that have had hardeners added to them may require stronger etching solutions or repeated etchings.

Coatings:

Prime Coat – Series 66 Hi-Build epoxoline 4.0-6.0 mils d.f.t.

Finish Coat – Series 66 Hi-Build epoxoline 4.0-6.0 mils d.f.t.

G. Coating System 7, Exterior Concrete, and Masonry

Surface Preparation: Care must be exercised to assure that the surface is free of dust, or any foreign matter that would interfere with the bond of the materials.

Coatings:

Prime Coat – Series 180 Tneme-Crete 4.0-8.0 mils d.f.t.

Finish Coat – Series 180 Tneme-Crete 4.0-8.0 mils d.f.t.

H. Coating System 8, Architectural Woodwork (Interior and Exterior).

Surface Preparation: Care must be exercised to assure that the surface is dry and free of dust or any foreign matter that would interfere with the bond of the materials.

Coatings:

Prime Coat – Series 36 Undercoater, 2.0-3.5 mils d.f.t.

Finish Coat – Series 113 Tneme-Tuf coat 4.0-6.0 mils d.f.t.

I. Coating System 9, Exterior Stucco

Surface Preparation: Surfaces must be clean before application. Remove efflorescence, scum, algae, mildew, curing compounds, release agents, oil, grease, or any other foreign material.

Coatings:

Prime Coat – Monochem Permashield Base®

Finish Coat – Monochem Permashield Premium®

120.4 PAYMENT

Full compensation for conforming to the requirements of **PAINTING AND COATING** shall be considered as included in the various CONTRACT items of work involved and no additional compensation will be allowed therefore.

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MECHANICAL EQUIPMENT - GENERAL

130.1 GENERAL

1.1 DESCRIPTION

A. This section contains general information required to install mechanical equipment as shown on the drawings and specified in the various individual specifications.

B. Included shall be all supervision, labor, materials, tools, equipment, and services as required for installation and test operation of equipment, including the services of manufacturer service engineers, receiving, unloading, storage, protection, installation, and complete erection of all mechanical equipment required in these specifications.

C. Installation shall include, but not be limited to, placing, shimming, anchoring, grouting, cleaning, painting, lubricating, assembling, testing, and adjusting of all mechanical equipment. Installation shall also include providing all required miscellaneous parts.

D. The CONTRACTOR shall coordinate his work with other disciplines to provide a complete, operational installation.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATION NOT USED

1.4 SUBMITTALS

A. Approval Information to be Submitted by the CONTRACTOR

1. Standard drawings, schematics, technical data, and all other information as necessary to evaluate compliance with the specifications shall be provided.

2. Manufacturer model number and supporting data as required for all major system components that shall be provided with the equipment to provide a complete operating unit. No changes in such equipment listed with the Bid shall be permitted without prior review and approval by the DISTRICT.

3. Shipping weight and number of pieces, method of shipment, point of origin.

4. Time required from date of contract to furnish certified detail shop drawings for review.

5. Completion of data sheets when attached to specifications.

6. A list of recommended spare parts with a price on each item.

7. A list of all special tools to be provided in accordance with Paragraph 2.4.

8. All information that is required in the individual equipment specifications.

9. Shop drawings shall show seismic and wind forces, design forces, and reactions and be sealed by a registered Professional Engineer licensed in the State of California.

1.5 OPERATING AND MAINTENANCE MANUALS

A. Operation and Maintenance Manuals shall be furnished in accordance with the job specifications and shall be submitted for review at least 90 days before equipment start up.

B. Operation and Maintenance Manuals that have been reviewed and approved shall be delivered to the DISTRICT at least 60 days before equipment start up.

1.6 CONFORMANCE TO DESIGN CRITERIA AND PERFORMANCE GUARANTEE

A. By submitting a bid, the CONTRACTOR formally acknowledges receipt of, and understanding of, the design criteria presented in the specifications and guarantees that the equipment supplied shall perform in compliance with the design criteria.

B. CONTRACTOR shall guarantee all equipment provided under this Contract to be in strict accordance with the Contract Documents.

1.7 QUALITY OF EQUIPMENT AND WORKMANSHIP

A. Equipment and appurtenances shall be designed in conformity with the specified standards listed herein. Equipment shall be constructed of materials for the conditions of exposure and of such strength to withstand all stresses, which may occur during testing, installation, and all conditions of normal operation.

B. All equipment shall be installed true and level and to the locations shown on the drawings. All work shall be performed to the satisfaction of the DISTRICT'S representative. Precision gauges and levels shall be used in setting all equipment.

C. The CONTRACTOR shall be responsible for installation of the equipment in a manner consistent with the requirements of performance warranties and equipment workmanship of the manufacturer.

D. Machinery parts shall conform exactly to the dimensions shown on the shop drawings. The corresponding parts of identical machines shall be made interchangeable. Clearance shall be provided for repairs, inspection, and adjustment.

E. Exposed surfaces shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be rounded or chamfered for personnel protection.

F. All machinery and equipment shall comply in all respects with the provisions of the Occupational Safety and Health Act of 1970, as well as other applicable Federal, State and local laws and regulations.

G. Equipment, together with their appurtenances, shall be designed to withstand the wind forces and loadings accordingly to the Uniform Building Code, current edition. Seismic and wind forces need not be combined. Structures shall be investigated for various conditions of content levels, including both full and empty. Design shall be based upon the most severe condition. Shop drawings shall show all design forces and reactions and be sealed by a registered Professional Engineer licensed in the State of California.

130.2 MATERIALS

2.1 ANCHORS AND SUPPORTS

A. The CONTRACTOR shall furnish, install, and protect all guides, bearing plates, anchor and attachment bolts, and all other appurtenances required for the installation.

Anchors and supports shall be of ample size and strength for the purpose intended and shall be approved by the DISTRICT'S representative.

B. Anchor bolts shall be furnished and set in concrete foundations where required. Drawings shall be referenced for sizes, locations, and materials.

C. The CONTRACTOR shall obtain and use shop drawings and suitable templates when required for installation of equipment.

2.2 LUBRICATION

A. The CONTRACTOR shall thoroughly lubricate all equipment in accordance with the equipment manufacturer's instructions. Lubricating oils and greases shall be of the type and viscosity recommended by the equipment manufacturer.

B. All lubricants shall be furnished with flushing oils as recommended by the Manufacturer. This includes, but is not limited to, all gearing and bearings, regardless of whether they have been shipped with or without oil soluble protective coatings.

C. Following flushing, oil lubricating systems shall be filled with "run-in" oil as recommended by the equipment manufacturer. The equipment shall be "run-in" at the no-load condition for a minimum of two hours. Following "run-in" and inspection, the equipment is to be drained and flushed again with flushing oil and refilled with lubricant as recommended by the manufacturer.

D. The schedule for the above procedures is to be submitted for review by the DISTRICT'S representative, at least two weeks prior to the selected procedure starting date.

E. The grease fittings on all mechanical equipment shall be such that they can be serviced with a single type of grease gun. The grease fitting shall be a standard button-head type.

F. Where locally mounted grease fittings would be difficult to service, the fittings shall be extended by adequately sized tubing to a point that shall provide accessibility for normal maintenance. Such points shall be located and installed per the DISTRICT'S directive.

2.3 PROTECTIVE COATINGS AND PAINTING

A. All equipment and materials shall be shop painted. Particular attention shall be directed to wetted surfaces and other areas exposed to corrosive, extreme temperature or other hazardous environments.

B. Painting shall be in strict accordance with the project specifications unless otherwise indicated in the detailed equipment specifications.

C. All matched surfaces and shafting shall be cleaned and protected from corrosion by the proper type and amount of coating necessary to assure a minimum protection for two years after shipment.

D. Oil lubricated gearing, bearings, and other lubricated components, shall be shipped with an oil soluble protective coating as recommended by the manufacturer. The coating shall be selected to provide protection for 2 years.

E. Motors, reducers, and electric controls shall have the standard factory finish prior to delivery except where noted in the individual equipment specifications.

F. Two quarts of paint compatible with the equipment finish coat shall be provided for field touch-up.

2.4 TOOLS AND ACCESSORIES

The CONTRACTOR shall furnish, with each type, make, or size of equipment, any special tools, wrenches and appliances, which may be needed to adjust, operate, maintain, or repair the equipment. Such tools and appliances shall be high-grade, properly labeled, and delivered to the DISTRICT with the equipment.

130.3 EXECUTION

3.1 RESPONSIBILITY FOR EQUIPMENT

The CONTRACTOR shall be liable for all damage to the equipment, which is to be furnished and installed under this Contract, as well as for any damage to the building structures or other property, real or personal, resulting from the movement of equipment or installation work. This liability shall continue until the installed equipment is accepted by the DISTRICT.

3.2 SHOP INSPECTION AND SHOP TESTING

A. The DISTRICT shall be granted reasonable access to the production and shop test areas of the equipment manufacturer's facility during manufacturing and testing.

B. The CONTRACTOR shall notify the DISTRICT'S representative in writing, at least five working days prior to commencement of shop tests, of the time and place of all shop tests.

C. Inspection by the DISTRICT'S representative will not relieve the CONTRACTOR of his responsibility for workmanship, materials, and Specification requirements.

D. Manufacturer's standard test procedures shall be required and the manufacturer shall demonstrate that equipment meets all the requirements of this specification.

3.3 SHIPPING AND IDENTIFICATION

A. All shipments shall be "tagged" by the CONTRACTOR with a "wired-on" metal or plastic tag clearly stenciled or lettered with paint or waterproof ink. The information on the tags and cartons should include CONTRACTOR'S order number, purchase order number, manufacturer's number, and the equipment number. Any expense incurred by the DISTRICT due to the CONTRACTOR'S failure to do so will be back-charged or deducted from his contract.

B. Each piece of equipment shall be provided with a substantial stainless steel nameplate, securely fastened in a conspicuous location, and clearly inscribed with the Manufacturer's name, year of manufacture, serial number, principal rating data, and equipment item number.

C. The equipment covered in these specifications shall be fabricated in the minimum number of sub-assemblies necessary for transportation. Small components or assemblies shall be adequately boxed or crated to prevent damage during shipment.

D. Each assembly or package shall be identified with a durable shipping tag securely attached and plainly marked with the CONTRACTOR'S order number, manufacturer's purchase order number, and equipment number.

E. All openings shall be covered with plywood, plastic or wood plugs or shields to prevent debris from entering the assemblies. Each assembly or sub-assembly shall have lifting lugs to facilitate erection.

3.4 OPERATION AND MAINTENANCE INSTRUCTION

A. The CONTRACTOR shall provide a minimum of 40 hours of instruction time, after the equipment has been accepted by the DISTRICT'S representative. The time shall be used to instruct the DISTRICT'S personnel in the proper operation and maintenance of the equipment. The manufacturer shall provide technical personnel familiar with the operation and maintenance of the equipment in making this presentation. The service shall be coordinated with the DISTRICT.

B. Training shall consist of on-site operation training, classroom training, as well as operational safety and emergency drills.

C. The CONTRACTOR shall recommend additional number of training days that may be required, if necessary, to properly instruct the DISTRICT'S operating personnel in the proper use of the equipment. Such additional instruction time shall be included in Bid.

3.5 INSTALLATION OF EQUIPMENT

A. The CONTRACTOR'S work procedure shall conform to the manufacturer's installation instructions unless expressly directed otherwise by the DISTRICT'S representative.

B. Equipment shall be erected level and plumb on the foundations and supports at the locations and elevations shown on the Drawings, unless otherwise directed by the DISTRICT'S representative during installation.

C. The equipment shall be brought to proper level with wedges, shims, or backing nuts. After the machine has been leveled and aligned, the nuts on the anchor bolts shall be tightened to anchor the machine firmly into place against the shims and backing nuts. Wedges shall be removed after shimming.

All equipment shall be installed in such a manner as to provide access for routine maintenance and lubrication as specified in paragraph 2.2.

Equipment of a portable nature, which requires no installation, shall be delivered to a location designated by the DISTRICT'S representative.

3.6 MECHANICAL START-UP

A. Once the equipment has been installed, complete with all auxiliary and support systems, and is ready for operation, the CONTRACTOR shall mechanically check out the equipment to verify that the equipment functions correctly under "non-process" conditions. The equipment shall be fine-tuned, adjusted, water tested where applicable and completely checked out before the equipment and support systems are considered ready for process start-up.

B. The CONTRACTOR will be responsible for coordinating this effort and providing all support services and facilities necessary for this work effort.

C. The equipment will not be considered ready for process start-up until the DISTRICT'S representative is satisfied that the equipment has been satisfactorily checked-out and successfully passed a "non-process" test run.

3.7 FIELD SERVICE

It is understood that the CONTRACTOR and manufacturer share a joint responsibility in this work. The CONTRACTOR shall provide the manufacturer's qualified field

representative and supporting personnel as required for the equipment furnished and installed under this Contract to perform the following:

A. Assistance during equipment installation shall be provided to align the equipment or check the alignment of pre-aligned equipment prior to making connections to or anchoring of the equipment.

B. Inspection during equipment installation work shall be provided to determine compliance with equipment erection methods and procedures recommended by the manufacturer.

C. Written approval of the equipment installation shall be submitted to the DISTRICT after satisfactory completion of mechanical start-up and "run-in period" of the equipment.

D. The CONTRACTOR shall conduct the process start-up necessary to operate, adjust, calibrate, and tune the equipment and systems into operating service in accordance with the design criteria described in each detailed equipment Specification.

E. The CONTRACTOR shall conduct performance tests to demonstrate compliance with design criteria and performance guarantee set forth in the Specifications.

3.8 PROCESS START-UP

A. Once the equipment has been considered ready for process start-up and the support systems can deliver the process material, the CONTRACTOR shall start-up the equipment under process conditions and conduct performance tests to verify compliance with the specifications.

B. The CONTRACTOR shall provide the necessary supervision and technical personnel and services required to perform the work. The DISTRICT'S representative shall coordinate this phase of the work with the CONTRACTOR and provide all necessary support services and facilities to assist the CONTRACTOR in performing the work.

C. The equipment shall be considered ready for a performance test only after the CONTRACTOR has demonstrated to the DISTRICT that the equipment can operate continuously, without mechanical interruption under process flow conditions for up to three days, or a lesser time as may be mutually agreeable to the DISTRICT and CONTRACTOR.

D. After it has been determined that the equipment will operate satisfactorily under process conditions, the performance test shall be made by the CONTRACTOR to verify that the equipment can meet the requirements outlined in the Specification. The performance test shall be based on maintaining the design requirements for up to seven consecutive days or lesser time mutually agreeable to the DISTRICT'S representative and the CONTRACTOR.

3.9 PERFORMANCE TESTS

A. Performance test procedures shall be prepared by the CONTRACTOR and approved (in writing) by the DISTRICT before performance tests are conducted.

B. Costs of all inspections, field service, mechanical start-up, run-in work, process start-up and performance test shall be borne by the CONTRACTOR and shall be included in the total price bid for the work.

C. If the equipment is rejected for failure to meet performance requirements, the CONTRACTOR will modify or replace such equipment with other equipment capable of meeting performance at no cost to the DISTRICT.

3.10 FAILURE OF TESTS

A. Any defects in the equipment, or deviations from the guarantees or requirements of the Specifications, shall be promptly corrected by the CONTRACTOR by replacement and/or DISTRICT'S representative approved repair. The decision of the DISTRICT'S representative as to whether or not the CONTRACTOR has fulfilled his obligations under the Contract shall be final and conclusive. If the CONTRACTOR fails to correct any defects or deviations, or if the replaced equipment, when tested, fails to meet the guarantees or specified requirements, the DISTRICT, not withstanding his having made partial payment for work and materials which have entered into the manufacture of such equipment, may reject that equipment and order the CONTRACTOR to remove it from the premises at the CONTRACTOR'S expense.

B. If the DISTRICT'S representative rejects a particular item of equipment, then the CONTRACTOR hereby agrees to repay to the DISTRICT all sums of money paid to him for the rejected equipment on progress certificates of otherwise on account of the prices specified. Upon receipt of such monies, the DISTRICT will execute and deliver to the CONTRACTOR a bill of sale of all his rights, title, and interest in and to the rejected equipment; provided however, that the equipment shall not be removed from the premises until the DISTRICT obtains from other sources equipment to take the place of that rejected. The bill of sale shall not abrogate DISTRICT'S right to recover damages for delays, losses, or other conditions arising out of the basic contract. The DISTRICT hereby agrees to obtain alternate equipment within a reasonable time and the CONTRACTOR agrees that the DISTRICT may use the original equipment furnished by him without rental or other charge until the alternate equipment is obtained.

C. The CONTRACTOR shall also agree to repay the DISTRICT installation costs for the rejected equipment. The installation costs will be derived by the DISTRICT based on actual costs charged for the installation of the equipment.

130.4 PAYMENT

Full compensation for conforming to the requirements of MECHANICAL EQUIPMENT – GENERAL, shall be considered as included in the various CONTRACT items of work involved and no additional compensation will be allowed therefore.

F-131

SLIDING GATE OPERATORS

131.1 GENERAL

1.1 DESCRIPTION

This section provides specifications for the sliding gate motor operator, and its associated sensors and controls.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; 2002.

1.4 SUBMITTALS

A. Submit per the submittal section in these specifications.

B. Product Data: Equipment list, system description, block diagrams on equipment to be finished, electrical wiring diagrams for installation, and manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

1.5 QUALITY ASSURANCE

A. Provide documentation of maintenance and repair service availability within four hours of notification for emergency conditions.

B. Installer Qualifications: Factory authorized CONTRACTOR specifically trained in gate operation systems of the type found in this section.

1.6 WARRANTY

Warranty: Manufacturer's standard warranty for two years after project acceptance by the DISTRICT.

131.2 MATERIALS

2.1 MANUFACTURERS

Acceptable Manufacturer: DoorKing Incorporated, which is located at: 120 Glasgow Ave. Inglewood, CA 90301; Tel: 310-645-0023, or approved equal.

2.2 GATE OPERATORS

A. Slide Gate Operator

Microprocessor based solid-state control board; two convenience outlets, power switch, and reset switch; adjustable clutch; built-in lockable power disconnect and reset switch; adjustable automatic timer; automatically reversing gate to full open position if obstruction is met during closing cycle.

B. For Gates Up to 100 feet Long, Weighing Up to 3000 lbs

Door King Model 9210; Coordinate actuator with actual gate supplied.

1. Class IV, when tested in accordance with UL 325.

2. Actual Footprint: 20 inches wide by 18 inches deep.

3. Pulling Medium: Number 60 roller chain.

4. Motor: 115 V, 1 phase, 1/2 HP (373 Watts) continuous duty, 5.4 A; AC power.

5. Entrapment Protection:

    a. Including primary and secondary sensing system reversing gate if obstruction sensed; gate stopped and internal alarm activated when sensing an entrapment, allowing entrapment opportunity to free self without outside intervention; requires reset switch activation to return to normal.

6. Manual Release:

    a. Built-in manual release allowing manual operation of gate.

    b. Removable crank allowing manual operation of gate; including integral interlock switch preventing start-up of gate operator during cranking operations.

7. Gate Operator Speed:

    a. 1 foot per second.

8. Operator Housing:

    a. 12 gage, 0.104 inch G-90 galvanized steel and aluminum with

charcoal gray finish, unless otherwise indicated.

2.3 SENSORS AND CONTROLS

A. Double Channel Loop Detector

1. Two (2) reversing loops wired in series to a single detector. The pre-formed loops shall measure 6 feet x 12 feet and shall be installed a minimum 4-feet away from the slide gate.

B. Photo-Reflective Beam

1. 30-foot sensing distance. Uses a reflector instead of a receiver.

C. Access Control System

1. Stand-alone receiver, Door King Model 8054-081 or equal. Provide the DISTRICT with six MicroPLUS® RF Control Transmitters, Door King Model 8069-080 or equal.

2.4 GATE ACCESSORIES

A. Magnetic Gate Lock:

1. 1200lb DoorKing Magnetic Gate Lock Model 1216-080 with lock mounting bracket.

B. Slide Gate Roller Assembly:

1. Door King Guide Rollers Type II

C. Digital Keypad:

1. Door King 1503-081 mounted on Standard DoorKing Mounting Post.

D. Key Switch:

1. Knox® Key Switch to match City of Garden Grove Fire Department Standard for Fire Department access.

2. Upon activation of the key switch, the gate shall remain open until returned to normal operation by means of the key switch.

3. The key switch shall be labeled with a permanent red sign with not less than ½" contrasting letters reading "FIRE DEPT" or a "Knox" decal.

4. Key Box: Knox Box® Key Box 3200 Series to hold key for Fire Department Key Switch.

131.3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Mount directly to concrete pad, firmly secured, plumb, and level.

C. Wire in accordance with national electric codes.

D. Enclose all splices in easily accessible junction boxes or on terminal boards.

E. Tag and identify all cable runs in all junction boxes.

F. Test system and adjust to assure components and accessories are hooked-up and in working order.

G. Provide installation service and training in accordance with Mechanical Equipment – General.

3.2 PROTECTION

Protect installed products until completion of project.

Touch-up, repair, or replace damaged products before substantial completion.

3.3 O&M MANUALS

Provide DISTRICT with six copies of operation, installation, and maintenance manuals including typical wiring diagrams, in accordance with the O&M Manual section of these specifications

131.4 PAYMENT

Full compensation for conforming to the requirements of **SLIDING GATE OPERATORS**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the Contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-132

VERTICAL MIXED FLOW PUMPS

132.1 GENERAL

1.1 DESCRIPTION

A. The CONTRACTOR shall furnish three (3) mixed flow pumps for the Pump Station. The pumps shall be single-stage propeller type and shall be constructed so as to be suspended from a heavy steel base plate. The pumping element is to be suspended below the necessary length of discharge column and elbow. A removable vortex suppression plate shall be provided on the suction bowl to minimize vortexing. The pump base plate shall be to the dimensions shown in the Contract Documents. The pump and appurtenances shall be so constructed that safe and proper assembling, dismantling and repairing may be accomplished without difficulty at the pump station site. The design and workmanship on the component parts of the pump and column shall be such that they are completely interchangeable with like parts in other pumps to ensure maximum potential usage on any single repair part. The complete assembly shall operate free of detrimental cavitation or vortexing, with noise and vibration limits as set forth by the “Hydraulic Institute” and these specifications.

B. The pump supplier shall have unit responsibility for also furnishing the right angle gear drives to assure operational compatibility of equipment.

1.2 SYSTEM

This section consists of pumps for conveying storm water from the detention basin to the downstream flood control channel.

1.3 STANDARD SPECIFICATIONS NOT USED

1.4 SUBMITTALS

A. The CONTRACTOR shall submit pump curves, detailed and dimensioned outline drawings of the pump and pump assembly. In addition, after DISTRICT’S approval of shop drawings, and after fabrication, the CONTRACTOR shall furnish reproducible tracings or sepias of “as-builts.”

B. The CONTRACTOR shall include the following data on the shop drawings:

1. Total Pump Assembly Weight

2. Pump Thrust

3. Thrust Factor

4. Shaft Diameter and Weight

5. Impeller Weight

6. Material Designation

1.5 OPERATION AND MAINTENANCE MANUALS

Operation and Maintenance Manuals shall be furnished as required in the Mechanical Equipment – General section.

1.6 PERFORMANCE

The pumps shall be single-stage and have the following characteristics at 390-rpm nominal speed.

Capacity (CFS)(GPM)	Total Dynamic Head (ft)	Pump Efficiency (%)
155 69,569	24.29	76.0

Pump operating speed is 390 rpm.

The pumps shall operate satisfactorily within its range of operation that develops total dynamic heads from - 5 to 25 feet of water with no inflection points on the pump curve. The submergence required (above the suction bell) without vortex plates shall be less than inches at standard atmospheric conditions.

To ensure uniformity with existing equipment at other pump stations owned by the DISTRICT, pumps shall be Sulzer Model SJM-42YHS, no equal.

132.2 MATERIALS

2.1 GENERAL

All pumps shall conform to the following specifications. The materials specified are a guide to a minimum quality required for the pumps.

2.2 BOWL ASSEMBLY

The bowl assembly shall consist of suction bell, stator case, impeller, pump shaft, pump shaft bearings, and necessary parts to secure the impeller to the shaft. Heavy duty lifting lugs shall be provided on the bowl assembly.

2.3 STATOR CASE AND SUCTION BELL

Pump stator case shall be high quality castings, machined with rabbet fits for connection to the pump discharge column. The stator case shall be flanged at the bottom for bolting to the suction bell and at the top for bolting to the discharge column. The upper end of the stator case cone or hub shall be machined to receive the bronze top case bearing and the lower end fitted with a renewable case wear ring to match the impeller. Diffusion vanes shall be cast as an integral part of the stator case and be of ample length to obtain the most efficient conversion of kinetic energy into pressure energy. The number

of vanes in the stator case and the impeller shall not be the same nor shall be such that they shall not cause instantaneous blockage of all vanes at the same time. The stator case shall also allow the shaft enclosing tube oil to drain through port(s) cast on the vanes, or specifically engineered to drain through the impeller balance leakage holes.

The suction bell, and stator case shall be cast iron conforming to ASTM A 48 Class 30, be separate flanged castings, bolted together to make up the complete pump case. The impeller liner or suction bell shall be bored conically to match the periphery of the impeller vanes. The impeller liner, stator case, and suction bell shall be concentrically aligned by precision rabbet fits. The bearing housing shall be an integral part of the suction bell supported by cast ribs and shall have a large grease chamber surrounding the bronze bottom bearing. This chamber shall be packed with non-water-soluble hydraulic grease at the time the pump is assembled at the factory and shall require no periodic replenishing. Both the bottom and bowl bearings shall be sized for continuous operation at the specified heads. Overhung impeller designs shall not be acceptable. A sand cap shall be mounted on the shaft immediately above the bottom bearing to prevent intrusion of solids. The suction bell shall be flared at the bottom to provide a smooth waterway entrance to the impeller.

2.4 PROPELLER

The impellers shall be propeller cast in one piece from high grade bronze ASTM B 148 Alloy C95200, accurately machined on all outside surfaces, hand filed in the waterways and statically and dynamically balanced in two planes. The impeller shall be machined to match the contour of the impeller liner or suction bell to insure proper running clearances. The impeller shall be mounted on the shaft with a clearance not to exceed 0.004 inches, torque driven by a key, and the hydraulic thrust shall be contained by a split ring in the shaft recess. Hydraulic thrust balance shall be optimized by balance leakage holes and close wear ring clearance. The impeller shall be able to pass a minimum of a 3-inch sphere.

2.5 PUMP SHAFT

The pump shaft shall be considered that section of shafting which supports the impellers in the bowl assembly and extends to a point immediately above the stator case bearing and connects to the line shafting. The shaft dimensions shall be of ample size to transmit maximum driver horsepower and shall operate without vibration or distortion. The pump shaft shall be accurately turned, ground and polished precision shafting of stainless steel, ASTM A 582 type 416, or Engineer-approved equivalent stainless steel alloy. Provision shall be made at the driver shaft for adjusting the propeller with reference to the bowls.

2.6 PUMP BEARINGS

The pump shall have bronze bearings immediately above and below the impeller. The lower most bearing shall be protected by a sand cap, preventing sand or grit from entering.

The suction bell bearing shall be packed with waterproof grease.

The bearings shall be cast from ASTM B 584 Alloy C93200 or Engineer-approved equal.

2.7 DISCHARGE COLUMN ASSEMBLY

The discharge column assembly shall consist of the elbow, necessary section of column, base plate, flanges, shaft enclosing tube, enclosing tube adaptor, line shafting, line shaft couplings, and line shaft bearings.

2.8 COLUMN AND ELBOW

The column shall be designed for suspension from the pump base plate. The column, base plate and elbow shall be so proportioned as to safely support the case assembly, dynamic forces, thrust, and any other loading that it may be subjected to during transportation, erection, operation, or testing required at the Pump Station.

Pump discharge column shall be integrally welded and flanged with rabbeted fits for proper alignment, in lengths not exceeding 10-feet. Column and elbow sizes shall be 54-inch OD (Schedule 40) from pump to baseplate. Integrally welded spiders shall be provided for accurate centering of inner column in each discharge column section. Each fabricated spider shall consist of a minimum four (4) equally spaced 3/8-inch thick minimum 4-inch deep gussets. Flanges shall be manufactured in accordance with AWWA C207-94 Class E.

The elbow and column shall be fabricated from ASTM A 36 steel with a minimum thickness of 0.375” (Schedule 20). The column and elbows shall be machined between centers for perfect alignment and concentricity. The elbow and each of the column pipes shall be provided with lifting lugs or lifting eyes to facilitate the handling of these parts during installation. The elbow shall have at least five miter sections, and shall be removable through pump floor opening. Pump discharge elbows shall have plain ends suitably finished including thrust restraint harnesses per AWWA M11 lug type RR for the flexible coupling being furnished which shall be Dresser or Baker or equivalent. There shall be no guide or diffusion vanes except in the pump case. The column and elbow shall be coated inside and outside with fusion bonded epoxy.

2.9 BASE PLATE AND DRIVE SUPPORT

The base plate shall be fabricated from ASTM A 36 steel plate, Grade D, of the size and minimum thickness shown on the drawings. Each base plate shall be set in recesses in the concrete floor slab with the top of plate set flush with finish floor. Base plate shall be drilled to accommodate hold down bolts.

The right-angle drive shall be mounted on heavy fabricated steel pedestals with precision rabbet fits for concentric alignment. These shall be designed and fabricated by the CONTRACTOR or pump manufacturer so as to conform to the following requirements:

A. Fabricate using heavy steel plates, top, bottom, and vertical, with reinforcing members and ribs as required by the equipment loads. Pipe used shall be 3/8-inch minimum, plate 5/8-inch minimum.

B. Provide two (2) access holes located at front and back and shall be sized, to allow ease of assembly or disassembly of pumps.

C. Details of the pedestal to be fabricated and furnished shall be submitted for DISTRICTS approval with the shop drawings.

D. Pedestal shall be integrally welded to base plate.

E. The pedestal shall be fitted with lifting lugs of sufficient strength to support the weight of the complete pumping unit.

F. Provide stainless steel heavy gauge screen over each opening, and fasten with stainless steel screws.

2.10 SHAFT ENCLOSURE TUBES

Inner column as a lubricating oil conductor and housing for the bronze guide bearings shall be provided. Maximum bearing span shall be as required for integrally welded inner column. The shaft enclosing tube shall have a minimum Schedule-80 wall thickness and shall connect to the pump discharge casting through the watertight tubing adapter to make certain no storm water will enter into the enclosing tube above this level. Each end of the shaft enclosing tube joints shall have two 0-ring seals.

2.11 LINE SHAFTING

Line shafting shall be solid; precision turned, ground, and polished from ASTM A 582 Type 416. The shaft diameter shall be such that no excessive deflection or whip will occur and shall be designed to transmit the maximum torque required to operate the pumps. Calculations shall be submitted with shop drawings substantiating the shaft size and couplings. Maximum allowable combined stress shall not exceed either 1/3 the yield strength or 1/5 the ultimate strength on the pump shafting or couplings.

2.12 LINE SHAFT COUPLINGS

Line shaft couplings shall be ASTM A 582 Type 416 and shall be heavy duty split ring and key type with threaded and set screwed ends for axial loading to transmit the full load torque and axial load and thrust required to operate the pump, and shall be at least equal to the shaft strength. They shall be designed also to maintain alignment between adjacent sections of shafting.

2.13 LINE SHAFT BEARINGS

All line shaft bearings shall be bronze ASTM B 584 Alloy C93200, of the removable type so they can be readily replaced in the field. They shall be grooved to allow oil to pass from one bearing to the next in the line shaft assembly to insure adequate lubrication for each line bearing. The bearing spacing shall be such that the shaft operates at no more than 80 percent of the first critical speed for the entire operating speed range. The bearings shall be of sufficient length to insure permanent shaft alignment and prevent shaft whip and vibration.

2.14 WELDING REQUIREMENTS

Welding and repair welding shall be performed in accordance with the pump manufacturer's written procedures. All welding shall be performed by Certified Code Welders. These welders shall be qualified in accordance with the ASME Code for Unfired Pressure Vessels, per Section IX. Pressure boundary welds shall be full penetration and shall be in accordance with ASME practices. Structural welds shall be continuous. Intermittent structural welds shall not be permitted.

2.15 LUBRICATION

Pumps shall be equipped with a 24 volt solenoid valve for line shaft lubrication. Valve operated lubrication systems shall supply lubricant to the line shaft bearings 1-minute prior to pump start. The solenoid valve operated oilers shall have metal oil reservoirs with a capacity of not less than five gallons. The system shall be equipped with a manual globe valve (1/4" N.P.T.) to bypass the solenoid valve to permit manual oiling of pump. The globe valve shall be 125 pound class Stockham B-16 or equal.

2.16 DYNAMIC AND STATIC BALANCE

All moving parts shall be statically and dynamically balanced.

2.17 BOLTING

All bolts and nuts necessary to assemble pump, and column shall be stainless steel ASTM A 320, Austenitic, Grade B-8, and shall be sized such that maximum combined stress shall be less than both 1/3 the yield strength or 1/5 the tensile strength, or equal.

2.18 VORTEX SUPPRESSION PLATE

A vortex suppression plate shall be provided for each pump. The umbrellas shall be of 4-piece design to facilitate handling during installation and subsequent disassembly. The umbrella shall be designed so that it can be mounted on the suction bell using stainless steel clamps, bolts, and nuts. Fabrication shall conform to Los Angeles County Flood Control DISTRICT Pump Station Design Manual Plates E-25 and E-26. The diameter of the plate shall be 104 inches.

132.3 EXECUTION

3.1 CLEANING AND PAINTING

Shop clean and prime coat all exposed ferrous surfaces in accordance with "Painting and Coating" of these specifications.

3.2 FACTORY TESTING

A. Pump

1. Perform hydrostatic and performance tests at the pumping unit manufacturer's testing facility in accordance with recommendations of the Hydraulic Institute of Standards. Provide certifications of compliance.

2. The complete pump units shall be required to provide the capacity under the head conditions as indicated herein. The pumps shall meet the minimum guaranteed bowl efficiency at the design points, including all losses throughout the pump. CONTRACTOR shall arrange for, and pay all travel, lodging, and meal expenses for two (2) DISTRICT representatives to attend a witnessed factory test. In case of a failure, CONTRACTOR shall pay all travel, lodging, and meal expenses for two (2) DISTRICT representatives to attend any subsequent witnessed factory testing. Testing shall be conducted for each of the three pumps by the manufacturer of the pump with at least five operating points indicated on the performance curve, and the results submitted to the Engineer. The CONTRACTOR shall submit certified pump curves showing total dynamic head, efficiency, and horsepower versus capacity.

3. Each certified pump curve shall be continuous from zero on the abscissa, state the rpm speed of the pumping unit and furnished full-size on 8-1/2x11 inch paper. The CONTRACTOR shall select a pump curve, which will be as close as possible to the design point stated in the contract specifications or on the drawings for each pumping unit. The CONTRACTOR shall state, on each curve, certified values for the following items at the required point, in conformance with the Hydraulic Institute of Standards.

    a. Total dynamic head.

    b. Capacity in gallons per minute.

    c. Brake horsepower.

3.3 SERVICES OF MANUFACTURER'S REPRESENTATIVE

The pumping unit manufacturer's technical representative shall provide his services at the pumping station site to assist in the installation of the pumping units, as well as service, make final adjustments, and assist in placing the pumping units into operation.

3.4 GUARANTEE

The manufacturing of the pumping unit shall include a minimum 1-year guarantee on parts, shipping, and labor requirements to correct deficiencies and repair failures to their respective equipment beginning on the date which the Notice of Completion is filed by the DISTRICT. The guarantee will exclude those problems arising out of normal wear, neglect or vandalism.

132.4 PAYMENT

Full compensation for conforming to the requirements of **VERTICAL MIXED FLOW PUMPS**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the Contract unit price paid per each and no additional compensation shall be allowed therefore.

F-133

RIGHT-ANGLE GEAR DRIVES

133.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall furnish and install three (3) right-angle gear drives. To ensure uniformity with existing equipment at other pump stations owned by the DISTRICT, the units shall be as manufactured by Amarillo Gear Company, no equal. The CONTRACTOR shall furnish and install a gear oil temperature sensor and level sensor.

The pump supplier shall have unit responsibility for providing the right angle gear drive to assure compatibility of the equipment.

1.2 SYSTEM

The right angle gear drive receives horizontal rotating force from the natural gas engines and by means of a right angle gear reduction transfers the power to vertical axis at a lower speed to turn the axial flow pumps.

1.3 STANDARD SPECIFICATIONS NOT USED

1.4 SUBMITTALS

A. The CONTRACTOR shall submit the following in accordance with standard submittal procedures.

1. Submit horsepower, torque, and thrust ratings, service factors and detailed dimensioned drawings of the gear head assembly for DISTRICT'S approval.

1.5 DESIGN REQUIREMENTS

A. The right-angle gear drives shall conform to the following design conditions:

Haster Basin Pump Station						
Input Speed (rpm)	**Output Speed (rpm)**	**Gear Ratio**	**Pump Down-Thrust (lbs.)**	**Thrust Capacity (lbs.)**	**Rating (hp)**	**Required Pump (hp)**
1,200	390	3:1	21,500	28,000	625	500
Amarillo Gear Company model SL1500 with AGWA service factor of 1.5						

133.2 MATERIALS

2.1 HOUSING

The housing shall be of rugged proportions specifically designed to provide a rigid, strong, and sealed construction. The housing material shall be fine grain cast iron or fabricated steel. The interior of the house shall be thoroughly cleaned and protected with a rust-resisting oil-proof paint.

2.2 BEARINGS

Ample capacity precision bearings shall be used throughout, the proportions and type being consistent with best modern practices for the loads and speeds of the application. The bearings shall be selected for a minimum B-10 life of 20,000 hours as per AFBMA Standards.

2.3 GEARS AND SHAFTS

All gears shall be manufactured from alloy steel forgings properly heat-treated and hardened. Gears shall be finished lapped in matched pairs.

The vertical output shaft of the gear unit shall be hollow-type made from heat-treated alloy steel forging.

The hollow-type construction permits installation and disassembly of the drive unit head shaft from pump in a horizontal position.

2.4 TEMPERATURE GAUGE CONNECTIONS

Oil temperature gauge shall be provided and mounted on the right-angle gear drive assembly. Tapped openings shall be provided during manufacture of the unit housing to accommodate the gauge.

The gauge is used to monitor the lubricating oil temperature. Gauge shall be Murphy temperature switch gage Model A-20T0 or equal.

2.5 OIL FILL SIGHT GAUGE

The oil reservoir in the right-angle gear housing shall be provided with a sight level oil gauge to provide a visual check of the oil level and condition. It shall also signal an alarm on high and low levels. The level device shall be Murphy L-129 or equal.

2.6 NON-REVERSE RATCHET

A no-back or non-reverse ratchet shall be provided to prevent pump reversal upon shut down of pumping, and subsequent damage to line shaft assembly. The rolling members shall be sized commensurate with loading.

2.7 LUBRICATION SYSTEM

A pressure lubrication system shall be incorporated into the drive. The system shall supply oil to all gear teeth in mesh and to all bearings. A self-priming positive displacement pump shall be connected directly to the lower end of the vertical shaft, giving positive oil pumping action at all times. To provide protection from ferrous metallic particles in the oil, which may damage the gears or bearings, the suction line shall be screened and the housing drain supplied with a magnetic plug.

2.8 LUBRICATING OIL COOLING SYSTEM

The unit shall be cooled by a heat exchanger system using fresh water.

133.3 EXECUTION

3.1 CLEANING AND PAINTING

Shop clean and field coat all surfaces in accordance with “Painting and Coating” of these specifications.

3.2 INSTALLATION

A. Check Head Shaft for Straightness

B. Align Gear Drive

C. Check Rotation

D. Fill with Oil

3.3 OPERATION AND MAINTENANCE MANUALS

Operation and Maintenance Manuals shall be furnished as required in the general mechanical equipment section.

3.4 MANUFACTURER FIELD INSTALLATION, VERIFICATION AND TESTING SERVICES

A. The right angle gear drive manufacturer’s technical representative shall provide his services as required in the general mechanical equipment section. To assist in the onsite installation of the pumping units, as well as service, make final adjustments, and assist in placing the pumping units into operation.

133.4 PAYMENT

Full compensation for conforming to the requirements of **RIGHT-ANGLE GEAR DRIVES**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the Contract unit price paid per each and no additional compensation shall be allowed therefore.

SECTION F-200

GENERAL ELECTRICAL PROVISIONS

200.1 GENERAL

1.1 DESCRIPTION

A. CONTRACTOR shall provide all labor, materials, equipment, permits, licenses and incidentals as shown, specified and required to complete the electrical work. The provisions of this section apply to all the following sections whether specifically referred to in those sections or not.

B. Coordination

1. Review installation procedures under other sections and coordinate the installation of items that must be installed with the formwork, walls, partitions, ceilings and panels.

2. CONTRACTOR shall be responsible for the installation of all conduits, inserts and other items to be embedded in the concrete, or built into walls, partitions, ceilings or panels constructed by other CONTRACTORS. CONTRACTOR shall provide other CONTRACTORS with detailed plans or sketches of the location of said conduits and other built-in items as may be required. CONTRACTOR shall keep himself fully informed of the construction where conduits and other built-in items are to be installed. CONTRACTOR shall install said conduits and other built-in items in such a manner and within such time periods as will not unnecessarily delay the work of the other CONTRACTORS.

C. General

1. Interpretation of Drawings:

a. Dimensions shown on the drawings that are related to equipment are based on one manufacturer's equipment. Coordinate the dimensions of the equipment furnished with the space allocated for that equipment.

b. The Drawings show the principal elements of the electrical installation. They are not intended as detailed working drawings for the electrical work but as a complement to the specifications to clarify the principal features of the electrical systems.

c. It is the intent of this section that all equipment and devices, furnished and installed under this and other sections, be properly

connected and interconnected with other equipment so as to render the installations complete for successful operation, regardless of whether all the connections and interconnections are specifically mentioned in the specifications or shown on the drawings.

D. Utilities

1. CONTRACTOR shall furnish and install underground pull section, metering section and main breaker lineup, empty primary conduits from service point to the pull section, complete grounding system, and full metering details for main power service in accordance with SCE requirements.

E. Temporary Power

1. CONTRACTOR shall obtain temporary power at his expense for construction purposes.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Electrical material and equipment shall conform in all respects to the latest approved standards of the following:

1. National Electrical Manufacturers Association (NEMA).

2. The American National Standards Institute (ANSI).

3. The Institute of Electrical and Electronic Engineers (IEEE).

4. Insulated Power Cable Engineers Association (IPCEA).

5. National Electrical Code (NEC).

6. National Electrical Safety Code (NESC).

7. State Department of Industrial Safety (CAL/OSHA).

B. Requirements of Regulatory Agencies

1. Permits: Obtain all permits required to commence work and, upon completion of the work, obtain and deliver to the Engineer a Certificate of Inspection and Approval from the State Board of Fire Underwriters or other authority having jurisdiction.

2. Codes: Material and equipment shall be installed in accordance with the current standards and recommendations of the National Electrical Code, the National Electrical Safety Code, and with local codes which apply.

Where discrepancies arise between codes, the most restrictive regulation shall apply.

3. Tests by Independent Regulatory Agencies: All electrical material and equipment shall be new and shall bear the label of the Underwriters' Laboratories, Inc., or other nationally-recognized, independent testing laboratory, wherever standards have been established and label service regularly applies.

4. Utilities:

   a. Electric Utility: Southern California Edison. Work in connection with the electric service and metering shall be done in strict conformance with the requirements of SCE.

   b. Telephone Utility: AT&T. Work in connection with providing telephone service shall be done in strict conformance with the requirements of AT&T.

5. Inspection Requirements: All equipment shall be inspected and tested at the site as specified in these Contract Documents.

C. Assembled Products

The major components of any assembly such as motor Control Centers, switchboards and panels shall be manufactured by the assembly manufacturer.

1.4 SUBMITTALS

A. General

1. Conform to requirements of shop drawings, samples, and record drawings

B. Shop drawings shall include the following information to the extent applicable to the particular item:

1. Manufacturer's name and product designation or catalog number.

2. Electrical ratings.

3. Conformance to applicable standards or specifications of ANSI, ASTM, ICEA, IEEE, ISA, NEC, NEMA, NFPA, OSHA, UL, or other organizations.

4. Dimensioned plan, section, and elevations showing means for mounting, conduit connection, and grounding.

5. Materials and finish specification, including paints.

6. List of components including manufacturer's names and catalog numbers.

7. Internal JIC schematic and wiring diagrams indicating all connection to components and numbered terminals for external connections.

8. All equipment and material of a similar nature and use shall be of one manufacturer.

C. The first stage submittal shall contain:

1. A product catalog cut sheets clearly marked to show the model number, optional features, and intended service of the device.

2. A detailed list of any exceptions, functional differences, of discrepancies between the supplier's proposed system and the contract requirements.

D. The second stage submittal shall contain:

1. Complete panel fabrication drawings and details of panel wiring, piping, and painting. Panel and subpanel drawings shall include overall dimensions, metal thickness, door swing, mounting details, and front of panel arrangement to show general appearance, with spacing and mounting height of instruments and control devices.

2. System wiring and installation drawings for all interconnection Wiring between components of the systems furnished and for all interconnecting wiring between the related equipment and the equipment furnished under this section. Wiring diagrams shall show complete circuits and indicate all connections.

3. If panel terminal designations, device interconnections, device features and options, or other features are modified as a result of the fabrication process or factor testing, revised drawings shall be resubmitted.

4. Electronic Files of Shop Drawings: Submit electronic files for all shop drawings in AutoCAD (latest version) format.

5. At the supplier's option, and for projects with very few fabrication drawings, the first stage and second stage submittal may be combined.

E. Third Stage Submittal:

1. Complete system documentation, in the form of operation and maintenance manuals, shall be provided. Manuals shall include complete product instruction books for each item of equipment furnished.

2. Where instruction booklets cover more than one specific model or range of instrument, product data sheets shall be included which indicate the instrument model number, calibrated range, and all other special features. A complete set of "as-built wiring, fabrication, and inter connection drawings shall be included with the manuals.

3. Electronic files for shop drawings: Submit as-built electronic files for all shop drawings in AutoCAD (latest version) format.

1.5 PRODUCT DELIVERY

A. Operation and Maintenance Data

1. Conform to requirements of the General Conditions.

B. Record Documents

1. Record drawings shall include the following:

a. One line wiring diagram of the distribution system.

b. Actual in place conduit and cable layouts with schedule of conduit sizes and number and size of conductors.

c. Layouts of the grounding system and lighting arrangement.

d. Control wiring diagrams with terminal numbers and all control devices identified.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials

CONTRACTOR shall instruct the manufacturers and vendors as to the maximum shipping sizes of equipment that can be accommodated at the site. Storage and handling of materials shall conform to the manufacturer's recommendations.

1.7 JOB CONDITIONS

A. CONTRACTOR shall examine the site and existing facilities in order to compare them with the drawings and specifications with respect to the conditions of the premises, location of and connection to existing facilities and any obstructions which may be encountered.

B. CONTRACTOR is cautioned to perform his work with due regard to safety and in a manner that will not interfere with installed equipment or in any way cause interruption of any of the functions of the pump station.

C. Work on energized circuits is prohibited. CONTRACTOR shall provide and install temporary feeders, control circuits and necessary equipment to allow shutdown of the circuits to be worked on. The temporary installation shall be removed on completion of the tie-in or modification work.

1.8 AREA CLASSIFICATIONS

The following lists of locations are not all inclusive. DISTRICT shall refer to the contract drawings for determination of actual requirements.

A. Corrosive Locations

The following areas shall be considered corrosive locations:

1. All outdoor areas.

2. Indoor areas above grade where designated on the drawings or listed below.

All materials, equipment and incidentals in areas identified as corrosive locations shall meet NEC and NEMA requirements for corrosive locations. Enclosures installed in corrosive locations shall be NEMA 4X non-metallic or 316 stainless steel. Conduits shall be PVC jacketed and terminated at enclosures with watertight, threaded hubs. All fittings shall be PVC jacketed.

All materials and equipment located in the sump shall meet NEC and NEMA required for a Class 1, Division 2 location.

1.9 GROUNDING

A. Ground rods shall be 3/4-inch by 10 feet long of copper-clad steel with drive heads.

B. Ground conductors shall be medium hard drawn, standard copper, bare for direct burial and green insulated for installation in conduits. They shall be sized to comply with the National Electrical Code.

C. All ground connections shall be made by the exothermic weld method, except ground connections at ground rods shall be of the bolted clamp type.

D. The grounding system shall be installed in accordance with the National Electrical Code and all State and local codes and regulations.

E. All non metallic conduits shall have a code sized ground wire installed.

200.2 MATERIALS NOT USED

200.3 EXECUTION

3.1 INSTALLATION

A. The drawings indicate connections for typical equipment only. If the equipment furnished is different from what is shown, provide the modifications necessary for a safe and properly operating installation in accordance with the equipment manufacturer's recommendations.

B. The drawings indicate diagrammatically the desired location and arrangement of outlets, conduit runs, equipment, and other items. Field determine exact location based on physical size and arrangement of equipment, finished elevations, and obstructions.

B. Work or equipment not indicated or specified which is necessary for the complete and proper operation of the electrical systems shall be accomplished without additional cost to the DISTRICT.

3.2 FOREIGN POWER ISOLATION IN EQUIPMENT ENCLOSURES

A. Provide foreign power circuit isolation devices in equipment enclosures. PLC input/output circuits for example, are a source of foreign power when they exist in an equipment enclosure such as a local control panel that has a separate source of control power. Circuits that are a source of foreign power shall pass through an isolation device where the wiring enters the equipment enclosure. Isolation devices are required in control cabinets, MCC buckets, etc., to provide an easily accessible isolation point, whenever the power source for the circuit would be considered foreign power in the enclosure. Isolation devices shall be clearly labeled.

B. Equipment manufacturers shall supply isolation devices integral with their equipment whenever possible (isolation switches integral with disconnect handles on MCC buckets for example).

C. Devices shall allow for the operation of equipment with doors open to allow for testing and/or maintenance.

D. The CONTRACTOR shall be responsible for supplying isolation devices as needed such that the complete system of power distribution installed at the facility complies with this specification.

3.3. IDENTIFICATIONS AND SIGNS

Mark each individual panelboard, motor controller, power panel, transformer, circuit breaker, disconnect switch, timer, relay, and contactor to identify each item with its respective service or function and unique identification number as shown on the drawings. Provide nameplates with engraved lettering not less than 1/4 inch high. Use black-on-white laminated plastic, attached with sheet metal screws or self-adhesive backs.

3.5 PERFORMANCE TESTS

After the electrical installation is complete, test it to demonstrate that the entire system is in proper working order and in accordance with the drawings and specifications.

3.5 COORDINATION STUDY

A. The CONTRACTOR shall provide a complete coordination study of relays, fuses, circuit breakers, and all other protective devices.

B. The coordination study shall include the entire distribution system starting with the smallest 480 volt, 3 phase, 60 Hz circuit protective device on the load end, to the nearest protective device on the power company's line side, or for work in the DISTRICT'S existing facilities, to the nearest protective device on the City's distribution system.

C. The study shall include, but not be limited to, the following:

1. A tabulation of all protective relay and circuit breaker trip settings and recommended medium-voltage fuse sizes and types.

2. Motor starting profiles for all motors sized 50 hp and above.

3. Transformer damage curves and protection evaluated in accordance with ANSI/IEEE C57.109.

4. Coordination curve(s) from the power company if available.

D. The CONTRACTOR shall be responsible for obtaining all of the required relay, fuse, and circuit breaker coordination curves; transformer damage curves; motor data; etc., for all new and existing electrical equipment.

E. The CONTRACTOR shall be responsible for coordinating with the Power Company to obtain the required protective device curves.

F. The CONTRACTOR shall be responsible for all field work required to obtain necessary data on existing relays, circuit breakers, fuses, and transformers to be included in the coordination study.

G. The coordination study shall be bound in a standard 8-1/2 by 11 inch size report. The study shall be provided in accordance with the submittal section. Final selection of all protective device settings or sizes shall be subject to review and acceptance by the Engineer.

200.4 PAYMENT

Full compensation for **GENERAL ELECTRICAL PROVISIONS** shall be considered as included in the various CONTRACT items of work involved and no additional compensation will be allowed therefore.

F201

RIGID CONDUIT

201.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install conduit and fittings to form complete, coordinated, and grounded raceway systems.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

1. NEC Article 347, Rigid Nonmetallic Conduit.

2. UL Standard No. 514, Electrical Outlet Boxes and Fittings.

3. UL Standard No. 651, Schedule 40 and 80 PVC Conduit.

4. UL Standard No. 886, Electrical Outlet Boxes and Fittings for Use in Hazardous Locations.

5. NEMA TC2, Electrical Plastic Tubing, Conduit and Fittings.

6. NEMA TC3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.4 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's catalog cuts and technical information for the conduit, fittings and supports proposed for use.

2. Layout drawings showing proposed routing of exposed conduits, conduits embedded in structural concrete and conduits directly buried in earth. Drawings shall show locations of pull and junction boxes and all penetrations in walls and floor slabs.

3. All material and equipment of similar nature and use shall be of one manufacturer.

B. Record Drawings: Include the actual routing of exposed and concealed conduit runs on record drawings.

201.2 MATERIALS

2.1 Non-metallic Conduit (buried locations):

A. PVC Plastic:

1. Material: Schedule 80 PVC plastic, NEMA Type EPC-80-PVD, 90°C rated, conforming to UL No. 651.

2. Manufacturer: Provide non-metallic conduit of one of the following:

a) Amoco Chemicals Corporation.

b) Carlon, Division of Indian Head, Incorporated.

c) Or equal.

3. Non-metallic Fittings: Form elbows, bodies, terminations, expansions and fasteners of same material and manufacturer as base conduit. Provide cement by same manufacturer as base conduit.

4. Minimum conduit size shall be 1-inch diameter.

B. PVC-Coated Conduit (all above grade locations)

1. PVC coated conduit shall be hot-dip galvanized including the threads. The interior and exterior surfaces shall be coated with a heat polymerizing lacquer 0.005 inch thick. The exterior of the conduit shall be PVC coated to a minimum 40-mil thickness. The PVC coating shall be permanently bonded to the conduit. The coating shall have a minimum tensile strength of 3500 psi. The bond between the conduit and PVC coating shall be greater than the tensile strength of the PVC coating. A PVC coated coupling shall have a 1.5 mils phenolic coating. A PVC coated coupling shall be furnished with each length of the conduit. The PVC sleeve of the coupling shall equal the OD of the coated conduit and shall extend 1-1/2 inches from each end of the coupling.

2. Minimum conduit size shall be ¾-inch diameter.

C. Conduit Tags:

1. Material: 19 gauge, 1-1/2-inch diameter round brass with backfilled legend, Style #250-BL as manufactured by Seton Nameplate Corporation or equal.

201.3 EXECUTION

3.1 INSTALLATION

A. Install in conformance with National Electrical Code.

B. Supports

1. Rigidly support conduits by clamps, hangers, or Unistrut channels.

2. Support single conduits by means of one-hole pipe clamps in combination with one-screw back plates, to raise conduits from the support surface. Support multiple runs of conduits on trapeze type hangers with steel horizontal members and threaded hanger rods, Kindorff or equal. Rods shall be not less than 3/8-inch diameter, and shall be 316 stainless steel.

3. For PVC coated rigid steel conduit runs, supports, and hardware shall be PVC coated or 316 stainless steel.

C. Fastenings: Fasten raceway systems rigidly and neatly to supporting structures by the following methods:

1. To Concrete: Phillips; Hilti Corporation; or equal, anchors.

2. To Steel: Welded threaded studs, beam clamps or bolts with lock washers or locknuts.

3. All hardware, clamps and spacers shall be 316 stainless steel.

D. Exposed Conduit

1. Install parallel or perpendicular to structural members or walls.

2. Install on structural members in protected locations.

3. Locate clear of interferences.

4. Maintain 1/4 inch from walls.

5. Install vertical runs plumb. Unsecured drop length not to exceed 12 feet.

6. Coordinate conduit installation with piping, ductwork, lighting fixtures and other systems and equipment and locate so as to avoid interferences and eliminate tripping hazards.

E. Underground Conduits

1. Install underground conduits a minimum of 24 inches below grade unless otherwise indicated.

2. Perform all excavation, bedding, backfilling and surface restoration including pavement replacement where required.

3. Make conduit connections watertight.

F. Field Bends: No indentations. Diameter of conduit shall not vary more than 15 percent at any bend.

G. Joints

1. Apply conductive compound to all joints before assembly.

2. Make up joints tight and ground thoroughly.

3. Use standard tapered pipe threads for conduit and fittings.

4. Cut conduit ends square and ream to prevent damage to wire and cable.

5. Use full threaded couplings. Split couplings not permitted.

6. Use strap wrenches and vises to install conduit. Replace conduit with wrench marks.

H. Terminations

1. Install insulated bushings on conduits entering boxes or cabinets, except threaded hub types.

2. Provide locknuts on both inside and outside of enclosure for grounding.

3. Bushings not to be used in lieu of locknuts.

I. Moisture Protection

1. Plug or cap conduit ends at time of installation to prevent entrance of moisture or foreign materials.

2. Make underground and embedded conduit connections watertight.

3. Drainage: Pay particular attention to drainage for conduit runs. Wherever possible, install conduit runs so as to drain to one end and away from buildings. Avoid pockets or depressions in conduit runs.

J. Core drill for individual conduits passing through existing concrete slabs and walls. Obtain authorization from DISTRICT prior to core drilling. Seal spaces around conduit with epoxy grout. Restore surfaces to original condition unless otherwise noted.

K. Non-metallic Conduit

1. Install in accordance with manufacturer's recommendations.

2. Join sections in accordance with manufacturer's installation procedures for push-fit, bell and spigot type joints, if applicable or with manufacturer's recommended cement.

3. During installation provide expansion fittings for expansion and contraction to compensate for temperature variations. Expansion fittings shall be watertight and of the type suitable for direct burial.

4. Provide watertight expansion/deflection fittings at all wall and floor penetrations of all buildings and equipment concrete pads.

3.2 TESTING

A. Test conduits by pulling through each conduit a cylindrical mandrel not less then two pipe inside diameters long, having an outside diameter equal to 90 percent of the inside diameter of the conduit.

B. Maintain a record, by number, of all conduits testing clear.

3.3 IDENTIFICATION

A. Tag all conduits at the ends and in all intermediate boxes, chambers, handholes, and other enclosures. Fasten tags to conduits with No. 14 AWG insulated copper wire. Where this method is not practical, fasten to the adjacent masonry by means of stainless steel expansion bolts.

B. Use numbers on all conduits as designated in the cable and conduit list and record the conduit numbers and the cable content by cable designation, size, quantity, origin of conductors, and name of equipment served.

201.4 PAYMENT

Full compensation for conforming to the requirements of **RIGID CONDUIT**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F202

FLEXIBLE CONDUIT

202.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install flexible metallic conduit and fittings.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Reference Standards: Comply with applicable provisions and recommendations of the following except where otherwise shown or specified.

1. NEC Article 351, Liquid-Tight Flexible Metal Conduit.
2. UL Standard No. 360, Liquid-Tight Flexible Steel Conduit.

1.4 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's catalog cuts and technical information for flexible conduit and fittings proposed for use.

202.2 MATERIAL

Flexible Conduit: Flexible metal conduit shall be formed from spirally wound galvanized steel strip with successful convolutions that are securely interlocked. Minimum size of the flexible metal conduit shall be 1-inch. Fittings shall be of the compression type. Flexible metal tubing shall include a code size insulated green ground conductor.

202.3 EXECUTION

3.1 INSTALLATION

A. Install at motors and equipment that are subject to vibration or require movement for maintenance purposes. Provide necessary reducer where equipment furnished cannot accept 1-inch size flexible conduit. Limit flexible conduit length to three feet maximum.

B. Install in conformance with National Electrical Code requirements.

202.4 PAYMENT

Full compensation for conforming to the requirements of **FLEXIBLE CONDUIT**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-203

600-VOLT CABLE

203.1 GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install 600 volt cable.

2. Insulated cable is required for installation.

B. Related Sections:

1. Section 16126, Instrumentation Cable.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Requirements of Regulatory Agencies

1. Codes: Cable shall be installed in accordance with the standards and recommendations of the National Electrical Code. Where discrepancies arise between codes, the most restrictive regulation shall apply.

2. Tests by Independent Regulatory Agencies: Cable shall bear the label of the Underwriters' Laboratories, Inc.

B. Reference Standards: Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

1. ASTM B 3, Soft or Annealed Copper Wire.

2. ASTM B 8, Concentric-Lay-Stranded Copper Conductors, Hard, Medium-hard, or Soft.

3. IPCEA S-66-524, NEMA WC7-1971, Cross-linked-thermosetting-polyethylene-insulated Wire, and Cable for the Transmission and Distribution of Electrical Energy.

4. National Electrical Code.

5. UL Standard No. 44, Wires and Cables, Rubber-Insulated.

1.4 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's literature, specifications, and engineering data for 600 volt insulated cable.

B. Test Records: Submit for review copies of written records of field insulation resistance test results.

203.2 MATERIALS

2.1 MATERIALS

A. Insulated Cable

1. Material: Single conductor copper cable conforming to ASTM B 3 and B 8 with flame-retardant, moisture, and heat resistant thermoplastic insulation with nylon outer jacket rated 90C in all locations and listed by UL as Type THHN.

2. Application: Use THHN for all applications.

3. Wire Sizes: Not smaller than No. 12 AWG for all circuits.

4. Stranding: All 600 volt cable shall be stranded.

5. Manufacturer: Provide cable of one of the following:

a. Pirelli Cable Corporation.

b. Triangle PWC, Incorporated.

c. Cablec Continental Wire and Cable Co.

B. Cable Connectors, Solderless Type

1. For wire sizes up to #4/0 AWG, use compression indent type.

2. Product and Manufacturer: Provide one of the following:

a. T & B Sta-Kon.

b. Burndy Hylug.

c. Or equal.

3. For sizes #250 MCM and larger, use connectors with at least 2 compression indents and provision for at least 2 bolts for joining to apparatus terminal.

4. Properly size connectors to fit fastening device and wire size.

5. Split bolt type connectors are not permitted. Compression connectors must be used for splicing and terminating wires. Compression connectors must be bolted to termination point.

203.3 EXECUTION

3.1 INSTALLATION

A. Install all cables complete with proper terminations at both ends. Check and correct for proper phase sequence and proper motor rotation. Check for proper control connection. All electrically common wires shall have the identical wire tag number at all points and ends.

B. Pulling

1. Use insulating types of pulling compounds containing no mineral oil.

2. Pulling tension shall be within the limits recommended by the wire and cable manufacturer.

3. Use a dynamometer where mechanical means are used.

4. Cut off section subject to mechanical means of gripping and pulling.

C. Bending Radius: Limit to 6 times cable overall diameter.

D. Slack: Provide maximum slack at all terminal points.

E. Splices

1. Where possible, install cable continuous, without splice, from termination to termination.

2. Where required, splice in junction box using terminal boards.

3. Splices in conduits not allowed.

4. Splices in below grade pull boxes or manholes not allowed without specific written approval from the ENGINEER for method in each instance.

F. Identification: Identify all conductors by circuit number and phase at each terminal or splice location.

G. Color code power cables in accordance with DISTRICT'S standards.

3.2 TESTING

A. Test each electrical circuit after permanent cables are in place to demonstrate that the circuit and connected equipment perform satisfactorily and that they are free from improper grounds and short circuits.

B. Individually test 600 volt cables for insulation resistance between phases and from each phase to ground. Test after cables are installed and again before, they are put in service with a Megger whose rating is suitable for the tested circuit. Tests shall meet with the applicable specifications of IPCEA S-66-524 and NEMA WC7-1971.

C. The insulation resistance for any given conductor shall not be less than the value recommended by the IPCEA or a minimum of 1 megohm for 600 volt and less service, if not IPCEA listed. Any cable not meeting the recommended value or which fails when tested under full load conditions shall be replaced with a new cable for the full length.

203.4 PAYMENT

Full compensation for conforming to the requirements of **600-VOLT CABLE,** including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-204

INSTRUMENTATION CABLE

204.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install instrumentation cable. The types of cable include twisted shielded instrument cable.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

1.4 SUBMITTALS

Submit the manufacturer's technical information for shielded instrumentation cable proposed for use for approval

204.2 MATERIALS

2.1 SINGLE PAIR OR TRIPLEX SHIELDED INSTRUMENT CABLE

A. Tinned copper, stranded conductors, #18 AWG minimum, twisted with 100 percent aluminum-polyester shield, stranded tinned #20 AWG copper drain wire and overall chrome vinyl jacket. It shall be rated for 600 volts minimum.

B. Manufacturer shall provide shielded cable of one of the following:

1. Okonite Company.
2. Belden Company.
3. Dekoron Wire and Cable Company.
4. Alpha Cable Company.

2.2 MULTI-PAIR SHIELDED INSTRUMENT CABLE

A. Tinned copper, 7 strand XLPE insulated conductors, #18 AWG, 600V, twisted in pairs with aluminum-Mylar shield over each pair, silicone rubber fiberglass fire barrier tape, tinned copper drain wire, aluminum Mylar overall shield, Hypalon outer jacket.

B. Manufacturer: Provide shielded cable of one of the following:

1. Okonite Company.
2. Dekoron Wire and Cable Company.
3. Belden Company.

4. Alpha Cable Company.

204.3 EXECUTION

3.1 INSTALLATION

A. Install in rigid PVC coated conduit separate from power and 110V control circuit cables unless otherwise noted.

B. Ground shield on shielded cables at the power source and as recommended by instrument manufacturer.

C. Terminate stranded conductors with pre-insulated crimp type spade or ring type terminals properly sized to fit fastening device and wire size.

D. Install and terminate vendor furnished cable in accordance with vendor equipment requirements.

E. Install in conformance with the National Electrical Code.

F. Conduit sizing is based on single .304 diameter #16 TWSH pair cables, Belden #8179. Cable of larger diameter or multi-pair cable may require conduit size increases over that shown in the Contract Documents. CONTRACTOR shall bear all additional costs for required revisions.

3.2 TESTING

A. Test all 600-volt wiring in conformance with the requirements of Section 16122, 600 Volt Cable.

B. Test shielded instrumentation cable shields with an ohmmeter for continuity along the full length of the cable and for shield continuity to ground.

C. Connect shielded instrumentation cables to a calibrated 4-20 milliamp DC signal transmitter and receiver. Test at 4, 12, and 20 milliamp transmitter settings.

D. All tests shall be reviewed and approved by the I & C CONTRACTOR.

204.4 PAYMENT

Full compensation for conforming to the requirements of **INSTRUMENTATION CABLE**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-205

OUTLET BOXES

205.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install outlet boxes for mounting wiring devices and lighting fixtures.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

A. NEC Article 370, Outlet, Switch and Junction Boxes and Fittings.

B. UL Standard No. 514, Electrical Outlet Boxes and Fittings.

1.4 SUBMITTALS

Submit for approval the manufacturer's technical information for outlet boxes proposed for use.

205.2 MATERIALS

2.1 DEVICE BOXES (NON CLASSIFIED LOCATIONS)

A. Material shall be cast gray iron alloy, or cast malleable iron, with zinc electroplate finish in all locations.

B. Device Cover Plates:

1. Malleable iron covers.
2. Gasketed spring door type for devices designated as weather proof.
3. Integral with device for hazardous locations.
4. Stainless steel screws and hardware.

C. Manufacturer: Provide device boxes of one of the following:

1. Crouse-Hinds Company.
2. Appleton Electric Company.
3. Or equal.

2.2 DEVICE BOXES (CLASSIFIED LOCATIONS)

In all Class I, Divisions 1 and 2, hazardous areas, boxes and fittings shall be explosion-proof and shall comply with Article 500 of the NEC. Seals for conduit systems in hazardous atmosphere locations shall be of hot-dip galvanized cast ferrous alloy, and each seal shall be of a suitable configuration for the individual circumstance. Sealing compound shall be UL listed for explosion-proof sealing fittings and shall be of the same manufacture as the fittings.

205.3 EXECUTION

3.1 INSTALLATION

Fasten boxes rigidly and neatly to supporting structures. For units mounted on masonry or concrete walls, provide suitable 1/2-inch spacers to prevent mounting back of box directly against wall. Leave no open conduit holes in boxes. Close unused openings with capped bushings. Label each circuit in boxes and identify with durable tag. Install in conformance with National Electrical Code.

205.4 PAYMENT

Full compensation for conforming to the requirements of Full compensation for conforming to the requirements of **OUTLET BOXES**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

SECTION F-206

RECEPTACLES

206.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install receptacles. A related section is Section 16134, Outlet Boxes.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

1. National Electrical Code.

2. UL Standard #1010, Electrical Receptacle - Plug Combinations for Use in Hazardous Locations.

1.3 SUBMITTALS

Submit for approval the manufacturer's technical information for receptacles proposed for use.

206.2 MATERIALS

2.1 RECEPTACLES FOR NON-HAZARDOUS LOCATIONS

Duplex grounding receptacle, two pole, three wire, 125 volt AC, 20 ampere. Product and manufacturer shall be either Cat. #53CM62, by Harvey Hubbell Incorporated, or equal.

2.2 POWER AND SPECIAL RECEPTACLES

Provide receptacles with number of poles and voltage and current rating as shown on the Drawings. Coordinate with equipment plugs. Provide matching plug for each receptacle.

206.3 EXECUTION

3.1 INSTALLATION

Install wiring devices in outlet or device boxes in accordance with Section 16134 in non-hazardous locations. Install receptacles in rigid metallic conduit systems in all locations. Install receptacles with ground pole in the down position. Mount receptacles 30 inches above finished floor in non-hazardous locations and 4 feet-6 inches above finished floor in hazardous or wet locations and process areas unless otherwise noted. Install in conformance with National Electrical Code.

206.4 PAYMENT

Full compensation for conforming to the requirements of **RECEPTACLES**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-207

DISCONNECT SWITCHES

207.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install disconnect switches.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

A. National Electrical Code.

B. UL #98, Enclosed Switches.

C. NEMA KS-1, Enclosed Switches.

1.4 SUBMITTALS

Submit for approval the manufacturer's technical information for disconnect switches proposed for use.

207.2 MATERIALS

2.1 SINGLE THROW, CIRCUIT DISCONNECT SWITCHES

Fused, horsepower rated, heavy-duty, single throw, quick- make, quick-break mechanism, visible blades in the OFF position and safety handle. Voltage and number of poles as required for motor or equipment circuits being disconnected. Switches shall bear a UL label. Auxiliary contact rated 5A, 250V single pole double throw, mechanically linked and internally mounted. Required as indicated on the Drawings.

2.2 DOUBLE THROW SAFETY SWITCHES

Fused, double throw with center OFF position, quick-make, quick-break mechanism, visible blades in the OFF position and safety handle. Voltage and number of poles as required for the circuits being disconnected.

2.3 ENCLOSURE

A. NEMA 3R non-metallic for wet outdoor locations.

B. NEMA 6P for all buried locations, or as shown on drawings.

2.4 MANUFACTURER

Provide disconnect switches of one of the following:

A. Square D Company.

B. General Electric Company.

C. Or equal.

207.3 EXECUTION

3.1 INSTALLATION

Mount equipment so that sufficient access and working space is provided for ready and safe operation and maintenance. Securely fasten equipment to walls or other structural surfaces on which they are mounted. Provide independent hot dipped galvanized steel supports where no wall or other structural surface exists. Install in conformance with National Electrical Code.

207.4 PAYMENT

Full compensation for conforming to the requirements of **DISCONNECT SWITCHES** including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

SECTION F-208

350-kW NATURAL GAS-GENERATOR

208.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide all labor, materials, tools, and equipment and perform all work to install an electric power generator. The electric power generator shall be sized to support the designed load at 480 volts, Wye connected, three phase, 1200 RPM, 60 hertz. This power shall be applied for Standby operation.

350-kW NATURAL GAS with sound attenuated enclosure (70 db (A) @ 85 feet, free field environment), no known equal.

1.2 SYSTEM

A. The system shall consist of a generator set which include all controls, protection, wiring, and accessories for automatic start-stop operation.

B. The generator set shall include the capability of automatically controlling generator set operation. After starting, the units will attain rated speed and voltage, and accept rated load. Generator set speed shall be controlled by the engine governor, while generator output voltage regulation shall be a function of the generator automatic voltage regulator. Manual adjustment of generator speed and voltage shall be provided from the control panel.

C. The generator set will automatically start, attain rated speed and voltage, and accept load. The set shall immediately shut down in the event of over speed, low oil pressure, high water temperature and over crank. Cause of shutdown shall be indicated by a light annunciator. System logic shall prevent restart until fault is cleared. There shall be a provision on the engine for an electric shutdown in the event of an emergency.

D. The operating environment of the power generating system shall be:

Altitude	12 ft (AMSL)
Engine room temperature, max	100 Degrees Fahrenheit
Outside temperature, min	35 Degrees Fahrenheit
Engine jacket water, glycol	30%
Installation desc.	Outdoor Enclosure
Fuel type	Natural Gas
Low heating value (LHV)	900 Btu/cu.ft
Supply fuel pressure (natural gas)	5.0 PSI
Cooling System Type	Split Core Radiator, Blower fan, engine mounted

E. The power generating system shall conform to the following performance criteria:

Rating - Engine brake horsepower shall be sufficient to deliver full rated generator set kW/KVA when operated at rated rpm and equipped with all engine-mounted parasitic and external loads such as radiator fans and power generators.

Conditions - The rating shall be based on SAE J1349 conditions of 100kPa (29.61 in Hg) and 25 C (77 F). The rating shall also apply at ISO 3046/1, DIN 6271, and BS 5514 standard conditions.

Gas engines shall be able to deliver rated power when operating on dry natural gas having a low heating value (LHV) of 900 Btu/cu ft.

Gas engine fuel rates shall be based on fuel having a low heating value (LHV) of 900 Btu/cu ft.

Start Time and Load Acceptance - Engines shall start, achieve rated voltage and frequency, and be capable of accepting load within 10 seconds when properly equipped and maintained.

F. The complete power generation system, including engine, generator, and radiator shall be the product of one manufacturer who has been regularly engaged in the production of complete generating systems for at least twenty (20) years. All components shall have been designed to achieve optimum physical and performance compatibility and prototype tested to prove integrated design capability. The manufacture must have at least five (5) years product experience after installation. Any exceptions or variations must be noted.

G. The responsibility for performance to this specification shall not be divided among individual component manufacturers, but must be assumed solely by the primary manufacturer. This includes generating system design, manufacture, test, and having a local supplier responsible for service, parts, and warranty for the total system. The local engine generator set supplier shall have the single source responsibility for the generator set controls.

H. The system manufacturer shall perform post production tests on the generator set supplied.

I. The system manufacturer shall provide printed specification sheets and performance curves that, when compared to the production test report, confirm that the generator set performs as advertised.

J. All installation drawings and wiring diagrams for the generator set, controls, and switchgear must conform to a common format.

1.3 STANDARD SPECIFICATIONS NOT USED

1.4 SUBMITTALS

Submittals for approval shall be made. Submittals shall include but not be limited to:

- Component List - A breakdown of all components and options.
- Technical Data - Manufacturer produced generator set specification or data sheet identifying make and model of engine and generator, and including relevant component design and performance data.
- Auxiliary Equipment - Specification or data sheets, including switchgear, transfer switch, and vibration isolators
- Drawings - General dimensions drawings showing overall generator set measurements, mounting location, and interconnect points for load leads, fuel, exhaust, cooling and drain lines.
- Wiring Diagrams - Wiring diagrams, schematics and control panel outline drawings published by the manufacturer in Joint Industrial Council (JIC) format for controls and switchgear showing interconnected points and logic diagrams for use by CONTRACTOR and DISTRICT.

1.5 WARRANTY TERMS

The manufacturer's and dealer's extended warranty shall in no event be for a period of less than two (2) years from date of initial start-up of the system. It shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Applicable deductible costs shall be specified in the manufacturer's warranty.

1.6 PARTS AVAILABILITY

The generator set supplier shall guarantee 100% parts availability within 48 hours from the time an order is entered with the dealer.

1.7 OIL SAMPLING SERVICE

The generator set supplier shall provide a scheduled oil sampling service to monitor engine condition on an ongoing basis. The sampling method shall be of the atomic absorption spectrophometry method and be accurate to within a fraction of one part per million. The oil samples shall be analyzed at the generator set supplier's facility by factory trained personnel. Immediate notification of critical results shall be provided to the DISTRICT'S representative.

208.2 MATERIALS

2.1 GENERAL

The Work of this Section shall be appropriate for long term operation under the following conditions:

A. Outdoors.

B. Temperatures ranging from 30 to 120 Degrees Fahrenheit

C. In an atmosphere containing moisture.

D. Relative humidity ranging from 0 to 95 percent.

E. At an altitude of 100 feet above sea level.

The engine shall be specifically designed to minimize the discharge of gaseous pollutants to the atmosphere and to meet the latest SCAQMD regulatory requirements (Rule 1110.2) for standby generators. Gaseous pollutants includes Oxides of Nitrogen (NOx), Carbon Monoxide (CO) and Reactive Organic Gases (ROG).

2.2 PRODUCT

The following articles and paragraphs are intended to define a power generation system of proven type and design, of current production, and with all components commercially available.

2.3 ENGINE EQUIPMENT

The engine shall be equipped with air filters, lubricating oil cooler, filters, and pressure gauge, water pump and temperature gauge, service hour meter, flywheel, and flywheel housing when applicable.

2.4 FUEL LINE

Flexible fuel lines between engine and NG fuel supply piping shall be installed to isolate vibration.

2.5 COOLING SYSTEM

The engine jacket water cooling system shall be a closed circuit design with provision for filling, expansion, and deaeration. The cooling pump shall be driven by the engine. The cooling system shall tolerate at least 25 PSI static head. Coolant temperature shall be internally regulated to disconnect external cooling systems until operating temperature is achieved.

2.6 RADIATOR, SPLIT-CORE ENGINE MOUNTED

Heat rejected to the engine jacket water shall be discharged to the atmosphere through a close coupled radiator. The radiator shall be sized to cool the engine and provide a maximum of 130°F water to the aftercooler, continuously while operating at full rated load and at site conditions of 30% EG of up to 104 °F ambient temperature. The radiator fan air flow shall be less rated less than 50,000 CFM.

2.7 FAN AND BELT GUARDING

The fan, fan drive, and fan belts shall be covered with guarding for personnel protection to OSHA standards.

2.8 BLOWER FAN

The radiator cooling fan shall be a blower type driven from the engine. Air shall be drawn from the engine side and exhausted through the radiator core.

2.9 INLET AIR SYSTEM

The engine air cleaner shall be engine mounted with dry element requiring replacement no more frequently than 250 operating hours or once each year.

2.10 AFTERCOOLING

After cooler core air surfaces shall be coated with a corrosion inhibitor to minimize oxidation.

2.11 EXHAUST NOISE CONTROL

The critical exhaust silencer shall be sized and supplied by the engine supplier. It shall be mounted in the generator set room to minimize noise and condensation, and pitched away from the engine. A provision for draining moisture shall be included. It shall provide the critical attenuation while imposing no more than 27 in water restriction. The silencer shall have a side inlet and end outlet, and be connected to the engine with a minimum 18 inch flexible exhaust fitting. Exhaust noise shall not exceed 75 dBA when measured 10 ft perpendicular to the exhaust silencer outlet. Exhaust piping and radiator shroud by mechanical as shown on sheet 14 of the drawings.

2.12 EXHAUST EMISSIONS

The engine shall be a rich burn configuration and be field adjusted for required exhaust emissions. The exhaust after treatment catalytic converter supplied is to be sized to reduce engine exhaust emissions to fewer than 1.5 grams/bhp-hr NO_X to meet SCAQMD gas engine emergency engine requirements.

2.13 WIRING

Engine and generator control wiring shall be multi-strand annealed copper conductors encased by cross-linked polyethylene insulation resistant to heat, abrasion, oil, water, antifreeze, and diesel fuel. Wiring shall be suitable for continuous use at 120 C (250 F) with insulation not brittle at -50 C (-60 F). Each cable will be heat stamped throughout the entire length to identify the cable's origin and termination.

2.14 ELECTRIC STARTING SYSTEM

The engine starting system shall include a single 24 volt DC starting motor, starter relay, and automatic reset circuit breaker to protect against butt engagement. Batteries shall be maintenance free, lead acid type mounted near the starting motor. A corrosion resistant or coated steel battery rack shall be provided for mounting. Required cables will be furnished and sized to satisfy circuit requirements. The system shall be capable of starting a properly equipped engine within 10 seconds at ambient temperatures greater than 22 C (70 F).

2.15 JACKET WATER HEATER

Jacket water heater shall be provided to maintain coolant temperature of 32 C (90 F) while the engine is idle. Heater shall accept 120 volt AC single phase power.

2.16 BATTERIES

Batteries for starting and control shall be selected and supplied by the generator set manufacturer. They shall be a heavy duty SLI lead acid type with thru-partition connectors, and housed in a hard rubber or polypropylene case with provision for venting.

Starting batteries shall be (2) 8 D's lead acid batteries, rated at 24 volt DC. Batteries shall be located as close to the starting motor as practical, away from spark sources, and permit easy inspection and maintenance.

Battery warranty shall be the responsibility of the generator set manufacturer.

2.17 BATTERY CHARGER

A dual rate 10 ampere battery charger shall be provided which shall accept 120 volt AC single phase input to provide 24 volt DC output. The charger shall include an AC ammeter and voltmeter, alarms, and be housed in a NEMA 1 enclosure suitable for mounting on the generator terminal box.

2.18 GENERATOR

The generator shall be manufactured and warranted by the engine manufacture and rated for Standby service at 350-kW, 437 KVA, 0.8 PF, 480 V, three phase, 6 wire, 60 Hz, 1200 rpm. It shall exhibit less than 5% waveform deviation at no load. Temperature rise shall be less than 80° C, with the generator oversized for starting VFD motors. Subtransient Reactance must be less than 12%.

The generator shall be close coupled, drip proof and guarded, constructed to NEMA 1 and IP 22 standards, single bearing, salient pole, revolving field, synchronous type with amortisseur windings in the pole faces of the rotating field.

2.19 MECHANICAL DESIGN

The generator housing shall be one piece and mount directly to the engine flywheel housing without bolted adapters. Engine torque shall be transmitted through flexible steel plates to the generator rotor. The generator ventilating fan shall mount to the engine flywheel and act as a pressure plate to secure the flexible plates. The rotor assembly shall demonstrate 150% over speed capability at 170 C for 2 hours. Rotor dynamic, two plane balance shall not exceed 0.002 inch peak to peak amplitude at operating speed. All rotating components shall be secured with SAE Grade 8 hardware.

2.20 WINDINGS

Thermal Class 200 magnet wire as described by NEMA Magnet Wire Standard MW 1000, Section MW 35-C, shall be used for rotor and stator windings. All winding

insulation materials shall be Class H in accordance with BS and IEEE standards. No materials shall be used which support fungus growth, and shall be impervious to oil, dirt, and fumes encountered in diesel engine operating environments. The revolving field coils shall be precision wet layer wound with epoxy based material applied to each layer of magnet wire. Stator shall have at least two dips and bakes using Class H impregnating varnish. Basic lightning impulse insulation level (BIL) shall not be less than 3 kV. Windings shall be tested at 3000 volts AC.

2.21 EXCITER-PERMANENT MAGNET

The permanent magnet excitation system shall derive excitation current from a pilot exciter mounted on the rotor shaft. It shall enable the generator to sustain 300% of rated current for ten seconds during a fault condition.

2.22 VOLTAGE REGULATOR - DIGITAL

The digital voltage regulator shall be microprocessor based with fully programmable operating and protection characteristics. The regulator shall be capable of sensing true RMS in three phases of generator output voltage, or operating in single phase sensing mode. It shall exhibit the following operational characteristics:

Generator output voltage maintained within +/- 0.25 percentage at steady state conditions. Generator output voltage maintained within +/- 0.25% of rated value for any load variation between no load and full load. Generator output voltage drift no more than +/-0.25% of rated value at constant temperature. Generator output voltage drift no more than +/- 0.5 percent of rated value within a 40 change over ambient temperature range of -40øC to 70øC. Response time less than 20 milliseconds. Voltage buildup with generator output as low as 6 VAC RMS at the regulator terminals. At full throttle engine starting, output voltage overshoot no more than 5% of its rated value, with respect to the volts/Hz curve. Meets ISO 8325-3 class G2 specifications. Voltage recovery within 1 second for any load change on a generator driven by a synchronous driver (constant speed). Power dissipation 55 W at 15 amps; <100 ma at rest. Telephone Influence Factor (TIF) of less than 50, as measured using methods described in NEMA MG1 - 22.43. Electronic Interference/Radio Frequency Interference (EMI/RFI) suppressed to MIL STD 461C Part 9 and VDE 875 level N. Maintain stable voltage control with 20% total harmonic distortion.

The regulator shall include the following features: Voltage level rheostat to provide generator output voltage adjustment of -10% to +10% of nominal. This shall be in addition to a programmable output voltage level of -25% to +10% Automatic gain adjustment to provide output voltage compensation for changes in load or frequency. Manual gain adjustment 0 - 10% to provide compensation for line losses between generator output terminals and the load.

It shall allow system parameter setup and monitoring, and provide fault alarm and shutdown information through a keyed LCD display. A PC-based user interface shall be available to allow viewing and modifying operating perimeters in a windowed environment. The regulator shall be factory preset but field programmable for: voltage output, minimum voltage, voltage droop/crosscurrent adjustment, voltage gain (IR compensation), internal voltage gain, output current, field current variation, three phase sensing, dual voltage/frequency slopes, slope intersect (knee) frequency, frequency set

point, over/under voltage trip, over/under voltage trip time. Alarms and fault shutdowns shall include: Under/over voltage, Over excitation, Loss of Excitation, Rotating Diode failure, Instantaneous Over current Trip (IST), Loss of Sensing, Loss of Frequency, and EEPROM failure.

Protection shall be provided for the regulator against long term over current conditions. Generator output shall shut off when output is shorted, or excitation current exceeds normal for 15 seconds. The regulator shall not be damaged or result in unsafe operation when subjected to open or shorted input due to sensing loss, or sensing source shorted to ground or adjacent conductor. The regulator shall withstand a 15,000 volt electrostatic discharge (ESD) when unpowered and repeatably applied to any terminal or location on the regulator housing. It shall tolerate ESD of 7000 volts while operating.

It shall have provision for remote voltage level control, using 16 ga shielded wire. The regulator module sealed in a waterproof and airtight shock resistant plastic housing. The regulator shall be manufactured by the manufacturer of the engine-generator set.

2.23 CONTROLS-GENERATOR SET MOUNTED

The control panel shall be designed and built by the engine-generator manufacture. It shall be mounted on the generator set and incorporate 100% solid state microprocessor based control circuitry, sealed dust tight, watertight modular components with metal housings, and digital instrumentation. The panel shall be labeled with ISO symbols and comply with IEC 144, IP 22, and NEMA 12 for external environmental resistance, and IP 44 and NEMA 12 for resistance of the internal sealed modules.

The panel shall be labeled with ISO symbols and include the following equipment:

Generator AC Output Metering Devices: Back-lit LCD displays for volts, hertz, and amps in a single environmentally sealed module. Numeral height shall be 13 mm (0.5 in.) with not less than 0.5% accuracy true RMS throughout a temperature range of -40 to +70°C. Distorted generator output voltage waveform of a crest factor less than 5 shall not affect metering accuracy.

Monitoring Devices: Back-lit LCD to sequentially rotate display of operating hours, engine RPM, battery DC volts, oil pressure, and jacket water temperature. A momentary switch shall be provided to continuously display a selected operating parameter. The display shall annunciate fault shutdowns, cycle programming, and diagnostic codes for troubleshooting. Engine monitoring signals provided by engine mounted lubricating oil pressure and coolant temperature transducers shall be communicated over a serial data link through a Data Sending Unit (DSU) to the panel control module. The safety logic shall shut the engine down if the serial data link is lost.

Controls: Generator voltage level rheostat and ammeter/voltmeter phase selector switch shall be mounted on the panel door. The engine start-stop switch shall be door mounted and include positions for off/reset, run/start, stop, and automatic mode. Start-stop logic shall have provisions for cycle cranking and cool down operation.

Shutdowns/Annunciation: The generator set shall shut down and red flashing LEDs shall signal operational faults of high water temperature, low oil pressure, overcrank, and overspeed.

2.24 ALARM MODULE

NFPA-110 requirements shall be satisfied by a solid state microprocessor alarm module mounted in the panel and including red and yellow flashing LEDs and silenceable alarm horn to annunciate alarm conditions for high and low coolant temperature, low oil pressure, low DC voltage, and system not in automatic. The horn shall resound on subsequent alarms after silencing/acknowledgment, with the flashing LED displaying a solid light until the condition is corrected. Low fuel level, battery charger malfunction, and engine inlet air damper closed alarms shall be available to accept remote switch inputs.

2.25 REMOTE ANNUNCIATOR PANEL

NFPA-110 requirements for remote annunciation shall be satisfied by a remote mounted solid state panel which includes a common red indicating light and silence able alarm horn to annunciate all alarms and shutdowns provided by the generator set control panel when equipped with the NFPA-110 alarm module.

2.26 CIRCUIT BREAKER-GENERATOR SET MOUNTED

The 600 amp main line circuit breaker shall be mounted and connected in a guarded drip proof enclosure meeting NEMA 1, UL standards.

208.3 EXECUTION

3.1 SERVICES OF MANUFACTURER

A. Inspection, Startup, and Field Adjustment

An authorized service representative of the Manufacture shall visit the site for 1 day to witness the following and to certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation:

1. Installation of the equipment
2. Inspection, checking, and adjusting the equipment
3. Startup and field-testing for proper operation
4. Performing field adjustments to ensure that the equipment installation and operation comply with the specified requirements.

B. Instruction of the DISTRICT'S Personnel

1. An authorized training representative of the Manufacturer shall visit the site for (1) 8-hour day to instruct the DISTRICT'S personnel in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment. Instruction shall be specific to the models of equipment provided.
2. The representative shall have at least two year's experience in training.
3. Training shall be scheduled a minimum of one week in advance.

4. Proposed training material and a detailed outline of each lesson shall be submitted for review. Comments shall be incorporated into the material.

5. The training materials shall remain with the trainees.

6. The DISTRICT may videotape the training for later use with the DISTRICTS personnel.

3.2 MOUNTING

The engine and generator shall be assembled to a common base by the engine-generator manufacturer. The generator set base shall be designed and built by the engine-generator manufacturer to resist deflection, maintain alignment, and minimize resonant linear vibration.

3.3 ISOLATOR-SPRING TYPE

Spring type isolators shall be installed between the generator set base and the mounting surface. The generator set supplier shall provide seismic calculations.

3.4 PRE-DELIVERY TESTING

Prior to delivery and acceptance, the generator set shall be tested on pipeline natural gas to show it is free of any defects and will start automatically and carry full load. This testing shall be performed at the facility of the system manufacturer's authorized local dealer. The testing shall be done on dry type, resistive load banks capable of definite and precise incremental loading. Load bank testing shall be done in the presence of the DISTRICT'S engineer or his appointed representative. Testing shall be for a minimum of four (2) hours under full load.

3.5 FIELD TESTING

Load - Two hours operation at 100% of full load rating on natural gas. After the first half-hour stabilization period at full load, the following shall be recorded at fifteen minute intervals: Voltage and amperage (3 phase), frequency, fuel pressure, oil pressure and water temperature. Proper operation of controls, engine shutdown, and safety devices shall be demonstrated. The manufacturer's representative shall provide inductive load banks and field engineer for the test.

3.6 ORIENTATION

The system manufacturer's authorized dealer shall provide a complete orientation for the DISTRICT'S engineering and maintenance personnel. Orientation limited to 4 hours, 2 visits, shall include both classroom and hands-on instruction. Topics covered shall include control operation, schematics, wiring diagrams, meters, indicators, warning lights, shutdown system and routine maintenance.

3.7 O & M MANUALS

The system manufacturer's authorized local dealer shall furnish six copy each of the manuals listed below for each unit under this contract: OPERATING INSTRUCTIONS - with description and illustration of all controls and indicators and engine and generator

controls. PREVENTATIVE MAINTENANCE INSTRUCTIONS - on the complete system that cover daily, weekly, monthly, biannual and annual maintenance requirements and include a complete lubrication chart.

208.4 PAYMENT

Full compensation for conforming to the requirements of **350-kW Natural Gas-GENERATOR**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

SECTION F-209

AUTOMATIC TRANSFER SWITCH

209.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall furnish all labor, materials, services, equipment and incidentals required to furnish, install, test and place in satisfactory operation, a 2000 amp, automatic transfer switch and system controls complete with all appurtenances necessary to operate and communicate fully and completely with the 350-kW natural gas generator set.

1.2 SYSTEM

In the event of a power outage the Automatic Transfer Switch (ATS) is used to automatically and safely transfer the incoming power supply from the utility source to onsite generation.

1.3 STANDARD SPECIFICATIONS

A. The manufacturer shall have been regularly engaged in the production and installation of engine generator sets, automatic transfer switches and associated controls for a minimum of ten (10) years. The manufacturer shall have complete parts and service facilities and a factory trained serviceman available on a 24 hour basis.

B. The manufacturer of the equipment specified herein shall be required to review and satisfy all relevant requirements of other sections of the Contract Documents and the requirements of the Contract Drawings. The CONTRACTOR, manufacturer, supplier, fabricator and/or subCONTRACTORs furnishing and installing equipment, services and specialties associated with this section of the Special Provisions shall not be entitled to any compensation for claims that are based on failure to review all relevant Contract Documents and Contract Drawings.

C. Requirements of Regulatory Agencies

1. Local Ordinances: The Manufacturer shall comply with all Rules and Regulations of the applicable inspection authorities and will conform to N.E.C.

2. Transfer switch to be labeled under UL 1008.

D. The CONTRACTOR shall be solely responsible for purchasing, permitting, submittal review and coordination with structural, architectural, plumbing, heating, ventilation, instrumentation and electrical work. The CONTRACTOR shall pay all processing and testing costs.

E. All materials, equipment and parts comprising the unit specified shall be new, of current manufacture and of the highest grade.

F. Standard production tests shall be performed at the factory after assembly to verify proper operation and performance. Field testing shall be performed by a factory trained serviceman as coordinated by the CONTRACTOR as described in Section 3.2.B.

G. The CONTRACTOR shall provide the following services in addition to any other services specified herein, and required by these Specifications.

1. A factory trained manufacturer's representative shall be provided for a minimum of one (1) trip and a minimum of one (1) eight hour day to provide installation supervision and start-up services and O&M training services. The installation services shall be coordinated with the Construction Manager. The start-up and O&M services shall be coordinated with the DISTRICT via the Construction Manager.

2. After installation supervision services by the manufacturer, the CONTRACTOR shall submit to the DISTRICT via the Construction Manager, a certification letter on the Manufacturer's letterhead and signed by the Manufacturer certifying that the equipment was installed per the Manufacturer's recommendations and requirements.

H. All costs, including travel, lodging, meals and incidentals shall be included in the CONTRACTOR's lump sum bid price.

1.3 SUBMITTALS

A. The CONTRACTOR must submit for approval outline drawings including overall dimensions of the unit. Additional manufacturer's literature, specifications, and Engineering data necessary to fully describe the automatic transfer switch and all appurtenances and to substantiate compliance with the Specifications must also be submitted. Submit a list of any and all instances where equipment proposed deviates from the Specifications.

B. Submit complete operations and maintenance manual which includes copies of all shop drawings, test reports, maintenance data and schedules, description of operation and spare parts information. Furnish operation and maintenance manual in conformance with requirements of Division 1.

209.2 MATERIALS

2.1 AUTOMATIC TRANSFER SWITCH

A. The automatic transfer switch shall be furnished by the manufacturer of the engine-generator set. It shall be listed by Underwriter’s Laboratory, Standard 1008 with circuit breaker protection. Wiring must comply with NEC table 373-6(b). The manufacturer shall furnish schematic and wiring diagrams for the

particular automatic transfer switch and a typical wiring diagram for the entire system.

B. The automatic transfer switch shall be a level 2 with advanced features. It shall be a 4 pole design rated for 600 amperes continuous operation in ambient temperatures of -20 degrees Fahrenheit to +140 degrees Fahrenheit. Main power switch contacts shall be rated 600 volt AC minimum. The transfer switch supplied shall have a minimum withstand and closing rating when fuse protected of 200,000 amperes. Where the line side overcurrent protection is provided by circuit breakers, the short circuit withstand and closing ratings shall be the rating listed in the UL listing or component recognition procedures for the transfer switch. All withstand tests shall be performed with the overcurrent protective devices located external to the transfer switch.

C. The transfer switch shall be double throw construction, positively electrically and mechanically interlocked to prevent simultaneous closing and mechanically held in both normal and emergency positions. Independent break before make action shall be used to positively prevent dangerous source to source connections. The transfer switch shall be approved for manual operation. The electrical operating means shall be by electric solenoid. Every portion of the CONTRACTOR is to be positively mechanically connected. No clutch or friction drive mechanism is allowed. This transfer switch shall not contain integral overcurrent devices in the main power circuit, including molded case circuit breakers or fuses.

D. The transfer switch electrical actuator shall have an independent disconnect means to disable the electrical operation during manual switching. Maximum electrical transfer time in either direction shall be 160 milliseconds, exclusive of time delays. Main switch contacts shall be high pressure silver alloy contacts to resist burning and pitting for long life operation.

E. There shall be two SPDT, 10 ampere, 250 volt auxiliary switches on both normal and emergency sides, operated by the transfer switch. Full rated neutral bar with lugs for normal, emergency and load conductors shall be provided inside the cabinet.

F. Transfer switch mechanism and controls are to be mounted in the motor control center line up.

D. Time Delays and Components

1. Start delay 0 to 5 seconds set at 2.

2. Transfer to emergency delay set at 0.

3. Retransfer to normal delay 0 to 30 minutes set at 10.

4. Retransfer delay bypass, key operated.

5. Unloaded running delay, 0 to 10 minutes set at 5.

6. Delay transition, both directions, isolating load from both sources, 0.5 - 7.5 seconds, set at 1 second.

7. Test switch, key operated with and without transfer.

8. Four (4) pilot lights for ATS position and source available.

9. Engine start contacts wired to terminal block.

10. Auxiliary contacts on both normal and emergency wired to terminal block.

11. Electronic exerciser 7-day, load/no load transfer.

12. Controls shall automatically retransfer the load from emergency source to normal source if emergency source fails and normal source is available.

209.3 EXECUTION

3.1 INSTALLATION

Install the complete automatic transfer switch, including all signal connections in accordance with the Drawings, approved Shop Drawings and the manufacturer's recommendations.

3.2 FIELD QUALITY CONTROL

A. A qualified factory trained serviceman shall perform the following services:

1. Supervise installation of the equipment specified herein.

2. Inspect and adjust the equipment after installation and insure that it operates properly.

3. Instruct DISTRICT personnel in the operation and maintenance of the equipment. A minimum of one (1) 8 hour day shall be provided.

B. Field testing shall be by a factory trained serviceman. The tests must verify that the entire installation has been made in accordance with the approved manufacturer's drawings, and that the units and all auxiliaries are ready for operation. The CONTRACTOR shall provide all equipment, lubricants, and material required for the field testing. Also, he/she must adjust and leave equipment in proper working order. Fuel supplied by CONTRACTOR.

3.3 WARRANTY

The automatic transfer switch shall have a 2-year extended warranty by the manufacturer against defective materials and factory workmanship. No prorating will be acceptable. Such defective parts shall be repaired or replaced at the manufacturer’s option, free of charge for travel and labor. An additional 48 months of the manufacturer’s extended warranty coverage shall be provided. The warranty period shall commence when the standby power system is first placed into service. Satisfactory

warranty documents must be provided. Also, in the judgment of the specifying authority, the manufacturer supplying the warranty for the complete system must have the necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.

209.4 PAYMENT

Full compensation for conforming to the requirements of **AUTOMATIC TRANSFER SWITCH**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

SECTION F-210

MANHOLES AND HANDHOLES

210.1 GENERAL

1.1 DESCRIPTION

A. The CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install manholes and hand holes.

B. Coordinate manhole and handhole installation with piping, sheet piling and other underground systems and structures and locate clear of interferences.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

1. National Electrical Code.

2. National Electrical Safety Code.

3. ASTM A 48, Gray Iron Castings.

4. OSHA.

1.4 SUBMITTALS

Submit for approval the manufacturer's technical information for manholes, hand holes and accessories proposed for use. Also submit drawings showing interior and exterior dimensions and details of openings, jointing, inserts and reinforcing.

210.2 MATERIALS

2.1 MATERIALS AND INSTALLATION

Materials shall be precast or cast-in-place type of reinforced concrete. Installation shall have minimum interior dimensions as indicated on the Drawings. The duct entrances sized and located to suit duct banks.

2.2 ACCESSORIES

A. Frames and Covers: The material shall be cast iron conforming to ASTM A 48, Class 30A. The covers must be watertight, round sealed type marked "ELECTRICAL" in raised two inch letters. The frame shall be grouted on the manhole or hand hole. Provide frames and covers of one of the following:

1. Neenah Foundry Company.

2. Flockhart Foundry Company.

3. Campbell Foundry Company.

4. Or equal.

B. Pulling Irons: The material shall be galvanized steel. Cast in the wall opposite to the centerline of each incoming duct bank and 12 inches below centerline of bottom line of ducts. Provide one of the following:

1. Cat. No. DU2T3 by McGraw Edison Company.

2. Cat. No. 8119 by A.B. Chance Company.

3. Or equal.

C. Cable Racks: The material shall be galvanized steel. The cable racks shall adequately support cables with space allowed for future cables. Each rack shall be a vertical assembly of 24 inch cable racks extending from within 6 inches of the manhole roof slab to within 6 inches of the manhole floor. Product and Manufacturer: Provide one of the following:

1. Cat. No. J-5125 by Joslyn Manufacturing and Supply Company.

2. Cat. No. 2125 by Hubbard and Company.

3. Or equal.

D. Cable Hooks material shall be galvanized steel. The length will be a minimum of 7-1/2-inches. Product and Manufacturer: Provide one of the following:

1. Cat. No. J-5132 by Joslyn Manufacturing and Supply Company.

2. Cat. No. 2132 by Hubbard and Company.

3. Or equal.

E. Insulators material shall be porcelain. Product and Manufacturer: Provide one of the following:

1. Cat. No. J-5122 by Joslyn Manufacturing and Supply Company.

2. Cat. No. 2120 by Hubbard and Company.

3. Or equal.

F. Manhole Steps shall not be permitted

210.3 EXECUTION

3.1 INSTALLATION

A. Install manholes and hand holes where shown on Drawings. Verify final locations in field. CONTRACTOR shall be responsible for all excavation and backfilling required for installation.

B. Complete installation of manholes and hand holes so that structures are watertight.

C. Cable racks shall attach with 3-inch by 3/8-inch diameter "tamp-in" studs mounted in 1-inch holes drilled into walls of manholes in the absence of inserts. Provide cable hooks to support each cable on each rack along the cable run within the manholes. Individually support each cable at each hook on porcelain insulators. In the manhole securely tie each cable in place at each insulator block to prevent excessive movement of insulators, cables, or fireproof tape. Tie cables with non-metallic 3/4-inch strapping tape as manufactured by 3M or tie down with nylon straps.

D. Install a 0.75 inch OD, 10 foot ground rod for each pull box. Bond all exposed metal pull box accessories and the concrete reinforcing rods with 250 MCM AWG minimum bare copper wire and connect to the ground rod and to the duct bank ground cable. Extend 250 MCM AWG ground cable to ground grid.

E. Provide a ¾-inch diameter crushed rock floor (minimum 12 inches) for the manhole floor.

F. Provide grade rings for pull boxes when required to adjust pull box cover to proper grade. Stacks shall be minimum of 12 inches in height, constructed on the roof slab or cone section on which the pull box frame and cover shall be placed. The height of the stack shall be such as is necessary to bring the pull box frame to the proper grade.

210.4 PAYMENT

Full compensation for conforming to the requirements of **MANHOLES AND HAND HOLES**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

SECTION F-211

480 VOLT SWITCHBOARDS

211.1 GENERAL

1.1 DESCRIPTION

A. CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required to provide a NEMA 3R 480 volt switchboard including incoming line and SCE metering compartment in full conformance with utility requirements and as shown and specified.

B. Coordinate conduit entries with conduit layouts. Comply with SCE requirements**.**

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Comply with applicable provisions and recommendations of ten following except where otherwise shown or specified:

1. NEMA PB-2, Low Voltage Distribution Switchboards.

2. UL Standard No. 891, Dead-Front Electrical Switchboards.

3. ANSI C37.13, Low Voltage AC Power Circuit Breakers.

4. National Electrical Code.

5. National Electrical Safety Code.

6. SCE Requirements.

1.4 SUBMITTALS

A. Submit for approval copies of manufacturer's technical information for the 480 volt switchboards proposed for use, including front views, floor plans, and complete data for each type of circuit breaker.

B. Submit to SCE all required data and drawings and obtain their approval before release for manufacture.

211.2 MATERIALS

2.1 SWITCHBOARD RATING

A. 480 volt, 3 phase, 60 hertz, 4 wire.

B. Continuous AC main bus ampacity and fault current rating as shown on the Drawings.

2.2 BUS SYSTEM

Copper main bus extending to each vertical distribution section with current capacity as shown on the Drawings. Copper neutral bus with current capacity equal to 50% of the main bus, in main breaker section only. Copper grounding bus extending the entire length of the switchboard.

2.3 CONSTRUCTION

Steel frame enclosed construction, NEMA 3R. Self-supporting structure of the required number of vertical sections bolted together to form one metal-enclosed switchboard 90 inches high.

2.4 MAIN BREAKERS

Fixed Type Molded Case Circuit Breaker shall have a rating of 480 volt, 3 pole, 60 hertz, with frame size, sensor rating, and short circuit rating as shown on the Drawings. It should be manually operated. Integral solid state device incorporating long time, short time, and instantaneous elements and integral ground fault protection. The accessories shall include shunt trip, auxiliary contacts for remote indication of circuit breaker status-open, closed, over current trip, and phase fail relay. The construction shall be dead front with external mechanical breaker operating handle.

2.5 MANUFACTURERS

Provide equipment manufactured by one of the following:

A. Square D Corp.

B. Siemens.

C. Allen Bradley.

211.3 EXECUTION NOT USED

211.4 PAYMENT

Full compensation for conforming to the requirements of **480 VOLT SWITCHBOARDS**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-212

LIGHTING AND DISTRIBUTION PANEL BOARDS

212.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install lighting and distribution panel boards.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Reference Standards: Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

1. NEC Article 384, Switchboards and Panel boards.

2. UL Standard #50, Electrical Cabinets and Boxes.

3. UL Standard #67, Electric Panel boards.

4. NEMA PB1, Panel boards.

1.4 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's technical information for panel boards proposed for use.

2. Listing of the panel boards to be furnished with their proposed location and number of branch circuit breakers identified.

212.2 MATERIALS

A. Panel boards

1. Rating: Voltage rating, current rating, number of phases, number of wires and number of poles shall be as indicated on the Drawings.

2. Circuit Breakers: Molded case, bolt-in thermal magnetic type with number of poles and trip ratings as shown on the Drawings. GFCI type where shown on the Drawings or required by local codes and the NEC.

3. 240V distribution power panel boards and the devices contained therein shall have fully rated (series or integrated ratings are not acceptable) interrupting ratings as indicated on the drawings.

4. Circuit breakers shall have a minimum interrupting rating of 65,000 amperes symmetrical at 208 and 240 volts.

5. Bus Bars: 98 percent conductivity copper. All 3 wire panel boards shall have a solid copper neutral bar. All panels shall have a copper ground bus.

6. Main: All panel boards shall have a main circuit breaker unless Drawings specifically call for main lugs only.

7. Branch circuit breakers connected for sequence phasing.

8. Construction: Code grade steel, ample gutter space, flush door, flush snaplatch and lock. NEMA 3R.

9. Trim: Surface as shown on the Drawings.

10. Directory: Typed card, with glass cover in frame on back of door giving the circuit numbers and the area or equipment served.

11. Identification: Nameplate identifying the panel number and voltage.

12. Manufacturer: Provide panel boards of one of the following:

    a. Square D Company.

    b. Westinghouse Electric Corporation.

    c. Siemens.

212.3 EXECUTION

A. Mounting: Install panel boards at locations shown on Drawings. Set cabinets so that top branch circuit breaker is not over 6 feet from the floor.

B. Directory: Complete typewritten directory indicating items controlled by each circuit breaker and the size of feeder serving the panel.

D. Arrange circuits to balance the loads on the panel boards.

212.4 PAYMENT

Full compensation for conforming to the requirements in **LIGHTING AND DISTRIBUTION PANEL BOARDS**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-213

DRY TYPE TRANSFORMERS

213.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install dry type transformers.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Reference Standards: Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

1. ANSI C89.1, Specialty Transformers.

2. ANSI C89.2, Dry-Type Transformers for General Applications.

3. UL Standard #506, Specialty Transformers.

4. National Electrical Code.

1.4 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's technical information for transformers proposed for use.

2. Listing of the transformers to be furnished with their ratings and proposed locations identified.

213.2 MATERIALS

A. General:

1. Type: General purpose, dry type, electrostatically shielded, Load service UL K-13 rated

2. Rating: KVA, primary voltage and connection, secondary voltage and connection, frequency and number of phases shall be as indicated on the Drawings.

3. Taps: Full capacity, two 2-1/2 percent primary taps above normal, and two 2-1/2 percent primary taps below normal.

4. Sound Level: ANSI C89.1 standard.

5. Enclosure: UL listed for either indoor or outdoor use.

6. Insulation: Class 185 C, 115 C rise.

7. Identification: Nameplate identifying the transformer number and voltages.

B. Manufacturer: Provide transformers of one of the following:

1. Westinghouse Electric Corporation.

2. General Electric Company.

3. Sorgel by Square D Company.

4. Or equal.

213.3 EXECUTION

A. Provide sufficient access and working space for ready and safe operation and maintenance.

B. Mount transformers so that vibrations are not transmitted to other equipment.

C. Adjust tap settings to provide proper voltage at panel boards.

D. Ground transformer properly and install in conformance with the National Electrical Code.

213.4 PAYMENT

Full compensation for conforming to the requirements in **DRY TYPE TRANSFORMERS**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-215

MOTOR CONTROL CENTERS

215.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install Motor Control Center.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

1. UL Standard #845 Electric Motor Control Centers
2. NEMA ICS2-322 AC General Purpose Motor Control Centers
3. National Electrical Code

1.4 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's technical information for motor control centers proposed for use.
2. Outline and summary sheets with schedules of equipment in each unit.
3. Unit control schematic and elementary wiring diagrams showing numbered terminal points and interconnections to other units. Complex schematics shall be drawn to JIC Standards.
4. Motor nameplate data on equipment being furnished for properly sizing circuit breakers, starters, and overloads.

215.2 PRODUCTS

A. General: Motor control center lineup shall be provided as shown on the Drawings.

1. Service: The Motor Control Center (MCC) shall operate from a 480 volt, 3 phase, 4 wire, 60 hertz system.
2. Wiring: NEMA Class II, Type B.

3. Enclosure: NEMA 12 with gasketed door.

4. Ambient: Equipment shall be rated for a 40°C ambient.

B. Construction:

1. Totally enclosed structure, dead front, consisting of nominal 20-inch deep, 30-inch wide, 90-inch high vertical sections bolted together to form a unit assembly.

2. Removable lifting angles for each shipping section.

3. Two removable floor sills for mounting.

4. Horizontal wireways top and bottom, isolated from horizontal bus and readily accessible.

5. Isolated vertical wireways with cable supports, accessible through hinged doors, for each controller section.

6. All metal non-conducting parts electrically continuous.

C. Bus System:

1. Rating: Bus bracing 65kA. Bus current capacities as indicated on the Drawings.

2. All bus bars tin plated copper rated UL heat rise standards.

3. Bus bar connections easily accessible with simple tools.

4. Main Horizontal Bus: Continuous edge mounted, insulated and isolated from wireways and working areas.

5. Vertical Bus: Continuous, insulated, and isolated by a glass polyester barrier.

6. Grounding Bus: Full length mounted across the bottom, drilled and with compression type lugs of appropriate capacity as required, copper.

D. Unit Compartments:

1. Individual front door for each unit compartment with engraved phenolic nameplate identifying equipment. Nameplates to be 1 inch by 3 inches minimum, secured to unit door with two screws.

2. Starter and feeder-unit doors interlocked mechanically with the unit disconnect device to prevent unintentional opening of the door while

energized and unintentional application of power while door is open, with provisions for releasing the interlock for intentional access and application of power.

3. Padlocking arrangement permitting locking the disconnect device in the OFF position with at least three padlocks with the door closed or open.

4. Overload Relays: Solid state type relays, manually reset from outside the enclosure by means of an insulated button with normally open auxiliary contact for remote alarm purposes and separate heater elements sized for the full load amperes and service factor of the actual motors furnished.

5. Motor horsepowers shown are preliminary. Circuit breaker trips and starter overload heaters to be coordinated with the actual equipment installed.

6. Auxiliary contacts, relays, timers as required for specified control functions and those shown on the Drawings. Auxiliary contacts shall be field convertible.

7. All starter devices, including spare contacts wired to numbered terminal blocks, which shall be pull-out type for all starters.

8. Control devices shall be 600 volt heavy duty, NEMA A600 unless otherwise noted. Relays shall have convertible contacts. Pilot devices shall be oiltight. Indicating lights shall be push-to-test.

9. Feeder Circuit Breakers: Thermal magnetic type, interrupting capacity of 65,000A minimum.

10. Motor Starter Circuit Breakers: Magnetic trip only motor circuit protectors, interrupting capacity of 65,000A minimum.

11. Each starter shall be provided with one extra N.O. and one extra N.C. auxiliary contact in addition to the seal-in contact and those required by the control diagrams.

12. Provide the following diagrams and tables on the inside of the door for each compartment:

a. Elementary wiring diagram.

b. Table of overload heater sizes with the correct heater highlighted.

c. Table of the motor circuit protector settings with the correct setting high-lighted.

13. The incoming breaker shall have ammeter and voltmeter and switches or provide Metering Module, Westinghouse IQ Data or equal where indicated on the drawings.

E. Spare Parts:

1. Provide the following spare parts for the motor control center lineup:

a. One box of each size and type used.

b. One auxiliary control relay with at least two normally open and two normally closed contacts.

c. One control transformer of each size used.

d. Two contactors of each size furnished.

e. Two overload relays of each size furnished.

2. Package spare parts in suitable containers bearing labels clearly indicating the contents and equipment with which they are to be used. Deliver spare parts at the same time as the motor control centers.

F. Product and Manufacturer: Provide motor control centers of one of the following:

1. Model 6 by Square D Company.

2. Series 2100 by Westinghouse Electric Corporation.

215.3 EXECUTION

3.1 INSTALLATION

A. Install at locations shown on the Drawings. Install support channels in concrete per manufacturer's recommendations.

B. For installations against masonry walls, provide an insulation board, 1/4 inch minimum thickness aluminum sheathed, between motor control center and wall for corrosion protection. Trim board neatly within outline of unit.

C. Provide no openings in top or side of units not required for conduit.

D. Cable circuits together within enclosures and identify with durable tag secured to cabling twine.

E. Set motor circuit protectors at lowest setting which permits motor starting without nuisance tipping.

F. Field test all motor control center components.

G. Verify that wiring diagrams on inside of door of each compartment reflects the "as-built" circuitry and that the correct overload heater size and motor circuit protector setting are noted.

H. Install and test in conformance with the National Electrical Code.

3.2 MANUFACTURER'S SERVICES

A factory trained representative shall be provided for installation supervision, startup and test services, and operation and maintenance personnel training services.

215.4 PAYMENT

Full compensation for conforming to the requirements in **MOTOR CONTROL CENTERS**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-216

SOLID STATE STARTERS

216.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install solid state reduced voltage starters.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Reference Standards: Comply with applicable, provisions, and recommendations of the following except where otherwise shown or specified.

1. NEMA Standard ICS2-110, General Standards for Manual and Magnetic Controllers.

2. NEMA Standard ICS2-321 AC General Purpose Class A Controller for Squirrel Cage Induction Motors, 600 volts and less.

3. UL Electrical Construction Materials Directory.

4. National Electrical Code.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's technical information for starters proposed for use.

2. Listing of the motor starters to be furnished with their location and equipment to be controlled identified.

216.2 MATERIALS

2.1 SOLID STATE STARTER

A. Solid-state reduced voltage starter shall be Square D "Altistart". Unit shall consist of a power section, one piece printed circuit logic board, and field writing interface terminal board. Internal construction shall consist of the following:

1. The power section shall be three-phase, 60 hertz, and rated for the HP, current, and voltage as indicated. It shall consist of three sets of back-to-back phase controlled power semi-conductors. Maximum current limit shall be 500 percent for standard units.

2. Resistor/capacitor snubber networks shall be used to prevent false firing of SCR's due to dv/dt characteristics of the electrical system.

3. Units shall be fan cooled with heat sink for all 3 phases. Thermal sensors shall be rated 90 degree C maximum.

4. The one piece logic board shall be mounted for easy testing, service and replacement.

5. Three-phase current sensing via current transformers for closed loop control to ensure motor stability shall be provided.

6. The logic board shall use a quick disconnect plug-in connector for current transformer inputs, line and load voltage inputs, SCR gate firing output circuits and status panel.

7. The logic circuitry shall include as a minimum:

   a. Short circuit electronic trip over current protection. Time not to exceed ½ cycle.

   b. Inverse time running over current protection.

   c. Auxiliary trip circuit.

   d. Gate firing circuit lockout protection on trip.

   e. Fault relay lockout protection.

   f. 250 percent to 500 percent current limit adjustments.

   g. Minimum and maximum voltage adjustments.

   h. Voltage stability adjustment.

   i. Indicating lights registering fault, alarm, and starter status.

B. Provide by-pass vacuum contactor and selector switches to allow full voltage across the line starting when selected or when a failure occurs in the solid state starting equipment.

C. Motor power shall automatically switch from the solid state starter to the by-pass contactor once the motor has reached full speed.

2.2 BY-PASS CONTACTOR

A. General

1. Type: Magnetic coil operated, horsepower rated with thermal overload protection.

2. Functional Type: Full voltage, single speed, non-reversing unless otherwise noted on Drawings.

3. Auxiliary contacts for remote status signals and interlocks as shown on Drawings plus two extra interlocks.

4. Overload relays of the temperature compensated type and overload heaters sized to coordinate with actual motors being controlled.

216.3 EXECUTION

A. Mount starter so that sufficient access and working space is provided for safe operation and maintenance.

B. Install in conformance with the National Electrical Code.

216.4 PAYMENT

Full compensation for conforming to the requirements in **SOLID STATE STARTERS,** including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-217

GROUNDING SYSTEMS

217.1 GENERAL

1.1 DESCRIPTION

CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install complete grounding for the electrical systems. The grounding system shall consist of green wire grounding from power sources, and a supplemental well facility wide ground grid, ground rods, and UFER grounds.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. Reference Standards: Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:

1. NEC Article 250, Grounding.

2. UL Standard #467, Electrical Grounding and Bonding Equipment.

1.4 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. Manufacturer's technical information for grounding materials proposed for use.

2. Listing of grounding connector types identifying where they are to be used.

3. Layouts of each structure ground grid.

4. Test point construction details.

5. Results of ground resistance tests at each test point.

217.2 MATERIALS

A. Bare Ground Cable:

1. Material: Annealed, bare, stranded copper, No. 8 AWG minimum size for equipment grounding, No. 4/0 minimum for ground loops.

2. Manufacturer: Provide ground cable of one of the following:

a. Continental Wire and Cable Corporation.

b. General Cable Corporation.

c. Rome Cable Company.

d. Or equal.

B. Ground Rods:

1. Material: Copperclad rigid steel rods, 3/4-inch diameter, 10 feet long.

3. Manufacturer: Provide ground rods of by one of the following:

a. Copperweld, Bimetallics Division.

G. ITT Blackburn Company.

c. Or equal.

C. Grounding Connectors:

1. Welded connections shall be by exothermic process utilizing molds, cartridges and hardware designed specifically for the connection to be made.

a. Welded Connections:

1) Cadweld by Erico Products, Incorporated.

2) Therm-O-Weld by Burndy Corporation.

3) Or equal.

D. Insulated Ground Cable: Sizes as shown on the Drawings and required by the NEC, green insulation, type THHN/THWN.

E. Hardware: Silicon bronze.

217.3 EXECUTION

3.1 GROUND SYSTEM

A. Provide individual and grouped ground rods and connecting ground loop as shown on the Contract Drawings.

B. Install 250 MCM bare copper cable around the exterior perimeter of structures linking rods, minimum 2 feet-6 inches below grade, unless otherwise shown on Drawings.

C. Install sufficient ground rods to provide a resistance to ground of less than 5 ohms at each point on the ground grid.

D. For structures with steel columns, install #4/0 ground cable from grid to each column around the perimeter of the structure. Connect cable to steel using exothermic welds.

E. Connect grids to a continuous underground water pipe system when practical. Provide UFER grounds at all structures and buildings and connect to grid.

F. Extend bare copper grounds from the ground grid to all railing, electrical equipment, tanks, pumps, process equipment, piping, structural steel and to all building and structure loops throughout the site.

G. Provide accessible test points for measuring the ground resistance of each grid, as shown on the Drawings.

H. Weld all buried connections except for test points.

3.2 EQUIPMENT GROUNDING

A. Ground all electrical equipment in compliance with the National Electrical Code and other applicable codes.

B. Equipment supplemental grounding conductors shall be bare stranded copper cable of adequate size installed in Schedule 80 PVC conduit where necessary for mechanical protection.

C. Connect supplemental ground conductors to metallic conduit with copper clamps, straps or with grounding bushings.

D. Connect supplemental ground conductors to piping by welding or brazing. Use copper bonding jumpers on all gasketed joints.

E. Connect supplemental ground conductors to equipment by means of an indent compression type lug. Bolt lug to equipment frame using holes or terminals provided on equipment specifically for grounding. Do not use holddown bolts. Where grounding provisions are not included, drill suitable holes in locations designated by ENGINEER.

F. Connect supplemental ground conductor to motors by bolting directly to motor frames, not to sole plates or supporting structures.

G. Connect supplemental ground and green wire ground to service water piping by means of copper clamps. Use copper bonding jumpers on all gasketed joints.

H. Scrape bolted surfaces clean and coat with a conductive oxide- resistant compound.

I. Run green insulated wire grounds with all power conductors, and in all PVC conduit runs.

3.3 TESTING

Test the completed ground systems for continuity and for resistance to ground using an electrical ground resistance tester and submit test reports for all ground rods and ground loops.

217.4 PAYMENT

Full compensation for conforming to the requirements in **GROUNDING SYSTEMS**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.

F-218

ELECTRICAL TESTING

218.1 GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall perform electrical system testing, this section sets the requirements for acceptance testing of the electrical system, wiring, equipment, and grounding.

1.2 SYSTEM NOT USED

1.3 STANDARD SPECIFICATIONS

A. National Electric Testing Association (NETA):

B. ATS-1995 -Acceptance Testing Specifications for Electric Power Distribution Equipment and Systems.

1.4 SUBMITTALS

A. Pre-Test Submittals

1. Testing service qualifications.
2. Test personnel qualifications (resumes).
3. Equipment testing schedule.
4. Test data forms.

B. Post -Test Submittals

1. Summary of testing for the project.
2. Description of the equipment tested.
3. Description of the test and test procedures.
4. Test results.
5. Conclusions and recommendations.
6. Completed test forms, including witness's signatures.
7. List of test equipment and calibration documents.
8. Date and time.
9. Include the following data tabulated for each piece of equipment:

a. Circuit number.

b. Equipment or motor name and tag number (where applicable).

c. Nameplate full-load-ampere rating.

d. Motor service factor.

e. Motor ambient temperature rating.

f. Overload relay rating.

g. Measured full load current.

h. Measured discharge pressures (where applicable).

C. Submit equipment test schedule to DISTRICT no later than 7 days prior to scheduled date of testing.

D. Project Record Documents: Note or indicate wiring deviations from Contract Documents on Project Record Documents.

1.5. QUALITY ASSURANCE

A. The CONTRACTOR shall retain a qualified Engineering appraisal and testing organization to provide inspections, tests, and evaluation to determine that the equipment designated herein is furnished in accordance with specifications and is installed and adjusted for successful energization and operation.

B. Testing Firm

1. Obtain services of an independent testing service firm that meets the Federal OSHA criteria for accreditation of testing laboratories, Title 29, Part 1910.7 and has a work history and qualifications acceptable to the Engineer.

2. The appraisal and testing organization shall have two or more years of experience related to the appraisal and testing of equipment designated herein.

3. The managing or supervising representatives of the appraisal and testing organization shall have extensive knowledge of the products involved and at least two years experience conducting appraisals and tests. All testing shall be conducted under the supervision of the managing or supervising representatives.

4. Testing technicians shall be trained and experienced in the testing they perform.

5. The engineering appraisal and testing organization shall utilize comprehensive report forms to document engineering appraisal and test results on all equipment's and products. Upon completion of the work, the report forms shall be signed by the managing or supervising engineering representative and included in the final report.

6. Testing shall be done in accordance with the manufacturer's instructions, these specifications, and applicable ANSI, ASTM and NEMA standards. Applicable product instructions shall be furnished to the DISTRICT and Engineer for review.

7. Prequalified Testing Services and Manufacturing Firms:

   a. Electro-Test Inc.

   b. Square D Company Technical Services Divisions.

   c. General Electric Company.

8. Qualifications of other testing services firms may be submitted to the DISTRICT for approval.

9. Testing service or testing personnel may be accepted or rejected based on, but not limited to, the testing equipment intended to be used, the qualifications of the firm, and personnel.

218.2 MATERIALS NOT USED

218.3 EXECUTION

3.1 EXAMINATION

A. Verify that electrical work is free from improper grounds, short circuits, and overloads.

B. Verify correctness of wiring first by visual comparison of the conductor connections with connection diagrams.

C. Make individual circuit continuity checks by using electrical circuit testers.

3.2 ACCEPTANCE TESTING

A. Perform testing and allow DISTRICT and Engineer to witness testing. Notify the DISTRICT'S representative three days or more in advance when any test is to take place.

B. Perform electrical acceptance testing in accordance with NETA Standards

C. Perform tests to assure that electrical equipment specified to be tested will operate within industry and manufacturers published tolerances, and will perform safely. Record test result data, to be used as a baseline for future tests.

D. Testing of installed equipment shall result in acceptable test data. Equipment for which acceptable test data has not been submitted, or has been submitted but rejected, shall be deemed as not meeting Contract requirements.

E. Conduct 3 point fall of potential ground test by using equipment of one of the following manufacturer, or equal:

1. Biddle Company.

2. Associated Research.

F. Test insulation resistance of circuits. Test each complete circuit prior to energizing. Insulation resistance between conductors and between each conductor and ground shall not be less than 25 megohms. Repair or replace wires or cables in circuits that do not pass this test, and repeat the test.

G. Test project electrical equipment, including 600 volt electrical distribution equipment, motor control centers, and grounding. Complete test reports for each individual piece of equipment. The following types of electrical equipment shall be tested according to the requirements of this specification section. Refer to the project documents to identify the equipment related to a specific project:

1. Power Distribution Switch

2. Molded Case Circuit Breaker.

3. Motor Circuit Protector, 200 amp and above.

4. Motors, 200 hp and above.

5. Grounding Electrode Systems and Equipment Grounding System (refer to section 16450 for additional requirements).

6. Protective Relays (relay settings shall be as documented in the project coordination study, see section 16010).

7. Three Phase Power Transformers.

H. Ground Fault Protective Equipment: The ground-fault protection system shall be performance tested after installation in accordance with NEC 230-95C. Submit a written record of the test to the DISTRICT'S representative. Label on panel above the device with certification and values. Record current pickup level and time delay settings to which the equipment was finally adjusted. Measure and record relay pickup current and the relay time delay at two values above pickup. Test for correct system operation at 57% rated voltage. If relay pickup current is not within 5% of the manufacturer's calibration marks or fixed setting or relay timing does not conform with manufacturer's published time-current characteristic curves, repair or replace equipment and repeat test.

I. Motor Operating Test: Run each motor as nearly as possible to rated operating conditions. Record current in each phase of each motor 1/2 hp and larger and submit to the DISTRICT'S representative. Repair or replace motor or driven equipment if current exceeds motor nameplate current.

J. Power Company Voltage Test: When the installation is essentially complete and the facility is in operation, check the voltage at the point of termination of the power company supply system to the project. Check voltage amplitude and balance between phases for loaded and unloaded conditions. If the unbalance (as defined by NEMA) exceeds 1%, or if the voltage varies throughout the day and from loaded to unloaded conditions more than +5% of nominal, make a

written request to the Power Company that the condition be corrected. If corrections are not made, request that the Power Company official provide a written statement that the voltage variations and/or unbalance are within their normal standards.

3.3 SUMMARY TEST REPORT

Upon completion of testing in every area, submit summary test report.

218.4 PAYMENT

Full compensation for conforming to the requirements in **ELECTRICAL TESTING**, including furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved shall be included in the contract Lump Sum price paid and no additional compensation shall be allowed therefore.