



**LAKE HAVASU CITY**

**FINAL CONTRACT DOCUMENTS**

**AND**

**TECHNICAL SPECIFICATIONS**

**REPLACEMENT AND**  
**REFURBISHMENT OF THE**  
**HORIZONTAL COLLECTOR WELL**  
**PUMPS AND PIPING**  
**#:B24-PW-108030-500434**

# August 2024

## LAKE HAVASU CITY

### CONTRACT DOCUMENTS VOLUME 1

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SECTION 00020  
**NOTICE INVITING BIDS**  
Lake Havasu City

**PROJECT NO.:** **B24-PW-108030-500434**

**PROJECT NAME:** **REPLACEMENT AND REFURBISHMENT OF THE  
HORIZONTAL COLLECTOR WELL PUMPS AND PIPING  
PROJECT**

**PRE-BID MEETING:** A **NON-MANDATORY** Pre-Bid meeting will be held at 900 London Bridge Road, Lake Havasu City, AZ 86404 at 8:30 am, Arizona Time, on Wednesday, September 25, 2024.

**BID DUE DATE:** **WEDNESDAY, OCTOBER 9, 2024**

**BID DUE TIME:** **3:00 p.m., ARIZONA TIME**

**PROJECT DESCRIPTION:**

This project consists of reconstruction of the three Lake Havasu City Horizontal Collector Well pumps, with minor repair work done to the above ground piping. Ground settlement resulted in the 20-inch to 48-inch discharge piping from the collector well to move, break, and leak. The new piping repairs would consist of fabricating a new 20inch flanged steel tee to fit the location of the broken flanged DI tee.

**QUESTIONS:** All questions that arise relating to this solicitation shall be directed in writing to [purchasing@lhcaz.gov](mailto:purchasing@lhcaz.gov). To be considered, written inquiries shall be received at the above-referenced email address by September 27, 2024 at 3:00 p.m., Arizona Time. Inquiries received will then be answered in an Addendum.

Sealed bids for the project specified will be received by the **City Clerk's Office, 2330 N. McCulloch Boulevard, Lake Havasu City, Arizona, 86403** until the time and date stated. **Bids received by the correct time and date will be opened and read aloud immediately thereafter in Room 109 of Lake Havasu City Hall.** Public openings may be attended virtually by accessing the following video conferencing system:

To join the meeting on a computer or mobile phone:

<https://tinyurl.com/3f94b2ww>

Meeting ID: 270 366 031 956

Passcode: jcVbxK

Join with a video conferencing device

[160264325@teams.bjn.vc](https://160264325@teams.bjn.vc)

Video Conference ID: 112 219 692 0

**Bids must be clearly addressed to the City Clerk's Office, 2330 McCulloch Blvd. N, Lake Havasu City, Arizona, 86403**, and received no later than the exact time and date indicated above. Late bids will not be considered under any circumstances.

Bids must be submitted in a sealed envelope with the Project Number and the bidder's name and address clearly indicated on the envelope. All bids must be completed in ink or typewritten on a form to be obtained from the specifications and a complete Invitation for Bid returned along with the offer no later than the time and date cited above.

Bidders interested in taking advantage of the streamlined e-Bid and e-Bond process shall submit their bids electronically via the City's DemandStar Network at <https://www.demandstar.com/app/buyers/bids/432149/details>. Paper bids and paper bid bonds will continue to be accepted. Bidders submitting e-Bids will be required to scan and enclose their paper bid bond/cashier's check with their electronic bid submission. The apparent low bidder shall submit their original bid bond/cashier's check within three (3) business days following the Bid opening.

Bid documents and specifications are available on Lake Havasu City's website at [www.lhcaz.gov](http://www.lhcaz.gov) or on DemandStar at [www.demandstar.com](http://www.demandstar.com). For documents obtained outside of DemandStar please contact [purchasing@lhcaz.gov](mailto:purchasing@lhcaz.gov) to be added to the planholders' list.

**BONDS:**

Bid Bond:	<u>10%</u>
Labor and Material Bond:	<u>100%</u>
Faithful Performance Bond:	<u>100%</u>

**Project Completion Date: 150 Calendar Days**

Lake Havasu City reserves the right to accept or reject any or all bids or any part thereof and waive informalities deemed in the best interest of the City.

*Pursuant to the Americans with Disabilities Act (ADA), Lake Havasu City endeavors to ensure the accessibility of all of its programs, facilities and services to all persons with disabilities. If you need an accommodation for this meeting, please contact the City Clerk's office at (928) 453-4142 at least 24 hours prior to the meeting so that an accommodation may be arranged.*

Publication Dates: Today's News Herald September 11 & 18, 2024  
Arizona Business Gazette September 12 & 19, 2024

**\*\* END OF SECTION \*\***

SECTION 00040  
**INTENT TO BID NOTIFICATION**

**ITB NO.: B24-PW-108030-500434**

**ITB TITLE: REPLACEMENT AND REFURBISHMENT OF THE HORIZONTAL  
COLLECTOR WELL PUMPS AND PIPING PROJECT**

**CLOSING DATE & TIME: WEDNESDAY, OCTOBER 9, 2024 at 3:00 PM, Arizona**

**LETTER OF INTENT TO BID SUBMITTAL** **Time**

This is notification that it is our present intent to submit a bid in response to the above referenced ITB. Please add our company to your planholders list.

The individual to whom all information regarding this ITB should be transmitted is:

Company Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State, & Zip: \_\_\_\_\_

Phone Number: Fax Number: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Submit this Letter of Intent by the deadline for requests for clarification and protests, which must be physically received by **WEDNESDAY, OCTOBER 9, 2024 at 3:00 p.m., Arizona Time.**

Clarification/Protest/Question/Letter of Intent to Bid ITB

No.: B24-PW-108030-500434

Lake Havasu City

Administrative Services Department, Procurement Email

to: [purchasing@lhcaz.gov](mailto:purchasing@lhcaz.gov)

\*\* END OF SECTION \*\*

SECTION 00100  
**INFORMATION FOR BIDDERS**

**1. RECEIPT AND OPENING OF BIDS**

The City of Lake Havasu City, Arizona, (hereinafter called the "Owner") invites Bids on the form attached hereto. All blanks must be appropriately filled in. The Bidder shall also complete and submit a form listing proposed subcontractors as enclosed herein. Any subcontractors proposed to be used on the project but not listed on this form shall not be considered when evaluating the Contractor's qualifications and ability to perform the work. Bids for the **REPLACEMENT AND REFURBISHMENT OF THE HORIZONTAL COLLECTOR WELL PUMPS AND PIPING PROJECT , PROJECT No. B24-PW-108030-500434** will be received by the **City Clerk's office, 2330 N. McCulloch Boulevard, Lake Havasu City, Arizona 86403** no later than **WEDNESDAY, OCTOBER 9, 2024, at 3:00 PM, Arizona Time**, where said Bids will be publicly opened and read aloud immediately thereafter in the Room 109 of Lake Havasu City Hall.

The Owner may consider informal any Bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all Bids. Any Bid may be withdrawn prior to the above scheduled time for the opening of Bids or authorized postponement thereof. Any Bid received after the time and date specified shall not be considered. No Bidder may withdraw a Bid within ninety (90) days after the actual date of the opening thereof.

**2. PREPARATION OF BID**

Each Bid must be submitted on the prescribed Form. Each Document must be submitted with an original signature of the Bidder, as well as all witnesses indicated therein. All blank spaces for Bid prices must be filled in, in ink or typewritten, in both words and figures.

Each Bid must be submitted in a sealed envelope bearing on the outside the name of the Bidder, the Bidder's address, and the name and number of the project for which the Bid is submitted. If forwarded by mail, the sealed envelope containing the Bid must be enclosed in another envelope addressed as specified in the Bid form.

**3. PRE-BID MEETING**

The pre-bid conference will be held for this project at the time and place stipulated in Section 00020 - Notice Inviting Bids, as modified by Addenda.

**4. FACSIMILE BIDS OR MODIFICATIONS**

No facsimile ("FAX") Bids or bid modifications will be accepted. Any modifications to the Bid shall be made by an authorized representative of the bidding company in person.

**5. QUALIFICATIONS OF BIDDER**

The Owner may make such investigations as he deems necessary to determine the qualifications of and the ability of the Bidder to perform the Work, and the Bidder shall furnish the Owner such information and data for this purpose as the Owner may request. The Owner may request that the Bidder provide a list of key people for the project with their related work experience.

The Owner reserves the right to reject any Bid if the evidence submitted by or investigation of such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein in a timely manner. Conditional Bids will not be accepted.

All Bidders and listed subcontractors must be valid Arizona Licensed Contractors at the time of Bidding, approved by the Arizona State Registrar of Contractors to do the type and amount of work specified in these documents. In accordance with the Arizona State Registrar of Contractors, the Bidder must possess a minimum of an Arizona Contractor's License to perform the type and amount of work specified in these documents. **Failure of any bidder to possess all contractors' licenses as listed in the bid packet, at the time of bidding, shall result in the bid being considered non-responsive and not in substantial compliance, and any such bid shall not be considered.** Refer to Section 00420, page 3, item 17.

## **6. ARITHMETIC DISCREPANCIES IN THE BID**

- A. For the purpose of the evaluation of Bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the Bid Schedule as submitted by Bidders:
  - 1. Obviously misplaced decimal points will be corrected;
  - 2. In case of discrepancy between unit price and extended price, the unit price will govern;
  - 3. Apparent errors in extension of unit prices will be corrected;
  - 4. Apparent errors in addition of lump sums and extended prices will be corrected; and
  - 5. In case of discrepancy between words and figures in unit prices, the amount shown in words shall govern.
- B. For the purpose of Bid evaluation, the Owner will evaluate the bids on the basis of the unit prices, extensions, and totals arrived at by resolution of arithmetic discrepancies as provided above.

## **7. INCOMPLETE BIDS**

Failure to submit a Bid on all items in the Schedule will result in an incomplete Bid and the



Bid may be rejected. **UNIT OR LUMP SUM PRICES MUST BE SHOWN FOR EACH BID ITEM WITHIN THE SCHEDULE.**

**NOTE: FAILURE TO INDICATE UNIT OR LUMP SUM PRICES IN THE APPROPRIATE COLUMN, WITH THE EXTENSION OF THE PRICES IN THE FAR RIGHT COLUMN, WILL CAUSE THE BID TO BE "NON-RESPONSIVE".**

**All forms indicated in the Bid Proposal, Section 00300, must be completely filled out, executed, and submitted with the Bid. Failure to do so will render the bid "non-responsive" and the bid will not be accepted.**

**8. BID SECURITY**

Each Bid must be accompanied by certified check, cashier's check, or a Bid Bond prepared on the form attached hereto or on a similar form acceptable to the Owner, duly executed by the Bidder as principal and having as surety thereon a surety company approved by the Owner, in the amount of ten percent (10%) of the Bid. Bid Bonds shall be valid for at least ninety (90) days after the date of the receipt of Bids. Such cash, check or Bid Bond will be returned to all except the three (3) lowest Bidders within fifteen (15) business days after the opening of Bids. The remaining checks, or Bid Bonds will be returned promptly after the Owner and the accepted Bidder have executed the Contract, or if no award has been made within ninety (90) days after the date of the opening of Bids, upon demand of the Bidder at any time thereafter, so long as he has not been notified of the acceptance of his Bid.

**9. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT**

The successful Bidder, upon his failure or refusal to execute and deliver the Contract, Bonds, and certificates required within ten (10) calendar days from the date of the Notice of Award, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the difference between his bid and the amount of the contract actually entered into with another party should he not enter into a contract at the bid price and provide the required payment and performance bonds and certificates of insurance. Liquidated damages for failure to enter into the contract shall not exceed the amount of the Bid Bond.

**10. SECURITY FOR FAITHFUL PERFORMANCE AND PAYMENT**

Simultaneously with his delivery of the executed Contract, the Bidder shall furnish **on the forms provided herein**, in 100% of the amount of this Contract, 1) a surety bond as security for faithful performance of this Contract, and 2) a surety bond as security for the payment of all persons performing labor on the project under this Contract and persons furnishing materials in connection with this Contract, and 3) a listing of all subcontractors who will be performing or providing more than one-half percent (0.50%) of the contract work, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner, listed on the Treasury Department's most current list (Circular 570 as amended), and authorized to transact business in the State of Arizona.

**11. POWER OF ATTORNEY**

Attorneys-in-fact who sign Bid Bonds or Contract bonds must file with each bond a certified and effectively dated copy of their power-of-attorney.

**12. LAWS AND REGULATIONS**

The Bidder's attention is directed to the fact that all applicable Federal Laws, State Laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the Contract throughout, and they will be deemed to be included in the Contract the same as though herein written out in full.

**13. METHOD OF AWARD**

- A. The City will award the Contract on the basis of the Bid or Bids most advantageous to the City. In determining whether a Bid is most advantageous, in addition to price, the City may consider the following:
1. The ability, capacity, and skill of the Bidder to perform the Contract or provide the service indicated;
  2. Whether the Bidder can perform the Contract or provide the service promptly, and within the time specified without delay or interference;
  3. The character, integrity, reputation, judgment, experience, and efficiency of the Bidder;
  4. The quality of performance on previous contracts;
  5. The previous compliance with laws and ordinances by the Bidder;
  6. The financial responsibility of the Bidder to perform under the Contract or provide the service;
  7. The limitations of any license the Bidder may be required to possess;
  8. The quality, availability, and adaptability of the product or service;
  9. The ability of the Bidder to provide future maintenance and/or service;
  10. The number and scope of any conditions attached to the Bid; and;
  11. The life cycle, maintenance, and performance of the equipment or product

being offered.

**14. OBLIGATION OF THE BIDDER**

At the time of the opening of Bids, each Bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Plans and Contract documents (including all Addenda, if applicable). The failure or omission of the Bidder to examine any form, instrument or document, or site changes due to natural causes, shall in no way relieve any Bidder from any obligation in respect to his Bid. Site changes due to natural causes prior to Bid opening shall not be cause for Bid alteration or withdrawal.

**15. TIME OF COMPLETION AND LIQUIDATED DAMAGES**

The Bidder must agree to commence work on or before a date to be specified in a written "Notice to Proceed" from the Owner.

The Bidder further agrees to pay as liquidated damages, the sum indicated in the following Schedule of Liquidated Damages for each consecutive calendar day thereafter, plus any additional costs incurred by the Engineer as provided in Section 17 of the General Conditions, that the Contract remains incomplete. For the purposes of determining the Liquidated Damages for the project, the Original Contract Amount shall be that which is included in the Contract between the Owner and the Contractor for the project.

<b>SCHEDULE OF LIQUIDATED DAMAGES</b>		
Original Contract Amount		Daily Charges
From More Than	To and Including	Calendar Day or Fixed Rate
0	25,000	210
25,000	50,000	250
50,000	100,000	280
100,000	500,000	430
500,000	1,000,000	570
1,000,000	2,000,000	710
2,000,000	5,000,000	1,070
5,000,000	10,000,000	1,420
10,000,000	---0---	1,780

**16. CONDITIONS OF WORK**

Each Bidder must inform himself fully of the conditions relating to the construction of the project and the employment of labor thereon. Failure to do so will not relieve a successful Bidder of his obligation to furnish all material and labor necessary to carry out the provisions of his Contract. Insofar as possible, the Contractor, in carrying out his work, must employ such methods or means as will not cause any interruption of or interference with the work of any other Contractor.

**17. ADDENDA AND INTERPRETATIONS**

All questions that arise relating to this solicitation shall be directed in writing to:

[Purchasing@lhcaz.gov](mailto:Purchasing@lhcaz.gov)

Administrative Services Department, Procurement Division

Lake Havasu City

2330 McCulloch Blvd. North

Lake Havasu City, AZ 86403

To be considered, written inquiries shall be received by the above-referenced contact by **FRIDAY, SEPTEMBER 27, 2024, 3:00 PM, Arizona Time**. Inquiries received will then be answered in an Addendum. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the Specifications which, if issued, will be available to all prospective Bidders, not later than seven (7) calendar days prior to the date fixed for the opening of Bids. Failure of any Bidder to incorporate any such Addendum or interpretation shall not relieve such Bidder from any obligation under his/her Bid as submitted. All Addenda so issued shall become part of the Contract documents. No informal contact initiated by offerors on this solicitation will be allowed with members of City staff from the date of distribution of this solicitation until after the closing date and time for the submissions of quotations. All questions or issues related to this solicitation shall be submitted in writing.

**18. CONFLICT OF INTEREST**

Pursuant to A.R.S. Section 38-511, this Contract is subject to cancellation by Buyer if any person significantly involved initiating, negotiating, securing, drafting or creating the Contract on behalf of Lake Havasu City is, at any time while the Contract is in effect, an employee of any other party to the Contract in any capacity or a consultant to any other party of the Contract with respect to the subject matter of the Contract.

**19. NO COLLUSION**

The bidder will be required to complete, notarize and submit as part of this bid package the "No Collusion Affidavit" form, as attached herein. Failure of the bidder to submit a properly executed affidavit may be grounds for rejection of the bid.

## **20. EMPLOYMENT ELIGIBILITY VERIFICATION**

The bidder will be required to complete, notarize and submit as part of this bid package the "Employer Verification of Employment Eligibility" form, as attached herein. Failure of the bidder to submit a properly executed verification of eligibility form may be grounds for rejection of the bid.

## **21. EXAMINATION OF THE PLANS AND SPECIFICATIONS**

Each Bid shall be made in accordance with the Plans and Specifications which may be examined at the following locations:

- A. Lake Havasu City, 2330 N. McCulloch Boulevard, Lake Havasu City, AZ 86403, 928.855.2116
- B. Dodge Data & Analytics, 3315 Central Avenue, Hot Springs, AR, 71913, 871.375.2946, FAX 501.625.3544, [www.construction.com](http://www.construction.com), [dodge.bidding@construction.com](mailto:dodge.bidding@construction.com)
- C. Colorado River Building Industry Association, 2182 McCulloch Blvd, Suite 3, Lake Havasu City AZ 86403, 928.453.7755, FAX 928.453.3175, [www.crbia.org](http://www.crbia.org), [frontdesk@criba.org](mailto:frontdesk@criba.org)
- D. Northern AZ Home Builders, 1500 E. Cedar Avenue, Suite 86, Flagstaff AZ 86004, 928.779.3071, FAX 928.779.4211, [www.nazba.org](http://www.nazba.org), [info@nazba.org](mailto:info@nazba.org)
- E. Performance Graphics Blueprinting, 4140 Lynn Drive, Suite 107, Fort Mohave, AZ, 86426, 928.763.6860, FAX 928.763.6835, [prints@pgblueprinting.net](mailto:prints@pgblueprinting.net)
- F. Construction Market Data, 30 Technology Parkway South, Suite 500, Norcross, GA 30092-2912, 800.876.4045, FAX 800.303.8629, [www.cmdgroup.com](http://www.cmdgroup.com), [projects@cmdgroup.com](mailto:projects@cmdgroup.com)
- G. ISqFt, 3301 N 24<sup>th</sup> Street, Phoenix, AZ, 85016, 800.364.2059, FAX 800.792.7508, [www.isqft.com](http://www.isqft.com), [arizonaplanroom@isqft.com](mailto:arizonaplanroom@isqft.com)
- H. Integrated Digital Technologies, LLC, 4633 E Broadway Blvd., Tucson, AZ 85711, PO Box 13086, Tucson AZ, 85732, 520.319.0988, FAX, 520.319.1430, [www.contractorsplanroom.com](http://www.contractorsplanroom.com), [content@idtplans.com](mailto:content@idtplans.com)
- I. Yuma/Southwest Contractors Association, 350 W. 16<sup>th</sup> Street, Suite 207, Yuma, AZ 85364, Phone: 928-539-9035, Fax: 928-539-9036, [www.yswca.com](http://www.yswca.com), [plans@yswca.com](mailto:plans@yswca.com)

- J. Arizona Builders Exchange, 1700 N. McClintock Drive, Tempe, AZ, 85281, (480) 227-2620, [www.azbex.com](http://www.azbex.com), [rkettenhofen@azbex.com](mailto:rkettenhofen@azbex.com)
- K. Construction Reports.com, 4110 N Scottsdale Road, Suite 335, Scottsdale, AZ, 85251, 480.994.0020, FAX 480.994.0030, [www.constructionreports.com](http://www.constructionreports.com), [jess@constructionreports.com](mailto:jess@constructionreports.com)
- L. Construction Reporter, 1609 2<sup>nd</sup> Street NW, Albuquerque, NM, 87102, 505.243.9793, FAX 505.242.4758, [www.constructionreporter.com](http://www.constructionreporter.com), [jane@constructionreporter.com](mailto:jane@constructionreporter.com)
- M. PlanRoom Central at A&E Reprographics, 1030 Sandretto Drive, Suite F, Prescott, AZ, 86305, 928.442.9116, [www.a-erepro.com](http://www.a-erepro.com), [planroom1@a-erepro.com](mailto:planroom1@a-erepro.com)
- N. Shirley's Plan Service, 425 S. Plumer Ave, Tucson, AZ, 85719, 520.791.7436, FAX 520.882.9208, [www.shirleysplanservice.com](http://www.shirleysplanservice.com), [shirley@shirleysplanservice.com](mailto:shirley@shirleysplanservice.com)
- O. Construction Notebook Nevada, 3131 Meade Ave, Suite B, Las Vegas, NV, 89102-7885, 702.876.8660, FAX 702.876.5683, [www.constructionnotebook.com](http://www.constructionnotebook.com)
- P. The Blue Book Building & Construction Network, Jefferson Valley, NY 10535, 800.431.2584, [www.thebluebook.com](http://www.thebluebook.com), [info@thebluebook.com](mailto:info@thebluebook.com), [tdizon@mail.thebluebook.com](mailto:tdizon@mail.thebluebook.com)
- Q. Integrated Marketing Systems (IMS), 945 Hornblend Street, Suite G, San Diego, CA 92109, 888.467.3151, FAX 858.490.8811, [www.imsinfo.com](http://www.imsinfo.com), [ims@imsinfo.com](mailto:ims@imsinfo.com)

\*\* END OF SECTION \*\*

SECTION 00300  
**BID PROPOSAL**

Lake Havasu City, Arizona

The undersigned, as bidder, declares that we have received and examined the documents entitled **"REPLACEMENT AND REFURBISHMENT OF THE HORIZONTAL COLLECTOR WELL PUMPS AND PIPING PROJECT "** and will contract with the Owner, on the form of Contract provided herewith, to do everything required for the fulfillment of the contract for the redevelopment of the Horizontal Collector Well, **Project No. B24-PW-108030-500434** at the prices and on the terms and conditions herein contained.

We agree that the Contract Documents include Divisions 1, 2, and 3 of the Contract Documents as well as the drawings and any other referenced documents.

**We agree that the following shall form a part of this proposal and are included herein as our submittal:** **Enclosed**

<u>Section</u>	<u>Title</u>	<u>✓</u>
<b>00300</b>	<b>Bid Proposal</b>	_____
<b>00310</b>	<b>Bid Schedule</b>	_____
<b>00400</b>	<b>Arizona Statutory Bid Bond</b>	_____
<b>00420</b>	<b>Bidder's Statement of Qualifications</b>	_____
<b>00430</b>	<b>Affidavit of Contractor Certifying That There Was No Collusion In Bidding For Contract</b>	_____
<b>00450</b>	<b>Hazard Communication Program</b>	_____
<b>00460</b>	<b>Employment Eligibility Verification</b>	_____

**We acknowledge that addenda numbers \_\_\_\_\_ through \_\_\_\_\_ have been received and have been examined as part of the Contract Documents.**

We certify that our proposal is genuine, and not sham or collusive, nor made in the interest or behalf of any undisclosed person, organization, or corporation, and that we have not directly or indirectly induced or solicited any other bidder to put in a sham bid, or directly or indirectly induced or solicited any other potential bidder to refrain from bidding, and that we have not in any manner sought by collusion to secure an advantage over any other bidder.

The bidder agrees that this Bid shall be good and may not be withdrawn for a period of ninety (90) calendar days after the scheduled closing time for receiving Bids.

Upon receipt of written notice of the acceptance of this bid, Bidder shall execute the formal Contract attached within 10 days and deliver a Performance Bond, Payment Bond, and Certificates of Insurance as required by Paragraph 25 of the General Conditions and the Special Provisions.

We hereby declare that we have visited the site and have carefully examined the Contract Documents relating to the work covered by the above bid or bids.

Enclosed herewith is a certified or cashier's check or bid bond, payable to Lake Havasu City, Arizona, in the amount of ten percent (10%) of the total bid. This check or bond is submitted as a guarantee that we will enter into a Contract and furnish the required bonds in the event a contract is awarded us. The bid security attached, without endorsement, is to become the property of Lake Havasu City, Arizona, in the event the Contract and Bonds are not executed within the time set forth, as liquidated damages for delay and additional work caused thereby.

We understand that Lake Havasu City, Arizona reserves the right to reject any and/or all bids, or to waive any informalities in any bid, deemed by them to be for the best interests of Lake Havasu City, Arizona.

Dated in \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_.

Respectfully Submitted By:

By: \_\_\_\_\_

Title: \_\_\_\_\_

Name of Firm: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ FAX: \_\_\_\_\_

Seal - If bid by a Corporation:

Arizona Contractor's License No.: \_\_\_\_\_ Type: \_\_\_\_\_

**\*\* END OF SECTION \*\***



**BID SCHEDULE**  
**LAKE HAVASU CITY**  
**REPLACEMENT AND REFURBISHMENT OF THE HORIZONTAL COLLECTOR**  
**WELL PUMPS AND PIPING PROJECT**  
**B24-PW-108030-500434**

Lake Havasu City Council  
Lake Havasu City  
2330 N. McCulloch Boulevard  
Lake Havasu City, AZ 86403

The City Council:

Pursuant to request for bids to be opened the **9th day of October, 2024, at 3:00 P.M.**, Arizona Time, at Room 109 of Lake Havasu City Hall, for the above project, the Contractor proposes to complete work, including furnishing all labor and materials, per the Specifications and Plans at the Following prices.

This Schedule of Items and Prices shall be completed in ink or typed by the Bidding Contractor. In case of discrepancy between the words and figures amount description, the word description shall control extensions.

Prices must be entered for each item and the appropriate subtotal and total shall be filled out. Bid prices shall include sales tax and all other applicable taxes and fees.

Bidder agrees to perform all the necessary work to complete the **REPLACEMENT AND REFURBISHMENT OF THE HORIZONTAL COLLECTOR WELL PUMPS AND PIPING Project, Project No. B24-PW-108030-500434.**

**BID SCHEDULE**

<b>ITEM NO.</b>	<b><u>DESCRIPTION</u></b>	<b><u>EST QTY</u></b>	<b><u>UNIT OF MEASURE</u></b>	<b><u>UNIT PRICE (WORDS)<sup>1</sup></u></b>	<b><u>UNIT PRICE (FIGURE)<sup>1</sup></u></b>	<b><u>ITEM TOTAL COSTS<sup>2</sup></u></b>
<b><u>BASE BID -- REPLACEMENT AND REFURBISHMENT OF THE HORIZONTAL COLLECTOR WELL PUMPS AND PIPING</u></b>						

1	Mobilization, Bonds, Insurance	1	LS	_____	\$ _____	\$ _____
2	Setup, Roof Removal, Pump Removal, Equipment Protection	1	LS	_____	\$ _____	\$ _____
3	Furnish and Install New, 3,000 gpm Pump	1	LS	_____	\$ _____	\$ _____
4	Furnish and Install New 6,000 gpm Pump	1	LS	_____	\$ _____	\$ _____
5	Electrical Work	1	LS	_____	\$ _____	\$ _____
6	Startup Testing	1	LS	_____	\$ _____	\$ _____
7	Demobilization, Roof Replacement	1	LS	_____	\$ _____	\$ _____
8	Force Account Work	1	LS	<u>Fifty Thousand Dollars</u>	<u>\$50,000.00</u>	<u>\$50,000.00</u>

**BASE BID TOTAL<sup>3</sup> + FORCE ACCOUNT**

\_\_\_\_\_ \$

Above line items and totals shall include all work shown on the plans and specified herein, including taxes, insurance and bonding.

\*1 The "Unit Price" column shall indicate unit or lump sum prices for each bid item and shall be indicated in written and numerical form.

\*2 The "Item Total Costs" column shall indicate the extension of the unit prices, which is obtained by multiplying the "Estimated Quantity" column by the "Unit Price"

## SECTION 00310

column.

\*3 The "Bid Total" amount shall be the sum of all costs listed in the "Item Total Costs" column. Additional Alternates are not to be included.

**BID SCHEDULE**

<b>ITEM NO.</b>	<b>DESCRIPTION</b>	<b>EST QTY</b>	<b>UNIT OF MEASURE</b>	<b>UNIT PRICE (WORDS)<sup>1</sup></b>	<b>UNIT PRICE (FIGURE)<sup>1</sup></b>	<b>ITEM TOTAL COSTS<sup>2</sup></b>
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**ADDITIONAL ALTERNATE BID -- REPLACEMENT AND REFURBISHMENT OF THE HORIZONTAL COLLECTOR WELL PUMPS AND PIPING**

ADD ALT 1.1	Refurbish One Existing Pump	1	LS	_____	\$ _____	\$ _____
ADD ALT 1.2	Replace Broken 20-inch DI Tee With Fabricated Steel 20-inch Tee	1	LS	_____	\$ _____	\$ _____
ADD ALT 1.3	Force Account	1	LS	Ten Thousand Dollars	\$ 10,000	\$ 10,000

**ADDITIONAL ALTERNATE BID TOTAL +  
FORCE ACCOUNT<sup>3</sup>**

\$ \_\_\_\_\_

Above line items and totals shall include all work shown on the plans and specified herein, including taxes, insurance and bonding.

\*1 The "Unit Price" column shall indicate unit or lump sum prices for each bid item and shall be indicated in written and numerical form.

\*2 The "Item Total Costs" column shall indicate the extension of the unit prices, which is obtained by multiplying the "Estimated Quantity" column by the "Unit Price" column.

\*3 The "Bid Total" amount shall be the sum of all costs listed in the "Item Total Costs" column. The "Additional Alternates" will be selected by the City.

The unit prices for **Replacement and Refurbishment of the Horizontal Collector Well Pumps and Piping, Project No. 108030**, shall include all labor, materials, water disposal, bailing, shoring, removal, disposal, overhead, profit, insurance, and all other related costs and work to cover the finished work of the several kinds called for. Changes in the Contract shall be processed in accordance with Paragraph 16 of the General Conditions.

Bidder understands that the Owner reserves the right to reject any or all Bids, or portions thereof, and to waive any informalities in the bidding.

The Bidder agrees that this Bid shall be good and may not be withdrawn for a period of ninety (90) calendar days after

SECTION 00310

the scheduled closing time for receiving Bids.

Upon receipt of written notice of the acceptance of this Bid, Bidder shall execute the formal Contract attached within 10 days and deliver a Performance Bond, Payment Bond, and Certificates of Insurance as required by Paragraph 25 of the General Conditions and the Special Provisions.

The Bid security attached in the sum of \$\_\_\_\_\_ is to become the property of the Owner in the event the Contract and Bond(s) are not executed and provided within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

Bidder hereby acknowledges receipt of the following Addenda: \_\_\_\_, \_\_\_\_, \_\_\_\_.

RESPECTFULLY SUBMITTED BY:

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

FIRM: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

PHONE: \_\_\_\_\_ FAX \_\_\_\_\_

Seal - if Bid by a corporation

AZ Contractor's License No: \_\_\_\_\_ Type \_\_\_\_\_

\*\* END OF SECTION \*\*

SECTION 00400  
**ARIZONA STATUTORY BID BOND**

PURSUANT TO TITLES 28, 34 AND 41, ARIZONA REVISED STATUTES  
(Penalty of this bond must not be less than 10% of the bid amount)

KNOW ALL MEN BY THESE PRESENTS:

That, \_\_\_\_\_(hereinafter "Principal"), as Principal, and \_\_\_\_\_, (hereinafter "Surety"), a corporation organized and existing under the laws of the State of \_\_\_\_\_, with its principal offices in the City of \_\_\_\_\_, holding a certificate of authority to transact surety business in Arizona issued by the Director of the Department of Insurance pursuant to Title 20, Chapter 2, Article 1, as Surety, are held and firmly bound unto Lake Havasu City, Arizona, (hereinafter "Obligee"), as Obligee, in the amount of Ten Percent (10%) of the amount of the bid of Principal, submitted by Principal to the Obligee for the work described below, for the payment of which sum, the Principal and Surety bind themselves, and their heirs, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

**Replacement and Refurbishment of the Horizontal Collector Well Pumps  
and Piping Project,**

**Project No. B24-PW-108030-500434**

NOW, THEREFORE, if the Obligee shall accept the proposal of the Principal and the Principal shall enter into a contract with the Obligee in accordance with the terms of the proposal and give the bonds and certificates of insurance as specified in the standard specifications with good and sufficient surety for the faithful performance of the contract and for the prompt payment of labor and materials furnished in the prosecution of the contract, or in the event of the failure of the Principal to enter into the contract and give the bonds and certificates of insurance, if the Principal pays to the Obligee the difference not to exceed the penalty of the bond between the amount specified in the proposal and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by the proposal then this obligation is void. Otherwise it remains in full force and effect provided, however, that this bond is executed pursuant to the provisions of Section 34-201, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions of that section to the extent as if it were copied at length herein.

Witness our hands this \_\_\_\_day of\_\_\_\_\_, \_\_\_\_.

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PRINCIPAL

SEAL

SURETY

SEAL

By: \_\_\_\_\_ By: \_\_\_\_\_  
Attorney-in-Fact

Its: \_\_\_\_\_  
Agency of Record

\_\_\_\_\_  
Agency Address

\*\* END OF SECTION \*\*

SECTION 00420  
BIDDER'S STATEMENT OF QUALIFICATIONS

The Undersigned certifies the truth and correctness of all statements and of all answers to questions made hereinafter.

SUBMITTED TO: Lake Havasu City, Arizona  
2330 N. McCulloch Boulevard  
Lake Havasu City, AZ 86403

SUBMITTED BY: NAME: \_\_\_\_\_ ☐ Corporation  
☐ Partnership  
ADDRESS: \_\_\_\_\_ ☐ Individual  
☐ Joint Venture  
PRINCIPAL OFFICE: \_\_\_\_\_ ☐ Other

(NOTE: Attach separate sheets as required)

1. How many years has your organization been in business as a Contractor?
2. How many years has your organization been in business under its present business name?  
\_\_\_\_\_
3. If a Corporation, answer the following:  
Date of Incorporation: \_\_\_\_\_  
State of Incorporation: \_\_\_\_\_  
President: \_\_\_\_\_  
Vice President(s): \_\_\_\_\_  
Secretary: \_\_\_\_\_  
Treasurer: \_\_\_\_\_
4. If a Partnership, answer the following:  
Date of organization: \_\_\_\_\_  
Type of Partnership: \_\_\_\_\_  
(General/Limited/Assoc.)  
Name and Address of all partners.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. If other than a Corporation or Partnership, describe Organization and name Principals:  
\_\_\_\_\_

6. What percent of the work do you normally perform with your own forces?  
List trades:

_____	_____	_____
_____	_____	_____

1. Have you ever failed to complete any work awarded to you? If so, indicate when, where and why:

_____
_____
_____

8. Has any Officer or Partner of your Organization ever been an Officer or Partner of another Organization that failed to complete a construction contract? \_\_\_\_\_ If so, state circumstances:

_____
_____

9. List major construction projects your Organization has under contract on this date:

<b>Project Name</b>	<b>Name, Email Address &amp; Telephone Number of Owner</b>	<b>Project Location</b>	<b>Contract Amount</b>	<b>Contract Date</b>	<b>Percent Complete</b>	<b>Scheduled Completion</b>

10. Provide a description of Radial Collector Well substantial construction or rehabilitation field work performed by the Prime Bidding Company, for two projects performed for each of the last five (5) years:

<b>Year</b>	<b>Project 1 Location</b>	<b>Project 1 Description</b>	<b>Project 2 Location</b>	<b>Project 2 Description</b>
<b>2023</b>				
<b>2022</b>				
<b>2021</b>				



<b>2020</b>				
<b>2019</b>				

11. Were any of the projects described above performed at depths of 80 feet or more?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

\_\_\_\_\_ Number of projects described above performed at depths of 80 feet or more

12. Was a decompression chamber used at any of the projects described above?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

\_\_\_\_\_ Number of projects described above performed using a decompression chamber

13. Is the Total Recordable Incident Rate for your Organization over the past 3 years less than 1.5?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

\_\_\_\_\_ Total Recordable Incident Rate, 2020 – 2022

14. Can your Organization complete the work described in Section 01110 Summary of Work and elsewhere in these bid documents by May 1, 2024?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

\_\_\_\_\_ If No, provide earliest completion date

15. List the construction experience of the principal individuals in your Organization:

Individual's Name	Construction Experience - Years	Within Your Organization		
		Present Position & Years Experience	Dollar Volume Responsibility	Previous Position & Years Experience

16. List states and categories in which your Organization is legally qualified to do business:

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17. List all Arizona Contractor licenses currently held by your Organization; the status of each license; and provide a photocopy of each license with your bid proposal.

	<u>License Class / #</u>	<u>Status</u>
1.	<hr/>	<hr/>
2.	<hr/>	<hr/>
3.	<hr/>	<hr/>
4.	<hr/>	<hr/>

Please attach a list of additional Arizona Contractor licenses, if any.

18. Bank References:

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19. Trade References:

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20. Name of Bonding and Insurance Companies and Name and Address of Agents: Maximum Bonding Capacity \_\_\_\_\_

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21. The Undersigned agrees to furnish, upon request by the Owner, within seven days after the Bid Opening, a current Statement of Financial Conditions, including Contractor's latest regular dated financial statement or balance sheet which must contain the following items:

Current Assets: (Cash, joint venture accounts, accounts receivable, notes receivable, accrued interest on notes, deposits, and materials and prepaid expenses), net fixed assets and other assets.

Current Liabilities: (Accounts payable, notes payable, accrued interest on notes, provision for income taxes, advances received from owners, accrued salaries, accrued payroll taxes), other liabilities, and capital (capital stock, authorized and outstanding shares par values, earned surplus).

Date of statement or balance sheet: \_\_\_\_\_

Name of firm preparing statement: \_\_\_\_\_

By: \_\_\_\_\_  
(Agent and Capacity)

22. List of Subcontractors. In accordance with paragraph 1.0 of Instructions to Bidders, the following is a breakdown of all subcontractors anticipated to be used for completing this project and their approximate percentage of work to be performed.

The Bidder certifies that all Subcontractors listed are eligible to perform Work on public works projects pursuant to ARS 34-241.

<u>Subcontractor</u>	<u>Description of Work</u>	<u>% of Total Project</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Total % of all Subcontractor's work on project		_____

\_\_\_\_\_  
Total % for Prime Contractor

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

23. Dated at \_\_\_\_\_ this \_ day of \_\_\_\_\_, \_\_\_\_\_

Name of Organization: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

**\*\* END OF SECTION \*\***

STATE OF )  
 ) ss  
CITY OF )

BEING DULY SWORN, DEPOSES AND SAYS:

OF \_\_\_\_\_  
(NAME OF BUSINESS)

THAT NEITHER HE NOR ANYONE ASSOCIATED WITH SAID

(NAME OF BUSINESS)

HAS DIRECTLY, OR INDIRECTLY, ENTERED INTO ANY CONTRACT, PARTICIPATED IN ANY COLLUSION OR OTHERWISE TAKEN ANY ACTION IN RESTRAINT OF FREE COMPETITIVE BIDDING IN CONNECTION WITH THIS PROJECT.

NAME \_\_\_\_\_

---

TITLE

NAME OF BUSINESS

SUBSCRIBED AND SWORN TO BEFORE ME THIS \_\_\_\_ DAY OF \_\_\_\_\_, \_\_\_\_\_

MY COMMISSION EXPIRES: \_\_\_\_\_

NOTARY PUBLIC: \_\_\_\_\_

**\*\* END OF SECTION \*\***

SECTION 00450  
HAZARD COMMUNICATION PROGRAM  
Lake Havasu City

**HAZARD COMMUNICATION PROGRAM FOR \_\_\_\_\_**

*(Name of Company)*

The purpose of this program is to ensure that potential hazards and hazard control measures for chemicals used by this company are understood by company employees.

The written program is available for employee review at any time. It is located \_\_\_\_\_ . A copy of the program will be provided to any employee or employee representative, upon request.

**CONTAINER LABELING:**

\_\_\_\_\_ will verify that all containers received for use by this company will: (name/title of individual)

- \* be clearly labeled as to the contents, matching identification on SDS;
- \* note the appropriate hazard warnings;
- \* List the name and address of the manufacturer.

No containers will be released for use until the above data is verified.

**MATERIAL SAFETY DATA SHEETS:**

Copies of SDS's for all hazardous chemicals to which employees may be exposed will be kept

\_\_\_\_\_ will be responsible for ensuring that:  
(name/title of individual)

- \* SDS's for the new chemicals are available;
- \* SDS's will be available for review to all employees during each work shift;
- \* Copies will be available on request.

**EMPLOYEE TRAINING AND INFORMATION:**

Each employee will be provided the following information and training before working in areas where hazardous chemicals exist. In addition, if a new hazardous material is introduced into the workplace, affected employees will be given new information and training concerning that material.

**A. Minimum Information Provided:**

- (1) All operations and locations in the work area where hazardous chemicals are present.

## **GENERAL INDUSTRY**

### **A. Minimum Information Provided:**

- (1) The location and availability of the written hazard communication program, including list(s) of hazardous chemicals used and related material safety data sheets;
- (2) The method the company will use to inform employees of potential hazards of non-routine tasks (jobs that are not routine for an individual because of infrequency, location or type.)

### **B. Minimum Training Provided:**

- (1) Methods and observations used to detect the presence or release of a hazardous chemical in the work area (such as company monitoring programs, continuous monitoring device, visual appearance, odor or to other characteristics of hazardous chemicals;
- (2) The physical and health hazards of chemicals in the assigned work area;
- (3) The measures to take to protect against such hazards, including specific company procedures concerning work practices, emergencies and care and use of protective equipment.
- (4) Details of the company hazard communication program, including explanation of the labeling system, the material safety data sheets, and how to obtain and use the appropriate hazard information.

(OPTIONAL) Upon completion of the training, each employee will sign a form acknowledging receipt of the written hazard communication program and related training.

### **HAZARDOUS NON-ROUTINE TASKS:** (If applicable.)

If company employees are required to do hazardous non-routine tasks, such as welding in confined spaces, or cleaning of tanks, the employer must address how the employees doing the work will be informed about the specific hazards to which they will be exposed, what personal protective equipment will be provided and who will be responsible to oversee the operation or operations. If the company does not have any hazardous non-routine tasks, line through this section and state "NO HAZARDOUS NON-ROUTINE TASKS".

### **CHEMICALS IN UNLABELED PIPES:** (If applicable.)

If the company has chemicals in unlabeled pipes, the company must inform the employees of the hazards associated with those chemicals. If the company does not have any chemicals in unlabeled pipes, line through this section and state "NO CHEMICALS IN UNLABELED PIPES".

**INFORMING CONTRACTORS:**

Providing contractors and their employees with the following information is the responsibility of \_\_\_\_\_.

(Name/title of individual)

- (1) Hazardous chemicals to which they may be exposed while on the job site;
- (2) Measures the employees may take to lessen the possibility of exposure;
- (3) Steps the company has taken to lessen the risks;
- (4) Where the SDS's are for chemicals to which they may be exposed;
- (5) Procedures to follow if they are exposed.

**CONTRACTORS INFORMING EMPLOYERS:**

Contractors entering this workplace with hazardous materials will supply this employer with SDS's covering those particular products the contractor may expose this company's employees to while working at this site.

**LIST OF HAZARDOUS CHEMICALS IN THIS WORKPLACE**

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**CONTRACTOR:**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

END OF SECTION



SECTION 00460

**LAKE HAVASU CITY**  
**EMPLOYMENT ELIGIBILITY VERIFICATION & FORM**

**INSTRUCTIONS FOR COMPLETION OF EMPLOYMENT ELIGIBILITY VERIFICATION FORM**

**WHO MUST COMPLETE THIS FORM:**

In accordance with Lake Havasu City Code Chapter 3.30, Employment of Unauthorized Aliens, all contractors and subcontractors furnishing labor, time, or effort for construction or maintenance of any structure, building, transportation facility, or improvements of real property must complete this form.

Contractors or subcontractors, as described above, must certify that they have complied, in good faith, with the applicable requirements of the Federal Immigration Control and Reform Act with respect to the hiring of covered employees. This certification must be executed by an authorized representative.

**WHEN THIS FORM MUST BE COMPLETED:**

This form must be completed by all contractors and subcontractors and submitted to the City department awarding the contract, license agreement, or lease no later than notification of successful direct selection, bid, request for proposals, request for qualification, or any similar competitive or noncompetitive procurement or bidding process.

## SECTION 00460

**LAKE HAVASU CITY**  
**EMPLOYMENT ELIGIBILITY VERIFICATION & FORM**

**LIST OF ACCEPTABLE DOCUMENTS:**

<b>LIST A</b> <b>Documents that Establish Both</b>		<b>LIST B</b> <b>Documents that Establish</b>		<b>LIST C</b> <b>Documents that Establish</b>
U.S. Passport (unexpired or expired)	<b>OR</b>	Driver's license or ID Card issued by a state or outlying possession of the United States provided it contains a photograph or information such as name date of birth	<b>AND</b>	U.S. social security card issued by the Social Security Administration
Certificate of U.S. Citizenship		ID card issued by a federal, state or local government agencies or entities, provided it contains a photograph or information		Certification of Birth Abroad issued by the Department of State
Certificate of Naturalization		School ID card with photograph		Original or certified copy of a birth certificate issued by a state, county, municipal authority or outlying
Unexpired foreign passport with I-551 stamp or attached federal Form I-94		Voter's registration card		Native American tribal document
Permanent Resident Card or Alien		U.S. Military card or draft record		U.S. Citizen ID Card
Unexpired Temporary		Military dependent's ID card		ID Card for the use of Resident Citizen in the
Unexpired Employment		U.S. Coast Guard Merchant Mariner Card		Unexpired employment authorization document issued by DHS
Unexpired Reentry		Native American tribal		
Unexpired Refugee Travel Document		Driver's license issued by a		
Unexpired Employment Authorization Document issued by DHS that contains a		<b>For persons under age 18 who are unable to present a document listed above:</b> School record or report card; Clinic.		

**LAKE HAVASU CITY**  
**EMPLOYER VERIFICATION OF EMPLOYMENT ELIGIBILITY & FORM**

The undersigned attests under penalty of perjury, that they have reviewed the documents presented to them by their employees, and that the documents provided to the undersigned by their employees, as more particularly identified in the attached exhibit entitled "list of acceptable documents" appear to be genuine and appear to relate to the employee name, and to the best of the undersigned's knowledge, the employee is eligible to work in the United States based upon the undersigned's review of the documents presented.

<b>Signature of Authorized Representative of Covered Employer/Contractor/ Subcontractor</b>	<b>Print Name</b>	<b>Title</b>
<b>Business or Organization Name</b>	<b>Business Phone Number</b>	<b>Date (month/date/year)</b>
<b>Address (Street Name and Number)</b>		
<b>City, State, Zip Code</b>		

SECTION 00500  
CONTRACT

THIS CONTRACT is entered into by and between LAKE HAVASU CITY, ARIZONA, a municipal corporation ("OWNER"), and \_\_\_\_\_ an ARIZONA corporation,  
**Federal I.D. #** ("CONTRACTOR").

WHEREAS, OWNER has developed plans for and desires to commence the **Replacement and Refurbishment of the Horizontal Collector Well Pumps and Piping Project, Project No. B24-PW-108030-500434** ("PROJECT"); and

WHEREAS, CONTRACTOR represents that it possesses the experience, competence, equipment and financing to properly complete the PROJECT, and has formally proposed to do so, and to furnish all necessary labor, materials, and equipment and services therefore in accordance with said plans, and subject to the terms and conditions hereof.

NOW, THEREFORE, in consideration of these promises and the mutual covenants herein, it is hereby agreed as follows:

1. CONTRACTOR shall commence and complete the construction of the PROJECT;
2. CONTRACTOR shall furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the PROJECT.
3. CONTRACTOR shall commence the PROJECT in accordance with the CONTRACT DOCUMENTS within TEN (10) calendar days after the date of the Notice to Proceed. Final completion of the PROJECT shall occur by \_\_\_\_\_. The period for completion may be extended through the authorized and approved change order process.
4. Liquidated Damages: OWNER and CONTRACTOR recognize that time is of the essence of this CONTRACT and that OWNER will suffer financial loss if the PROJECT is not completed within the time specified in paragraph 3 above, plus any extensions thereof allowed in accordance with the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual losses or damages (including special, indirect, consequential, incidental and any other losses or damages) suffered by OWNER if a complete acceptable PROJECT is not delivered on time. Accordingly, and instead of requiring proof of such losses or damages, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay the OWNER **\$XXX** for each calendar day that expires after the time specified in paragraph 3 for delivery of acceptable Bid Items, plus any costs incurred by the Engineer as provided in Section 17 of the General Conditions.

5. CONTRACTOR agrees to complete the PROJECT in accordance with all of the terms and conditions of the CONTRACT DOCUMENTS for the sum of \$\_\_\_\_\_ as shown in the Bid Schedule.
6. CONTRACTOR shall submit a completed Section 00450 entitled Hazard Communication Program with the executed copy of this CONTRACT.
7. The term "CONTRACT DOCUMENTS" means and includes the following:
  - 00020 Notice Inviting Bids
  - 00100 Information for Bidders
  - 00300 Bid Proposal
  - 00310 Bid Price Schedule
  - 00400 Bid Bond
  - 00420 Bidder's Statement of Qualifications
  - 00430 Bidder's Affidavit of No Collusion
  - 00450 Hazard Communication Program
  - 00460 Employment Eligibility Verification
  - 00500 CONTRACT
    - 00500A Indemnification and Insurance Requirements
    - 00500B Contractor Claim Handling Procedure
  - 00510 Arizona Statutory Performance Bond
  - 00520 Arizona Statutory Payment Bond
  - 00670 Notice of Award
  - 00680 Notice to Proceed
  - 00685 Certificate of Substantial Completion
  - 00690 Certificate of Final Completion
  - 00700 General Conditions
  - 00800 Special Provisions
    - Technical Specifications and Details
    - Construction Contract Drawings
    - Change Orders
    - Lien Releases (Conditional and Final)
    - Addenda
8. OWNER shall pay CONTRACTOR in the manner and at such times as set forth in the General Conditions and in such amounts as required by the CONTRACT DOCUMENTS.
9. In the event CONTRACTOR fails to perform any portion of the PROJECT or satisfy any term or condition of the CONTRACT DOCUMENTS, OWNER may at its sole discretion file notice and/or claim of such failure with CONTRACTOR'S surety.
10. Israel. If applicable, Contractor certifies that it is not currently engaged in, and agrees for the duration of this Contract that it will not engage in, a boycott of goods and services from Israel, as defined in A.R.S. § 35-393.
11. Conflict of Interest. The Contract may be cancelled in accordance with Arizona

12. Forced Labor of Ethnic Uyghurs Certification. If applicable, Contractor certifies that it does not currently, and agrees for the duration of the Contract that it will not, use: (1) the forced labor of ethnic Uyghurs in the People's Republic of China; (2) any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China; or (3) any contractors, subcontractors, or suppliers that use the forced labor or any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China. If Contractor becomes aware it is not in compliance with this certification, it shall notify the City within five business days after becoming aware. This Contract will terminate upon failure to remedy the noncompliance within 180 days of the notification. (A.R.S. § 35-394)
13. Export Administration Act. The CONTRACTOR warrants compliance with the Export Administration Act.
14. Recyclable Products. The CONTRACTOR shall use recyclable products and products which contain recycled content to the maximum extent economically feasible in the performance of the work set forth in the CONTRACT.
15. Asbestos License. The CONTRACTOR shall possess an asbestos abatement license if required under A.R.S. Title 32 or 49.
16. Assignment. No right or interest in this CONTRACT shall be assigned by CONTRACTOR without prior, written permission of the OWNER signed by the City Manager; and no delegation of any duty of CONTRACTOR shall be made without prior written permission of the OWNER signed by the City Manager. Any attempted assignment or delegation by CONTRACTOR in violation of this provision shall be a breach of this CONTRACT by CONTRACTOR.

[SIGNATURES ON FOLLOWING PAGE]

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this CONTRACT in two (2) copies, each of which shall be deemed an original. The last date of signature shall be the effective date of this CONTRACT.

OWNER:

Lake Havasu City, Arizona

By: \_\_\_\_\_

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

APPROVED AS TO FORM:

Lake Havasu City Attorney's Office

By: \_\_\_\_\_

Date: \_\_\_\_\_

**CONTRACTOR:**

By: \_\_\_\_\_

Date: \_\_\_\_\_

Name/Title: \_\_\_\_\_

Address: \_\_\_\_\_

ATTEST:

BY: \_\_\_\_\_

Name/Title: \_\_\_\_\_

**\*\* END OF SECTION \*\***

SECTION 500A  
LAKE HAVASU CITY CONSTRUCTION CONTRACT  
INDEMNIFICATION AND INSURANCE REQUIREMENTS  
(long form)

**I. INDEMNIFICATION**

Contractor shall indemnify and hold harmless City, Its officers, employees and volunteers from and against any and all liabilities, damages, losses, and costs, including reasonable attorney's fees, but only to the extent caused by the negligence, recklessness, or intentional wrongful conduct of Contractor or other persons employed or used by the Contractor in the performance of this Contract. It is agreed that Contractor will be responsible for primary loss investigation, defense, and judgment costs where this indemnification is applicable.

**II. INSURANCE REQUIREMENTS**

A. CONTRACTOR and its subcontractors shall procure and maintain until all of their obligations have been discharged, including any warranty periods under this CONTRACT, are satisfied, insurance against claims for injury to persons or damage to property which may arise from or in connection with the performance of the work hereunder by the CONTRACTOR, its agents, representatives, employees or subcontractors.

B. The insurance requirements herein are minimum requirements for this CONTRACT and in no way limit the indemnity covenants contained in this CONTRACT. City in no way warrants that the minimum limits contained herein are sufficient to protect the CONTRACTOR from liabilities that might arise out of the performance of the work under this CONTRACT by the CONTRACTOR, its agents, representatives, employees or subcontractors, and CONTRACTOR is free to purchase additional insurance.

C. MINIMUM SCOPE AND LIMITS OF INSURANCE: CONTRACTOR shall provide coverage with limits of liability not less than those stated below.

**1. Commercial General Liability – Occurrence Form**

Policy shall include bodily injury, property damage, personal injury and broad form contractual liability coverage.

a. General Aggregate	\$5,000,000
b. Products – Completed Operations Aggregate	\$5,000,000
c. Personal and Advertising Injury	\$5,000,000
d. Blanket Contractual Liability – Written and Oral	\$1,000,000
e. Fire Legal Liability	\$50,000
f. Each Occurrence	\$5,000,000



- i. The policy shall be endorsed to include the following additional insured language: ***"Lake Havasu City, its departments, agencies, boards, commissions, and its officers, officials, agents, volunteers and employees shall be named as additional insureds with respect to liability arising out of the activities performed by or on behalf of the CONTRACTOR."***
- ii. Policy shall contain a waiver of subrogation against Lake Havasu City, its departments, agencies, boards, commissions, and its officers, officials, agents, volunteers and employees for losses arising from work performed by or on behalf of the CONTRACTOR.
- iii. Completed operations coverage shall remain effective for at least two years following expiration of CONTRACT.

**2. Business Automobile Liability**

- a. Bodily Injury and Property Damage for any owned, hired, and/or non-owned vehicles used in the performance of this CONTRACT.

Combined Single Limit (CSL)	\$1,000,000
-----------------------------	-------------

- i. The policy shall be endorsed to include the following additional insured language: "Lake Havasu City, its departments, agencies, boards, commissions, and its officers, officials, agents, volunteers and employees shall be named as additional insureds with respect to liability arising out of the activities performed by or on behalf of the CONTRACTOR, involving automobiles owned, leased, hired or borrowed by the CONTRACTOR."
- ii. Policy shall contain a waiver of subrogation against Lake Havasu City, its departments, agencies, boards, commissions, and its officers, officials, agents, volunteers and employees for losses arising from work performed by or on behalf of the CONTRACTOR.

**3. Workers' Compensation and Employers' Liability**

- |                                       |             |
|---------------------------------------|-------------|
| a. Workers' Compensation              | Statutory   |
| b. Employers' Liability Each Accident | \$ 500,000  |
| Disease – Each Employee               | \$ 500,000  |
| Disease – Policy Limit                | \$1,000,000 |

- i. Policy shall contain a waiver of subrogation against Lake Havasu City, its departments, agencies, boards, commissions, and its officers, officials, agents, volunteers and employees for losses arising from work performed by or on behalf of the CONTRACTOR.
- ii. This requirement shall not apply if exempt under A.R.S. Section 23-901.

**4. Professional Liability (Errors and Omissions Liability) (if applicable)**

- a. Each Claim \$1,000,000
- b. Annual Aggregate \$2,000,000
- i. In the event that the professional liability insurance required by this CONTRACT is written on a claims-made basis, CONTRACTOR warrants that any retroactive date under the policy shall precede the effective date of this CONTRACT; and that either continuous coverage will be maintained or an extended discovery period will be exercised for a period of two (2) years beginning at the time work under this CONTRACT is completed.
- ii. The policy shall cover professional misconduct or lack of ordinary skill for those positions defined in the Scope of Work of this CONTRACT.

**5. Builders' Risk (Property) Insurance (Vertical Construction Only)**

- a. CONTRACTOR shall purchase and maintain, on a replacement cost basis Builders' Risk insurance in the amount of the initial CONTRACT amount as well as subsequent modifications thereto, including modifications through Change Order, for the entire work at the site. Such Builders' Risk insurance shall be maintained until final payment has been made or until no person or entity other than CITY has an insurable interest in the property required to be covered, whichever is earlier. This insurance shall include interests of CITY, CONTRACTOR and any tier of CONTRACTOR's subcontractors in the work during the life of the CONTRACT and course of construction, and shall continue until the work is completed and accepted by CITY. For new construction projects, CONTRACTOR agrees to assume full responsibility for loss or damage to the work being performed and to the buildings or structures under construction. For renovation construction projects, CONTRACTOR agrees to assume responsibility for loss or damage to the work being performed at least up to the full CONTRACT amount, unless otherwise required by the Contract documents or amendments thereto.

b. Builders' Risk insurance shall be on an all-risk policy form and shall also cover false work and temporary buildings or structures and shall insure against risk of direct physical loss or damage from external causes including debris removal, demolition occasioned by enforcement of any applicable legal requirements and shall cover reasonable compensation for architects' and engineers' services and expenses, and other "soft costs," required as a result of such insured loss.

c. Builders' Risk insurance must provide coverage from the time any covered property falls within CONTRACTOR's control and/or responsibility and continue without interruption during construction or renovation or installation, including any time during which covered property is being transported to the construction or installation site, and while on the construction or installation site awaiting installation. The policy will provide coverage while the covered premises or any part thereof is occupied. Builders' Risk insurance shall be primary and not contributory.

d. If the CONTRACT requires testing of equipment or materials or other similar operations, at the option of CITY, CONTRACTOR will be responsible for providing property insurance for these exposures under a Boiler Machinery insurance policy.

## **6. Contractor's Personal Property**

CONTRACTOR and each of its subcontractors and suppliers shall be solely responsible for any loss or damage to its or their personal property and that of their employees and workers, including, without limitation, property or materials created or provided pursuant to this CONTRACT, any subcontract or otherwise, its or their tools, equipment, clothing, fencing, forms, mobile construction equipment, scaffolding, automobiles, trucks, trailers or semi-trailers including any machinery or apparatus attached thereto, temporary structures and uninstalled materials, whether owned, used, leased, hired or rented by CONTRACTOR or any subcontractor, consultant or supplier or employee or worker (collectively, "Personal Property"). CONTRACTOR and its subcontractors, consultants and suppliers, at its or their option and own expense, may purchase and maintain insurance for such Personal Property and any deductible or self-insured retention in relation thereto shall be its or their sole responsibility. Any such insurance shall be CONTRACTOR's and the subcontractors', suppliers' volunteers and employees' and workers' sole source of recovery in the event of loss or damage to its or their Personal Property. Any such insurance purchased and maintained by CONTRACTOR and any subcontractor, consultant or supplier shall include a waiver of subrogation as to Owner. CONTRACTOR waives all rights of

recovery, whether under subrogation or otherwise, against all such parties for loss or damage covered by CONTRACTOR's property insurance. CONTRACTOR shall require the same waivers from all subcontractors and suppliers and from the insurers issuing property insurance policies relating to the Work or the Project purchased and maintained by all subcontractors and suppliers. The waivers of subrogation referred to in this subparagraph shall be effective as to any individual or entity even if such individual or entity (a) would otherwise have a duty of indemnification, contractual or otherwise, (b) did not pay the insurance premium, directly or indirectly, and (c) whether or not such individual or entity has an insurable interest in the property which is the subject of the loss or damage.

## **7. Theft, Damage, or Destruction of Work**

In the event of theft, damage or destruction of the Work, CONTRACTOR will re-supply or rebuild its Work without additional compensation and will look to its own resources or insurance coverages to pay for such re-supply or rebuilding. CONTRACTOR will promptly perform, re-supply or rebuild, regardless of the pendency of any claim by CONTRACTOR against any other party, including Owner, that such party is liable for damages, theft or destruction of CONTRACTOR's Work. This subparagraph shall apply except to the extent that the cost of re-supply or rebuilding is paid by Owner's builder's risk insurance; in such event, Owner waives (to the fullest extent permitted by the builder's risk policy) all rights of subrogation against CONTRACTOR and each of its subcontractors to the extent of such payment by Owner's builder's risk insurer.

D. ADDITIONAL INSURANCE REQUIREMENTS: The policies shall include, or be endorsed to include, the following provisions:

1. Lake Havasu City, its departments, agencies, boards, commissions and its officers, officials, agents, volunteers and employees wherever additional insured status is required. Such additional insured shall be covered to the full limits of liability purchased by the CONTRACTOR, even if those limits of liability are in excess of those required by this CONTRACT.
2. The Contractor's insurance coverage shall be primary insurance with respect to all other available sources.
3. Coverage provided by the Contractor shall not be limited to the liability assumed under the indemnification provisions of this CONTRACT.

- E. NOTICE OF CANCELLATION: Each insurance policy required by the insurance provisions of this CONTRACT shall not be suspended, voided, cancelled, reduced in coverage or in limits without ten (10) business days written notice to City. Such notice shall be mailed directly to Lake Havasu City, Public Works Department, Procurement Division, 2330 McCulloch Blvd. North, Lake Havasu City, AZ 86403 and shall be sent by certified mail, return receipt requested.
- F. ACCEPTABILITY OF INSURERS: Insurance is to be placed with duly licensed or approved non-admitted insurers in the state of Arizona with an "A.M. Best" rating of not less than A- VII. CITY in no way warrants that the above-required minimum insurer rating is sufficient to protect the CONTRACTOR from potential insurer insolvency.
- G. VERIFICATION OF COVERAGE:
1. CONTRACTOR shall furnish CITY with certificates of insurance as required by this CONTRACT. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf and the Project/contract number and project description shall be noted on the certificate of insurance.
  2. All certificates and endorsements are to be received and approved by CITY at least ten (10) days before work commences. Each insurance policy required by this CONTRACT must be in effect at or prior to commencement of work under this CONTRACT and remain in effect for the duration of the Project. Failure to maintain the insurance policies as required by this CONTRACT, or to provide evidence of renewal, is a material breach of contract.
  3. All renewal certificates required by this CONTRACT shall be sent directly to Lake Havasu City, Public Works Department, Procurement Division, 2330 McCulloch Blvd. North, Lake Havasu City, AZ 86403. The Project/contract number and project description shall be noted on the certificate of insurance. CITY reserves the right to require complete, certified copies of all insurance policies required by this CONTRACT at any time.
- H. SUBCONTRACTORS: CONTRACTOR's certificate(s) shall include all subcontractors as insureds under its policies **or** CONTRACTOR shall furnish to CITY separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to the minimum requirements identified above.
- I. APPROVAL: Any modification or variation from the insurance requirements in this CONTRACT must have prior approval from the CITY's Human

Resources/Risk Management Division, whose decision shall be final. Such action will not require a formal CONTRACT amendment, but may be made by administrative action.

- J. EXCEPTIONS: In the event the CONTRACTOR or sub-contractor(s) is/are a public entity, then the Insurance Requirements shall not apply. Such public entity shall provide a Certificate of Self-Insurance.

**SECTION 00500B**  
**CONTRACTOR Claim Handling Procedure**

1. Claimant is to submit in writing to the OWNER or their REPRESENTATIVE the details of the claim to include the where, when, and how of the claim, and an estimate of damage, if applicable.
2. OWNER or their REPRESENTATIVE will forward the claim directly to the CONTRACTOR for handling. The CONTRACTOR is to respond to the claimant, in writing, within 30 calendar days of receipt with copies to:

Lake Havasu City Human Resources/Risk Management Division  
Lake Havasu City Public Works Department  
OWNER'S REPRESENTATIVE, if applicable

If the CONTRACTOR denies the claim, the reasons for such denial must be included in the response to the claimant.

SECTION 00510  
ARIZONA STATUTORY PERFORMANCE BOND

PURSUANT TO TITLES 28, 34, AND 41, ARIZONA REVISED STATUTES  
(Penalty of this bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS THAT: \_\_\_\_\_  
(hereinafter "Principal"), as Principal, and \_\_\_\_\_  
(hereinafter "Surety"), a corporation organized and existing under the laws of the State of \_\_\_\_\_  
with its principal office in the City of \_\_\_\_\_, holding a certificate of \_\_\_\_\_  
transact surety business in Arizona issued by the Director of Insurance pursuant to Title 20,  
Chapter 2, Article 1, as Surety, are held and firmly bound unto Lake Havasu City, Arizona  
(hereinafter "Obligee") in the amount of \_\_\_\_\_(Dollars) (\$), for the payment  
whereof, Principal and Surety bind themselves, and their heirs, administrators, executors,  
successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated  
the \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, to furnish all of the material, supplies, tools, equipment, labor  
and other services necessary for the construction and completion of

**Replacement and Refurbishment of the Horizontal Collector Well Pumps and Piping  
Project,  
PROJECT NO. B24-PW-108030-500434**

which contract is hereby referred to and made a part hereof as fully and to the same extent as  
if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THE OBLIGATION IS SUCH, that if the Principal  
faithfully performs and fulfills all of the undertakings, covenants, terms, conditions  
and agreements of the contract during the original term of the contract and any extension  
of the contract, with or without notice of the Surety, and during the life of any guarantee  
required under the contract, and also performs and fulfills all of the undertakings, covenants,  
terms, conditions and agreements of all duly authorized modifications of the contract that may  
hereafter be made, notice of which modifications to the Surety being hereby waived, the  
above obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 34,  
Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond shall be determined  
in accordance with the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes,  
to the same extent as if it were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment  
reasonable attorney fees that may be fixed by a judge of the court.



Witness our hands this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
PRINCIPAL SEAL

\_\_\_\_\_  
AGENCY OF RECORD BY: \_\_\_\_\_

\_\_\_\_\_  
AGENCY ADDRESS SURETY SEAL

BY: \_\_\_\_\_

\*\* END OF SECTION \*\*

SECTION 00520  
ARIZONA STATUTORY PAYMENT BOND  
PURSUANT TO TITLES 28, 34, AND 41, ARIZONA REVISED STATUTES  
(Penalty of this bond must be 100% of the Contract amount)

KNOW ALL MEN BY THESE PRESENTS THAT: \_\_\_\_\_  
(hereinafter "Principal"), as Principal, and \_\_\_\_\_ (hereinafter Surety), a corporation organized and existing under the laws of the State of \_\_\_\_\_ with its principal office in the City of \_\_\_\_\_, holding a certificate of authority to transact surety business in Arizona issued by the Director of the Department of Insurance pursuant to Title 20, Chapter 2, Article 1, as Surety, are held and firmly bound unto Lake Havasu City, Arizona (hereinafter "Obligee") in the amount of \_\_\_\_\_ (Dollars) (\$ \_\_\_\_\_), for the payment whereof, Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the \_\_\_\_\_ of \_\_\_\_\_, \_\_\_\_\_, to furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of

**Replacement and Refurbishment of the Horizontal  
Collector Well Pumps and Piping Project, PROJECT NO.  
B24-PW-108030-500434**

which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFOR, THE CONDITION OF THE OBLIGATION IS SUCH, that if the Principal promptly pays all monies due to all persons supplying labor or materials to the Principal or the Principal's subcontractors in the prosecution of the work provided for in the contract, this obligation is void. Otherwise it remains in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of Title 34, Chapter 2, Article 2, Arizona Revised Statutes, to the same extent as if it were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the court.

Witness our hands this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
PRINCIPAL

\_\_\_\_\_  
SEAL

\_\_\_\_\_  
AGENCY OF RECORD

BY: \_\_\_\_\_

\_\_\_\_\_  
AGENCY ADDRESS

\_\_\_\_\_  
SURETY

\_\_\_\_\_  
SEAL

BY: \_\_\_\_\_

\*\* END OF SECTION \*\*

SECTION 00670  
**NOTICE OF AWARD**

**TO:**

**DATE:**

**PROJECT DESCRIPTION: Replacement and Refurbishment of the Horizontal Collector Well Pumps and Piping Project, Project B24-PW-108030-500434**

The OWNER has considered the BID submitted by you for the above-described WORK in response to its Advertisement for BIDS dated \_\_\_\_\_, and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$\_\_\_\_\_, to include all work for the project entitled, "Horizontal Collector Well Redevelopment Project", Lake Havasu City Project B24-PW-108030-500434.

You are required by the Information for Bidders to execute the Contract and furnish the required CONTRACTOR'S Performance Bond, Payment Bond, and Certificates of Liability, Vehicular, and Workmen's Compensation Insurance within ten (10) calendar days from the postmark date when this notice was sent by U.S. Mail.

If you fail to execute said Contract and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 2024.

Lake Havasu City, Arizona

BY: \_\_\_\_\_

NAME: Kimberly Fiumara

TITLE: Purchasing & Grants Supervisor

**Acceptance of Notice**

(NOTE: The contractor shall return a signed copy of this notice to the owner.)

Receipt of this NOTICE OF AWARD is hereby acknowledged by:

Contractor

This the \_\_\_\_\_ day of \_\_\_\_\_, 2024.

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

\*\* END OF SECTION \*\*

SECTION 00680  
**NOTICE TO PROCEED**

**DATE:**

**TO:**

**RE: Replacement and Refurbishment of the Horizontal Collector Well Pumps and Piping Project, Project No. B24-PW-108030-500434**

You are hereby notified to commence WORK in accordance with the Contract dated \_\_\_\_\_, within ten (10) calendar days of the date of this Notice To Proceed, and you

are to complete the WORK by \_\_\_\_\_. The period for completion may be extended through the authorized and approved change order process.

OWNER: Lake Havasu City, Arizona

By: \_\_\_\_\_

Name: Kimberly Fiumara

Title: Purchasing & Grants Supervisor

ACCEPTANCE OF NOTICE

(NOTE: The Contractor shall return a signed copy of this Notice to the Owner)

Receipt of the above NOTICE TO PROCEED is hereby acknowledged

this the \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**\*\* END OF SECTION \*\***

**SECTION 00685  
CERTIFICATE OF SUBSTANTIAL COMPLETION**

I hereby state that the degree of completion of:

**RReplacement and Refurbishment of the Horizontal Collector Well Pumps and  
Piping Project**

**PROJECT NO. B24-PW-108030-500434**

Provides the full-time use of the project, or defined portion of the project, for the purposes for which it was intended and is the commencement of the Guarantee Period.

"Substantial Completion" shall not be considered as final acceptance.

**Lake Havasu City, Arizona**

Date: \_\_\_\_\_

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**ACCEPTANCE OF NOTICE**

(NOTE: The Contractor shall return a signed copy of this Notice to the Owner)

Receipt of the above **CERTIFICATE OF SUBSTANTIAL COMPLETION** is hereby acknowledged this the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

**CERTIFICATE OF COMPLETION**

I hereby state that all goods and services required by:

**Replacement and Refurbishment of the Horizontal Collector Well Pumps and Piping  
Project  
Project No. B24-PW-108030-500434**

have been delivered in conformance with the Contract, and all activities required by  
the Contractor under the Contract were completed as of \_\_\_\_\_ .

(Date)

**Lake Havasu City, Arizona**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

SECTION 00700  
**GENERAL CONDITIONS**

This section of the Contract Documents is pre-printed. Any modifications to the following Articles, as may be required for this Project, are made in the Special Provisions.

**1.0 DEFINITIONS**

Wherever in the Contract Document the following terms are used, the intent and meaning shall be interpreted as follows:

**1.1 Addenda**

Written or graphic instruments issued prior to the opening of Bids which modify or interpret the Contract Documents, Drawings and Specifications, by additions, deletions, clarifications or corrections.

**1.2 As Approved**

The words "as approved," unless otherwise qualified, shall be understood to be followed by the words "by the Owner."

**1.3 As Shown, and as Indicated**

The words "as shown" and "as indicated" shall be understood to be followed by the words "on the Drawings" or "in the Specifications."

**1.4 Award**

The acceptance, by the Owner, of the successful Bidder's proposal.

**1.5 Bid**

The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

**1.6 Bidder**

Any individual, firm partnership or corporation, or combination thereof submitting a proposal for the Work contemplated, acting directly or through a duly authorized representative.

**1.7 Bonds**

Bid, Performance, and Payment Bonds and other instruments of security, furnished by the Contractor and its surety in accordance with the Contract Documents.



## **1.8** Calendar Day

Every day shown on the calendar, measured from midnight to the next midnight.

## **1.9** Change Order

A written order to the Contractor, signed by the Owner, covering changes in the Plans, Specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for the Work affected by such changes.

If the Change Order increases the existing Contract Amount, the Builder's Risk Insurance limit must be increased to the adjusted Contract Amount.

## **1.10** Contract

The "Contract" is the written Contract covering the performance of the Work and the furnishing of labor, materials, incidental services, tools, and equipment in the construction of the Work. It includes Supplemental Contracts amending or extending the Work contemplated in the manner hereinafter described and which may be required to complete the Work in a substantial and acceptable manner to the Owner. The Contract may include Contract Change Orders.

## **1.11** Contract Documents

The "Contract Documents" consist of the Bidding Requirements, Contract Forms, Conditions of the Contract including General and/or Supplemental General Conditions, Special Provisions, the Technical Specifications, and the Drawings, including all Addenda and modifications thereafter incorporated into the Documents before execution and including all other requirements incorporated by specific reference thereto.

## **1.12** Contract Price

The total monies payable by Owner to the Contractor under the terms and conditions of the Contract Documents.

## **1.13** Contract Time

The number of calendar days stated in the Contract Documents for the completion of the Work.

## **1.14** Contractor

The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the Work contracted for and the payment of all legal debts pertaining to the Work who acts directly or through lawful agents or employees to complete the Contract Work.

## **1.15** Days

Unless otherwise specifically stated, the term "days" will be understood to mean calendar days.

#### **1.16 Drawings**

The term "Drawings," also described as "Plans," refers to the official drawings, profiles, cross sections, elevations, details, and other working drawings, and supplementary drawings, or reproductions thereof, which show the locations, character, dimensions, and details of the Work to be performed. Drawings may either be bound in the same book as the balance of the Contract Documents or bound in separate sets, and are a part of the Contract Documents, regardless of the method of binding.

#### **1.17 Engineer**

The individual, partnership, firm, or corporation duly authorized by the Owner (sponsor) to be responsible for the Engineering of the contract Work and acting directly or through an authorized representative.

#### **1.18 Field Order**

A written order effecting a change in the Work not involving an adjustment in the Contract Price or an extension of the Contract Time, issued by the Engineer to the Contractor during construction.

#### **1.19 Final Acceptance**

Upon due notice from the Contractor of presumptive completion of the entire project, the Owner will make an inspection. If all construction provided for and contemplated by the contract is found completed to the Owner's satisfaction and all requirements of the contract have been met, that inspection shall constitute the final inspection and the Owner will make the final acceptance and issue the Certificate of Completion.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory or that all requirements of the contract have not been met, the Owner will give the Contractor the necessary instructions for correction or completion, and the Contractor shall immediately comply with and execute the instructions. Upon correction of the work, completion of contract requirements, and notification to Owner, another inspection will be made which shall constitute the final inspection provided the work has been satisfactorily completed and all requirements of the contract met. In such event, the Owner will make the final acceptance and issue the Certificate of Completion.

#### **1.20 Inspector**

An authorized representative of the Owner assigned to make all necessary inspections and/or tests of the Work performed or being performed, or of the materials furnished or being furnished by the Contractor.

### **1.21 Methodology and Quality of Workmanship**

The manner and sequence of construction which considered to be the acceptable standard in which to perform the Work.

### **1.22 Notice**

The term "notice" or the requirement to notify, as used in the Contract Documents or applicable State or Federal statutes, shall signify a written communication delivered in person or by certified or registered mail to the individual, or to a member of the firm, or to an officer of the corporation for whom it is intended. Certified or registered mail shall be addressed to the last business address known to him who gives the notice.

### **1.23 Notice of Award**

The written notice of the acceptance of the Bid from the Owner to the successful Bidder.

### **1.24 Notice to Proceed**

Written communication issued by the Owner to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the Work.

### **1.25 Or Equal**

The phrase "or equal" shall be understood to indicate that the "equal" product is the same or better than the product names in function, performance, reliability, quality, and general configuration. Determination of equality in reference to the project design requirements will be made by the Owner.

### **1.26 Owner**

The term "Owner" shall be understood to be Lake Havasu City, Arizona.

### **1.27 Payment Bond**

The approved form of security furnished by the Contractor and its surety as a guaranty that it will pay in full all bills and accounts for materials and labor used in the construction of Work.

### **1.28 Performance Bond**

The approved form of security furnished by the Contractor and its surety as a guarantee that the Contractor will complete the Work in accordance with the terms of the Contract and guarantee the Work for a period of one (1) year after the date of Certificate of Substantial Completion.

### **1.29 Plans**

Plans shall have the same meaning as "Drawings," see Section 1.16.

### **1.30 Project**

The undertaking to be performed as provided in the Contract Documents, see Section 1.11.

### **1.31 Proposal**

The offer of the Bidder for the Work when made out and submitted on the prescribed proposal form, properly signed and guaranteed.

### **1.32 Proposal Guarantee**

The cash, or cashier's check or certified check, or bidder's bond accompanying the Proposal submitted by the Bidder, as a guarantee that the Bidder will enter into a contract with the Owner for the construction or doing of the Work, if it is awarded to it, and will provide the contract bonds and insurance required.

### **1.33 Shop Drawings**

All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a Subcontractor, manufacturer, supplier or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.

### **1.34 Specifications**

The directions, provisions and requirements pertaining to the method and manner of performing the Work or to the quantities and qualities of the materials to be furnished under the Contract, together with all other directions, provisions and requirements, plus such amendments, deletions from or additions which may be provided for by Supplemental Contract or Change Orders.

### **1.35 Subcontractor**

A Subcontractor is a person or entity who has a direct or indirect contract with a Contractor to perform any of the Work at the site. For convenience, the term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender but includes the plural and feminine gender and includes a Sub-Subcontractor or an authorized representative thereof. The term Subcontractor does not include any separate Contractor or its Subcontractors.

### **1.36** Substantial Completion

"Substantial Completion" shall be that degree of completion of the project or a defined portion of the project, sufficient to provide the Owner, at its discretion, the full-time use of the project or defined portion of the project for the purposes for which it was intended. "Substantial Completion" shall not be considered as final acceptance.

### **1.37** Supplemental General Conditions

Modifications to General Conditions required by a Federal Agency for participation in the Project and approved by the agency for participation in the Project and approved by the agency in writing prior to inclusion in the Contract Documents and such requirements that may be imposed by applicable state laws. The term also includes modifications or additions to the General Conditions required by the Owner or Engineer.

### **1.38** Supplier

Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.

### **1.39** Surety

The corporation, partnership, or individual, other than the Contractor, executing Payment, or Performance Bonds which are furnished to the Owner by the Contractor.

### **1.40** Work

The word "Work" within these Contract Documents shall include all material, labor, tools, utilities, and all appliances, machinery, transportation, and appurtenances necessary to perform and complete the Contract, and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated and as required by good practice to provide a complete and satisfactory system or structure.

### **1.41** Working Day

A working day shall be any day, other than a legal holiday, Saturday or Sunday, on which the normal working forces of the Contractor may proceed with regular work.

## **2.0** **NOTICE TO PROCEED**

**2.1** After the Owner has issued the Notice Of Award, the Contractor shall provide the Performance Bond, the Payment Bond, the Certificate Of Insurance, the Work Schedule, the monthly cash flow, and a signed Contract within ten (10) calendar days. The Owner's attorney will review each document and, if they are found to be acceptable, the Owner will sign and execute the Contract. Within a period of sixty (60) calendar days after executing the Contract,

the Owner will issue the Notice To Proceed. Within ten (10) calendar days of the postmark date of the Notice To Proceed, the Work shall commence. The Contractor shall not commence any Work until such time that the Notice To Proceed has been issued.

### **3.0 ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS**

**3.1** The Engineer may furnish additional instructions to the Contractor by means of Drawings or otherwise, during the progress of the Work as necessary to make clear or to define in greater detail the intent of the Specifications and Contract Drawings.

The additional drawings and instruction thus supplied will become a part of the Contract Documents. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

### **4.0 SCHEDULES, REPORTS AND RECORDS**

**4.1** The Contractor shall submit to the Owner payrolls, reports, estimates, records and other data where applicable as are required by the Contract Documents for the Work to be performed.

**4.2** The Contractor, after the Contract award and prior to the Pre-Construction Conference, shall prepare for submittal to the Engineer for review, a detailed progress schedule. The progress schedule shall be brought up to date and submitted to the Engineer prior to each progress payment request, and at such other time intervals as the Engineer may request.

#### **A. Progress Schedule**

The schedule shall be a time-scaled critical path progress schedule showing in detail the proposed sequence of activity. The critical path analysis shall consist of a graphic network diagram and shall clearly show start and completion dates and percentage of work completed.

**4.3** The Contractor shall also forward to the Engineer, prior to each progress payment request, an itemized report of the delivery status of major and critical items of purchased equipment and material, including Shop Drawings and the status of shop and field fabricated work. These progress reports shall indicate the date of the purchase order, the current percentage of completion, estimated delivery, and cause of delay, if any.

**4.4** If the completion of any part of the Work or the delivery of materials is behind the approved schedule, the Contractor shall submit in writing a plan acceptable to the Engineer for bringing the Work up to schedule.

**4.5** The Owner shall have the right to withhold progress payments for the Work if the Contractor fails to update and submit the progress schedule and reports as specified, and such withholding shall not constitute grounds for additional claims by the Contractor against the Owner.

**4.6** The Contractor shall submit an estimated monthly cash flow, based upon the progress schedule with the bonds, schedules, and Certificate Of Insurance.

## **5.0 DRAWINGS AND SPECIFICATIONS**

**5.1** The intent of the Drawings and Specifications is that the Contractor shall furnish all labor, materials, tools, equipment, utilities, and transportation necessary for the proper execution of the Work in accordance with the Contract Documents and all incidental work necessary to complete the Project in an acceptable quality and manner, ready for use, occupancy or operation by the Owner.

**5.2** In case of conflict between the Drawings and Specifications, the Specifications shall govern. Figure dimensions on Drawings shall govern over scale dimensions, and detailed Drawings shall govern over general Drawings.

**5.3** Any discrepancies found between the Drawings and Specifications and site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported verbally and within 24 hours of such a discovery, in writing to the Engineer, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the Contractor's risk, and the Contractor shall assume full responsibility therefor and shall bear all costs attributable thereto, if not acceptable to the Owner.

## **6.0 SHOP DRAWINGS**

**6.1** The Contractor shall provide seven (7) copies of the Shop Drawings as specified or as may be necessary for the prosecution of the Work as required by the Contract Documents. All drawings and schedules shall be submitted sufficiently in advance to allow the Engineer not less than 20 regular working days for checking the submittal. The Engineer's approval of any Shop Drawings shall not release the Contractor from responsibility for deviations from the Contract Documents.

**6.2** When submitted for the Engineer's review, Shop Drawings shall bear the Contractor's certification by means of a signed Stamp, that he has reviewed, checked and approved the Shop Drawings and that they are in conformance with the requirements of the Contract Documents. Shop Drawings, which in the opinion of the Engineer are incomplete or unchecked by the Contractor, will be returned to the Contractor for resubmission in the proper form.

If Shop Drawings or submittals are rejected by the Engineer, all costs incurred by the Engineer Or The Owner for reviewing the resubmittals shall be charged to the Contractor, and the Owner has the right to deduct such costs from any monies owed the Contractor by the Owner.

**6.3** When Shop Drawings have been reviewed by the Engineer, two sets of submittals will be returned to the Contractor appropriately stamped. If major changes or corrections are necessary, the Shop Drawing may be rejected and one set will be returned to the Contractor with such changes or corrections indicated, and the Contractor shall correct and resubmit the Shop Drawings. No changes shall be made by the Contractor to resubmitted Shop Drawings other than those changes indicated by the Engineer, unless such changes are clearly described in a letter

accompanying the resubmitted Shop Drawings.

**6.4** The review of such Shop Drawings and catalog cuts by the Engineer shall not relieve the Contractor from responsibility for corrections of dimensions, fabrication details, and space requirements, or for deviations from the Contract Drawings or Specifications, unless the Contractor has called attention to such deviations in writing by a letter accompanying the Shop Drawings and the Engineer approves the change or deviation in writing at the time of submission; nor shall review by the Engineer relieve the Contractor from the responsibility for errors in the Shop Drawings. When the Contractor does call such deviations to the attention of the Engineer, the Contractor shall state in his letter whether or not such deviations involve any deduction or extra cost adjustment.

**6.5** Portions of the Work requiring a Shop Drawing or sample submission shall not begin until the Shop Drawing or submission has been approved by the Engineer. A copy of each approved Shop Drawing and each approved sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.

## **7.0 RECORD DRAWINGS**

**7.1** During construction, the Contractor shall keep an accurate record of the following:

- A. Deviations between the Work as shown on the Plans and the Work as actually installed.
- B. The specific locations of piping, valves, electric conduits, duct work, equipment, and other such work which was not located on the Plans. The Record Drawings shall show distances to these locations from known points on the Plans.
- C. Equipment schedules indicating manufacturer's names and model numbers. When all revisions showing work as installed are made, the corrected set of plans shall be delivered to the Engineer before the final pay request is processed. These plans shall be clearly marked "Record Drawings."

**7.2** Nothing contained in this section shall be construed as authorizing any deviation in the Work as shown on the Contract Drawings without a written Change Order or written authority to the Contractor from the Engineer.

## **8.0 MATERIALS, SERVICES, AND FACILITIES**

**8.1** It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the Work within the specified time.

**8.2** The Contractor shall furnish the Owner a list of materials and the source of supply of each



of the materials on the list. The source of supply of each of the materials shall be approved by the Owner before the delivery of said materials is started. Only materials conforming to these Specifications and approved by the Owner shall be used in the Work. All materials proposed for use may be inspected or tested at any time during their preparation and use. After trial, if it is found that sources of supply which have been approved do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved material from other approved sources. No material which, after approval, has in any way become unfit for use shall be used in the Work.

**8.3** The Contractor warrants to the Owner and Engineer that the materials and equipment furnished under the Contract will be new and of a quality equal to that specified or approved and, that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. Mechanical and electrical equipment shall be the products of manufacturers of established good reputations and regularly engaged in the fabrication of such equipment. Unless otherwise noted, any equipment offered shall be current models which have been in successful regular operation under comparable conditions for a period of at least two years. This time requirement, however, does not apply to minor details nor to thoroughly demonstrated improvements in design or in material of construction. Work shall be done and completed in a thorough and workmanlike manner and if required by Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment used.

**8.4** All materials which the Engineer or its authorized Inspector has determined do not conform to the requirements of the Plans and Specifications will be rejected. They shall be removed immediately from the vicinity of the Work by the Contractor at his own expense, unless otherwise permitted by the Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used in the Work, unless approval in writing has been given by the Engineer. Upon failure of the Contractor to comply promptly with any order of the Engineer made under the provisions in this section, the Engineer shall have authority to cause the removal and replacement of rejected material and to deduct the cost thereof from any monies due or to become due the Contractor.

**8.5** If any part or portions of the Work done or material furnished under this Contract shall prove defective or non-conforming with the Drawings and Specifications, and if the imperfection in the same shall not be of sufficient magnitude or importance as to make the Work dangerous or unsuitable, or if the removal of such Work will create conditions which are dangerous or undesirable, the Engineer shall have the right and authority to retain such Work but shall make such deductions in the final payment therefor as may be just and reasonable. Such adjustment shall be effected whether or not final payment has been made.

**8.6** Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the Work. Stored materials and equipment to be incorporated in the Work shall be located so as to facilitate prompt inspection.

**8.7** Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

**8.8** Materials, supplies or equipment to be incorporated into the Work shall not be purchased by the Contractor or the Subcontractor subject to a chattel mortgage or under a conditional sale contract or other Contract by which an interest is retained by the seller.

## **9.0 INSPECTION AND TESTING**

**9.1** All material and equipment used in the construction of the Project shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the Contract Documents.

**9.2** The Owner shall provide all inspection and testing services not required by the Contract Documents.

**9.3** The Contractor shall provide at its expense the testing and inspection services required by the Contract Documents.

**9.4** If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to specifically be inspected, tested, or approved by someone other than the Contractor, the Contractor will give the Engineer timely notice of readiness, the minimum of which shall be forty-eight (48) hours. The Contractor will then furnish the Engineer the required certificates of inspection, testing or approval.

**9.5** Inspections, tests or approvals by the Engineer or others shall not relieve the Contractor from its obligations to perform the Work in accordance with the requirements of the Contract Documents.

**9.6** The Engineer and its representatives will at all times have access to the Work. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all Work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The Contractor will provide proper facilities for such access and observation of the Work and also for any inspection, or testing thereof.

**9.7** If any Work is covered contrary to the written instructions of the Engineer or prior to inspection, if must, if requested by the Engineer, be uncovered for his observation and replaced at the Contractor's expense.

**9.8** If the Engineer considers it necessary or advisable that Work that has already been approved be inspected or tested by the Engineer or others, the Contractor, at the Engineer's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the Work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such Work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such Work is not found to be defective, the Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate Change Order shall be issued.

## **10.0 SUBSTITUTIONS**

**10.1** Whenever a material, article or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the Contract Documents by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may approve its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract Price and the Contract Documents shall be appropriately modified by Change Order. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time. Any substitutions not properly approved and authorized by the Engineer may be considered defective and the Engineer may require the Contractor to remove the substituted material, article or piece of equipment and the Contractor shall bear any and all costs associated with the removal of the substituted item, including all engineering, inspection, testing or surveying costs incurred by the Owner or the Engineer.

**10.2** Determination of equality in reference to the project design requirements will be made by the Owner. "Equal" products shall not be purchased or installed by the Contractor without the Owner's written approval. Contractor shall have fourteen (14) days after issuance of Notice to Proceed for submission of data substantiating a request for substitution of an "or equal" item.

## **11.0 PATENTS**

**11.1** The Contractor shall pay all applicable royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and indemnify and hold the Owner and Engineer harmless from loss on account thereof, except that the Owner shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, however if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, it shall be responsible for such loss unless it promptly gives such information to the Engineer.

## **12.0 SURVEYS, PERMITS, REGULATIONS**

**12.1** The Owner shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the Work together with a suitable number of bench marks adjacent to the Work as shown in the Contract Documents. The Contractor shall satisfy itself as to the accuracy of all measurements before constructing any permanent structure and shall not take advantage of any errors which may have been made in laying out the Work. From the information provided by the Owner, unless otherwise specified in the Contract Documents, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batter

boards, stakes for pile locations and other working points, lines, elevations and cut sheets.

**12.2** Such stakes and markings as the Engineer may set for either its own or the Contractor's guidance shall be scrupulously preserved by the Contractor. In the event the Contractor, or its employees, destroy or otherwise remove or obliterate such stakes or markings, an amount equal to the cost of replacing the same may be deducted from subsequent estimates due the Contractor at the discretion of the Owner.

**12.3** Permits and licenses of a temporary nature necessary for the prosecution of the Work shall be secured and paid for by the Contractor unless otherwise stated in the Supplemental General Conditions. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn and specified. If the Contractor perceives that the Contract Documents are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in Section 16. Changes In The Work. If the Contractor performs and works knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Engineer, he shall assume full responsibility therefore and shall bear all costs attributable thereto.

### **13.0 PROTECTION OF WORK, PROPERTY AND PERSONS**

**13.1** The Contractor shall have sole responsibility for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to, all employees on the Work and other persons who may be affected thereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and other items not designated for removal, relocation or replacement in the course of construction.

**13.2** The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. The Contractor shall erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. The Contractor shall notify Owners of adjacent utilities when prosecution of the Work may affect them. The Contractor shall remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the Contract Documents or to the acts or omissions of the Owner or the Engineer or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contractor.

**13.3** In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. He shall give the Engineer

prompt Written Notice of any significant changes in the Work or deviations from the Contract Documents caused thereby, and a Change Order shall thereupon be negotiated and issued covering the changes and deviations involved, as provided in Section 16.0, Changes in the Work.

**13.4** The Contractor shall designate a responsible member of its organization at the site whose duty shall be the prevention of accidents and the safety of all those at the site. The person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and the Engineer. The Engineer will not be responsible for safety precautions and programs in connection with the Work or for the Contractor's failure to properly perform its responsibilities with respect to initiating, maintaining and supervising all safety precautions and programs.

#### **14.0 PUBLIC SAFETY**

**14.1** Whenever the Contractor's operations create a condition hazardous to traffic or to the public, it shall furnish at its own expense, and without cost to the Owner, such flagmen and guards as are necessary to give adequate warning to the public of any dangerous conditions to be encountered and he shall furnish, erect, and maintain such fences, barricades, lights, signs, and other devices as are necessary to prevent accidents and avoid damage or injury to the public.

**14.2** Should the Contractor appear to be neglectful or negligent in furnishing warning and protective measures as above provided, the Engineer may direct attention to the existence of a hazard and the necessary warning and protective measures shall be furnished and installed by the Contractor at its own expense without cost to the Owner. Should the Engineer point out the inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from responsibility for public safety or abrogate his obligation to furnish and pay for these devices.

**14.3** Should the Contractor fail to, be neglectful, or be negligent in furnishing or maintaining warning and protective facilities as required herein, the Owner may furnish or maintain such facilities and charge Contractor therefor by deducting the cost thereof from periodic progress payments due the Contractor as such costs are incurred by Owner.

**14.4** No material or equipment shall be stored where it will interfere with the free and safe passage of public traffic, and at the end of each day's Work and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from that portion of the right-of-way open for use by public traffic.

#### **15.0 SUPERVISION BY CONTRACTOR**

**15.1** The Contractor shall supervise and direct the Work, using its best skill and attention. The Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor shall employ and maintain on the Work a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site, and who shall have been approved by the Engineer, which approval shall not be unreasonably withheld. The supervisor shall have full authority to act on

behalf of the Contractor and all communications given to and by the supervisor shall be as binding as if given to and by the Contractor. The supervisor shall be present on the site at all times. The Contractor shall be responsible to the Owner for the acts and omissions of the employees, subcontractors, and the agents and employees, and other persons performing any other Work under the Contract with the Contractor.

## **16.0 CHANGES IN THE WORK**

**16.1** The Owner may at any time, as the need arises, order changes within the scope of the Work without invalidating the Contract. If such changes increase or decrease the amount due under the Contract Documents, or in the time required for performance of the Work, an equitable adjustment shall be authorized by Change Order.

**16.2** The Engineer, also, may at any time, by issuing a Field Order, make changes in the details of the Work. The Contractor shall proceed with the performance of any changes in the Work so ordered by the Engineer unless the Contractor believes that such Field Order entitles him to a change in Contract Price or Time, or both, in which event he shall give the Engineer Written Notice thereof within seven (7) days after the receipt of the ordered change. Thereafter the Contractor shall document the basis for the change in Contract Price or Time within fourteen (14) days. The Contractor shall not execute such changes pending the receipt of an executed Change Order or further instruction from the Owner.

**16.3** If the Contractor wishes to make a claim for an increase in the Contract sum, it shall give the Engineer written notice thereof within fourteen (14) days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property, in which case Contractor shall proceed in accordance with the provisions of the Contract. No such claim shall be valid unless so made. If the Owner and Contractor cannot agree on the amount of adjustment in the Contract sum, it shall be determined by the Engineer. Any change in the Contract sum resulting from such claim shall be authorized in a Change Order.

**16.4** The value of any Work covered by a Change Order shall be determined by one or more of the following methods in the order of precedence listed below:

- A. Unit prices previously approved.
- B. An agreed lump sum.
- C. Cost plus percentage.

## **17.0 TIME FOR COMPLETION AND LIQUIDATED DAMAGES**

**17.1** The date of beginning and the time for completion of the Work are essential conditions of the Contract Documents and the Work embraced shall be commenced on a date specified in the Notice To Proceed.

**17.2** The Contractor shall proceed with the Work at such rate of progress to insure full completion within the Contract Time. It is expressly understood and agreed, by and between the

Contractor and the Owner, that the Contract Time for the completion of the Work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the Work.

**17.3** The Contractor shall only work an eight (8) hour day consisting of Monday through Friday, between 6:00 a.m. to 6:00 p.m., and do not include local municipal holidays. If the Contractor desires to carry on Work more than eight (8) hours each day, or work at night or outside the regular hours, it shall give timely notice (72 hours) to the Engineer and receive the Owner's written approval to allow satisfactory arrangements to be made for inspecting the Work in progress. Should the prosecution of the Work be discontinued for any reason, the Contractor shall notify the Engineer at least 24 hours in advance of resuming operations. The Contractor shall be responsible for any extra compensation due or costs incurred as a result of Contractor's desire to carry out Work beyond an eight (8) hour day, or at night or outside regular hours, including but not limited to, any additional costs or compensation due the Engineer And Owner or its employees or agents as a result of having to be present at the site. The costs or extra compensation necessitated by the Contractor's Work beyond an eight (8) hour day, or at night or outside regular business hours may be deducted or withheld from progress payment or any other payments due to Contractor.

**17.4** If for any reason a suspension of the work should occur; the Contractor, at its own expense, shall do all the Work necessary to provide a safe, smooth and unobstructed passageway through construction for use by public traffic or to provide for the proper and efficient operation of sewer, drainage and other facilities within the site of the Work, during the period of such suspension. In the event that the Contractor fails to perform the Work specified in this Subsection, the Owner will perform such Work and the cost thereof will be deducted from periodic progress payments due the Contractor.

**17.5** During inclement weather and other conditions, the Contractor shall pursue only such portions of the Work as shall not be damaged thereby. No portions of the Work which satisfactory quality or efficiency will be affected by an unfavorable condition shall be constructed while these conditions remain, unless by special means or precautions, approved by the Engineer, the Contractor is able to overcome them.

**17.6** Delays in delivery of equipment or material purchased by the Contractor or its Subcontractor, including Engineer-selected equipment, shall not be considered as a just cause for delay as this is not beyond the control of the Contractor. The Contractor shall be fully responsible for the timely ordering, scheduling, expediting, delivery, and installation of all equipment and materials.

**17.7** In case of failure on the part of the Contractor to complete the Work within the time affixed in the Contract, or such extension thereof as may be allowed by Engineer or Owner, the Contract shall by that fact be terminated by written notice. The Owner shall not thereafter pay or allow the Contractor any further compensation for any Work done by it under said Contract, and the Contractor and its sureties shall be liable to the Owner for all loss or damage which it may suffer by reason of his failure to complete the Contract within such time. Failure to prosecute the Work diligently shall be grounds for termination by the Owner pursuant to this paragraph.

In the event the Contract should be terminated, the Owner shall have the right to take over the Work and to proceed with the same until it is completed, either by performing said Work itself directly or by contracting it out to some other person or persons, and in such event the Owner 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 for its completion. Nothing herein contained shall be deemed to limit the right of the Owner in the event of any breach of Contract by the Contractor; but all rights herein given to the Owner are and shall be deemed to be additional to any other rights or remedies which the Owner shall have under any provision of law.

**17.8** Should the Contractor fail to complete the Work, or any part thereof, in the time agreed upon in the Contract or within such extra time as may have been allowed for delays by extensions granted as provided in the Contract, the Contractor shall reimburse the Owner for the additional expense and damage for each calendar day that the Contract remains uncompleted after the Contract completion date. It is agreed that the amount of such additional expense and damage incurred by reason of failure to complete the Work is the per diem rate, as stipulated in Section 15, Information For Bidders, plus any costs incurred by the Engineer including, but not limited to: the Engineer's costs for additional inspection, testing or surveying as a result of the Contractor's failure to complete the Work in the time agreed upon. The said amounts are agreed upon as liquidated damages for the loss to the Owner on account of expense due to the employment of Engineers, inspectors, and other employees after the expiration of the time of completion, and on account of the value of the operation of the Works dependent thereon. It is expressly understood and agreed that this amount is not to be considered in the nature of a penalty, but as liquidated damages which have accrued against the Contractor. The Owner shall have the right to deduct such damages from any amount due, or that may become due the Contractor, or the amount of such damages shall be due and collectible from the Contractor or its Surety.

**17.9** The Contractor shall not be charged with liquidated damages or any excess costs when the delay in completion of the Work is due to any of the reasons set forth below provided the Contractor has given Written Notice of the delay within three (3) days of the occurrence of the cause of the delay to the Owner or Engineer. In the event notice is not given as provided, liquidated damages may be assessed.

A. To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to: acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a separate contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather.

## **18.0 CORRECTION OF WORK**

**18.1** The Contractor shall promptly correct all work rejected by the engineer as defective or as failing to conform to the contract documents, whether observed before or after substantial completion and whether or not fabricated, installed or completed. Contractor shall bear all costs of correcting such rejected work, including compensation for the engineer's additional services made necessary thereby. Contractor shall also bear the costs of making good all work of the



Owner or separate Contractor destroyed or damaged by such correction or removal.

**18.2** All removal and replacement work shall be done at the Contractor's expense. If the Contractor does not take action to remove such rejected work within ten (10) days after receipt of Written Notice, the Owner may remove such work and store the materials at the expense of the Contractor, including compensation for the engineer's additional services made necessary thereby.

## **19.0 SUBSURFACE CONDITIONS**

**19.1** The Contractor shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the Owner by Written Notice of:

- A. Subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents; or
- B. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents.

**19.2** The Owner shall promptly investigate the conditions, and if it finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the Work, an equitable adjustment shall be made and the Contract Documents shall be modified by a Change Order. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he has given the required Written Notice; provided that the Owner may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

## **20.0 SUSPENSION OF WORK, TERMINATION AND DELAY**

**20.1** The Owner may suspend the Work or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the Contractor, by Written Notice to the Contractor and the Engineer which notice shall fix the date on which Work shall be resumed. The Contractor shall resume that Work on the date so fixed. The Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension.

**20.2** In addition to any other reasons for termination provided in the Contract, the Contractor shall be considered in default of the Contract and such default will be considered as cause for the Owner to terminate the Contract for any of the following reasons if the Contractor:

- A. Fails to begin the Work under the Contract within the time specified in the "Notice To Proceed," or
- B. Fails to perform the Work or fails to provide sufficient workers, equipment or materials to assure completion of Work in accordance with the terms of the

Contract, or

- C. Performs the Work unsuitably or neglects or refuses to remove materials or to perform such new Work as may be rejected as unacceptable and unsuitable, or
- D. Discontinues the prosecution of the Work, or
- E. Fails to resume Work which has been discontinued within a reasonable time after notice to do so, or
- F. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- G. Allows any final judgment to stand against him unsatisfied for a period of 10 days, or
- H. Makes an assignment for the benefit of creditors, or acceptable manner, or
- I. Is otherwise in breach of the Contract and has failed to remedy the breach within ten (10) days of written notice of the existence of such breach, or
- J. Fails to provide safe conditions for its workers and/or the general public.

Should the Owner consider the Contractor in default of the Contract for any reason above, he shall immediately give Written Notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the Contract.

If the Contractor or Surety, within a period of 10 days after Written Notice, does not proceed in accordance therewith, then the Owner shall have, upon written notification of the facts of such delay or neglect, the power and authority without violating the Contract, to take the prosecution of the Work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment that have been mobilized for use in the Work and are acceptable and may enter into an Contract for the completion of said Contract according to the terms and provisions thereof, or use such other methods as in the opinion of the Owner will be required for the completion of said Contract in an acceptable manner.

All costs and charges incurred by the Owner, together with the cost of completing the Work under Contract, will be deducted from any monies due or which may come due the Contractor. If such expense exceeds the sum which would have been payable under the Contract, then the Contractor and the Surety shall pay to the Owner the amount of such excess.

**20.3** Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of monies due Contractor by Owner will not release Contractor from liability.

**20.4** Upon seven days Written Notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, elect to terminate the Contract. In such case, Contractor shall be paid (without duplication of any items):

**20.4.1** for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such work;

**20.4.2** for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead on such expenses;

**20.4.3** for reasonable costs incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and

**20.4.4** for reasonable expenses directly attributable to termination.

Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

**20.5** If the Work should be stopped under an order of any court or other public authority for a period of more than ninety (90) days, through no act or fault of the Contractor or of anyone employed by him, or if the Owner should fail to pay the Contractor within 45 days after the time specified in the Payments To Contractor, Section 22.0, then the Contractor may, upon 15 days Written Notice to the Owner, stop Work until payment of the amount owing has been received.

**20.6** The Owner may terminate the Contract or a portion thereof if conditions encountered during the progress of the Work make it impossible or impracticable to proceed with the Work or a local or national emergency exists.

When Contracts, or any portion thereof, are terminated before completion of all Work in the Contract, adjustments in the amount bid for the pay items will be made on the actual quantity of Work performed and accepted, or as mutually agreed for pay items of Work partially completed or not started. No claim for loss of anticipated profits will be considered.

Termination of the Contract or any portion thereof shall not relieve the Contractor of its responsibilities for the completed work nor the surety of its obligation for and concerning any just claims arising out of the Work performed.

## **21.0 ISSUANCE OF NOTICE OF COMPLETION AND FINAL ACCEPTANCE BY OWNER**

**21.1** Upon completion of the Project, a Final Inspection shall be requested by the Contractor in writing and the Owner will make an inspection within seven (7) days. If all construction provided for and contemplated by the contract is found completed to his satisfaction, that inspection shall constitute the final inspection and the Owner will make the final acceptance and issue a Certificate

Of Completion to the Contractor.

If, however, the inspection discloses any Work, in whole or in part, as being unsatisfactory, the Owner will give the Contractor the necessary instructions for correction of same, and the Contractor shall immediately comply with and execute such instructions. Upon correction of the Work, another inspection will be made which shall constitute the final inspection provided the Work has been satisfactorily completed. In such event, the Owner will make the final acceptance and issue a Certificate Of Completion to the Contractor.

## **22.0 PAYMENTS TO CONTRACTOR**

**22.1** In addition to any documents required by the Engineer to be submitted to Engineer at the time a partial pay estimate is submitted, including partial lien released as specified in Section 22.9 of the General Conditions, the Contractor shall, at least ten (10) days before each progress payment falls due (but not more often than once a month), submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the Work performed during the period covered by the partial payment estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work, title to such materials and equipment shall vest in the Owner, and Contractor shall supply, at the time of submission of payment estimate, supporting documents satisfactory to the Owner, to establish and protect Owner's interest in the materials and equipment, and Contractor shall maintain appropriate insurance on same until such time as actual possession by the Owner of the materials and equipment shall occur. The Engineer will, within seven (7) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the Owner or return the partial payment estimate to the Contractor indicating in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate. The Owner will, within fourteen (14) days of presentation to him of an approved partial payment estimate, pay the Contractor a progress payment on the basis of the approved partial payment estimate. The Owner shall retain ten (10) percent of the amount of each payment until final completion and acceptance of all Work covered by the Contract Documents. When the Contract is fifty percent completed, one-half of the amount retained shall be paid to the Contractor provided the Contractor makes a written request for the payment and the Contractor is making satisfactory progress on the Contract and there is no specific cause or claim requiring a greater amount to be retained. After the Contract is fifty per cent completed, no more than five per cent of the amount of any subsequent progress payments made under the Contract may be retained providing the Contractor is making satisfactory progress on the project, except that if at any time the Owner determines satisfactory progress is not being made, ten per cent retention shall be reinstated for all progress payments made under the Contract subsequent to the determination.

**22.2** In lieu of ten percent (10%) retention provided for in paragraph 22.1, of this Article, the Owner shall, at the Contractor's option, accept as a substitute an assignment of any of the following:

- A. Time certificates of deposit of banks licensed by the State of Arizona; or

- B. Securities of or guaranteed by the United States of America; or
- C. Securities of the State of Arizona, or any county, municipality or school district thereof; or
- D. Shares of savings and loan institutions authorized to transact business in the State of Arizona.

Such assigned instruments shall have a face value in an amount equal to ten percent (10%) of the progress payment for which such instruments are tendered and shall be retained by the Owner as a guarantee for complete performance of the Contract.

In the event the Owner accepts substitute security as provided herein for the ten percent (10%) retention, the Contractor shall be entitled to all interest or income earned by such security, and all such security in lieu of retention shall be returned to the Contractor within sixty (60) days after final completion and acceptance of all material, equipment and work covered by the contract if the Contractor has furnished the Owner satisfactory receipts for all labor and material billed and waivers of liens from any and all persons holding claims against the work.

In no event shall the Owner accept a time certificate of deposit of a bank or shares of a savings and loan institution in lieu of the retention specified in paragraph 22.1 of this Article unless accompanied by a signed and acknowledged waiver of the bank or savings and loan institution of any right or power to set off against either the Owner or the Contractor in relationship to the certificates or shares assigned.

**22.3** The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner out of the amount paid to the Contractor on account of such Subcontractors' Work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractors' Work. The Contractor shall, by an appropriate Contract with each Subcontractor, require each Subcontractor to make payments to his Sub-subcontractors in similar manner.

**22.4** Prior to Substantial Completion, the Owner, with the approval of the Engineer and with the concurrence of the Contractor, may use any completed or substantially completed portions of the Work. Such use shall not constitute an acceptance of such portions of the Work.

**22.5** The Owner shall have the right to enter the premises for the purpose of doing Work not covered by the Contract Documents. This provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the Work, or the restoration of any damaged Work except such as may be caused by agents or employees of the Owner.

**22.6** Upon final completion and acceptance of the Work, the Engineer shall issue a certificate attached to the final payment request that the Work has been accepted under the conditions of the Contract Documents. No retention of payments may be delayed or retained without a specific written finding by the Engineer or Owner of the reasons justifying the delay in payment. The

entire balance found to be due the Contractor, including the retained percentages, except the amount necessary to pay the expenses the Owner reasonably expected to incur in order to pay or discharge the expenses determined by the Engineer or Owner in the finding justifying the retention or delay, shall be paid to the Contractor, within sixty (60) days of completion or proper filing of the Notice of Completion.

**22.7** The Contractor shall indemnify and save the Owner or the Owner's agents harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the Work. The Contractor shall, at the Owner's request, furnish satisfactory evidence, in the form of lien releases or other documents deemed appropriate by the Owner, that all obligations of the nature designated above have been paid, discharged, or waived. If the Contractor fails to do so the Owner may, after having notified the Contractor, either pay unpaid bills or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor, his Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Owner shall be considered as a payment made under the Contract Documents by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

**22.8** If any payment to Contractor is delayed after the date due, interest shall be paid at the rate of one percent per month or fraction of a month on such unpaid balance as may be due. If the Owner fails to make payment sixty (60) days after final completion and acceptance, in addition to other remedies available to the Contractor, interest shall be paid at the rate of one per cent per month or fraction of the month on such unpaid balance as may be due, except for that amount necessary to pay the expenses the Owner reasonably expects to incur in order to pay or discharge the expense determined by the Engineer or Owner in the finding justifying the retention or delay.

**22.9** The Owner may require the Contractor to furnish partial releases or liens executed by all persons, firms and corporations who have furnished labor services or materials incorporated into the Work during the period of time for which the progress payment is due, releasing such lien rights as these persons, firms or corporations may have for that period.

### **23.0 ACCEPTANCE OF FINAL PAYMENT AS RELEASE**

**23.1** Following the Owner's acceptance of the Work, the Owner will issue a Notice of Completion to the Contractor. Sixty days after the issuing of the Notice of Completion, and upon receipt of the necessary Unconditional lien releases executed by all persons, firms and corporations who have furnished labor services or materials incorporated into the work evidencing that all liabilities have been fully discharged, the Owner will pay to the Contractor the entire sum so found to be due after deducting therefrom all previous payments and all amounts to be kept and all amounts to be retained under the provisions of the Contract. All previous prior partial estimates and

payments shall be subject to correction in the final estimate and payment.

**23.2** The acceptance by the Contractor of final payment shall be and shall operate as a release to the Owner of all claims and all liability to the Contractor other than claims in stated amounts as may be specifically excepted by the Contractor for all things done or furnished in connection with this Work and for every act and neglect of the Owner and others relating to or arising out of this Work. Any payment, however, final or otherwise, shall not release the Contractor or his sureties from any obligations under the Contract Documents or the Performance Bond and Payment Bonds.

## **24.0 INSURANCE**

**24.1** The Contractor shall give special attention to Section 00500-A of the Bid Documents when preparing a bid, which outline the insurance requirements of Owner and the Contractor shall consider these insurance requirements part of the Bid/Contract documents.

The Contractor shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's execution of the Work, whether such execution be by itself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- A. Claims under worker's compensation, disability benefit and other similar employee benefit acts;
- B. Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;
- C. Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;
- D. Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person; and
- E. Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

The Contractor is responsible to respond to claims arising as a result of its work. See Section 500-B for specific procedures.

**24.2** Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates shall contain a provision that coverages afforded under the policies will not be canceled unless at least ten (10) days prior Written Notice has been given to the Owner, "Attention: Contract Administrator, 2330 McCulloch Boulevard North, Lake Havasu City, AZ, 86403".

**24.3** The Contractor shall procure and maintain, at its own expense, during the Contract Time, liability insurance as specified in Section 500-A, incorporated herein.

## **25.0 CONTRACT SECURITY**

**25.1** The Contractor shall within ten (10) days after the receipt of the Notice Of Award furnish the Owner with a Performance Bond and a Payment Bond in sums equal to the amount of the Contract PRICE, conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and Contracts of the Contract Documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the Work provided by the Contract Documents. Such Bonds shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the state in which the Work is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these Bonds shall be borne by the Contractor. If at any time a surety on any such Bond is declared a bankrupt or loses its right to do business in the state in which the Work is to be performed or is removed from the list of Surety Companies accepted on Federal Bonds, Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable Bond (or Bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such Bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable Bond to the Owner.

## **26.0 ASSIGNMENTS**

**26.1** Neither the Contractor nor the Owner shall sell, transfer, assign or otherwise dispose of the Contract or any portion thereof, or of his right, title or interest therein, or his obligations thereunder, without written consent of the other party. Nor shall the Contractor assign any monies due or to become due to him hereunder without the previous written consent of the Owner.

**26.2** The Owner and Contractor each bind itself, its partners, successors and assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, Contracts and obligations contained in the Contract Documents.

## **27.0 INDEMNIFICATION**

**27.1** Contractor shall indemnify and hold harmless City, its officers and employees from and against any and all liabilities, damages, losses, and costs, including reasonable attorney's fees, but only to the extent caused by the negligence, recklessness, or intentional wrongful conduct of Contractor or other persons employed or used by the Contractor in the performance of this Contract. It is agreed that Contractor will be responsible for primary loss investigation, defense, and judgment costs where this indemnification is applicable.

**27.2** In any and all claims against the Owner or the Engineer, or any of their agents or



employees, by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation of benefits payable by or for the Contractor or any Subcontractor under worker's compensation acts, disability benefit acts or other employee benefits acts.

**27.3** The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, his agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, Change Orders, designs or Specifications.

## **28.0 SEPARATE CONTRACTS**

**28.1** The Owner reserves the right to let other contracts in connection with this Project. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall properly connect and coordinate its Work with theirs. If the proper execution or results of any part of the Contractor's Work depends upon the Work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such Work that render it unsuitable for such proper execution and results.

**28.2** The Owner may perform additional Work related to the Project by itself, or it may let other contracts containing provisions similar to these. The Contractor shall afford the other Contractors who are parties to such Contracts (or the Owner, if he is performing the additional Work himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work, and shall properly connect and coordinate his Work with theirs.

**28.3** If the performance of additional Work by other Contractors or the Owner is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to the Contractor prior to starting any such additional Work. If the Contractor believes that the performance of such additional Work by the Owner or others involves it in additional expense or entitles him to an extension of the Contract Time, it may make a claim therefore as provided in Sections 16 and 17.

## **29.0 SUBCONTRACTING**

**29.1** The Contractor may utilize the services of specialty Subcontractors on those parts of the Work which come under normal contracting practices or are typically performed by specialty Subcontractors, provided the Contractor, simultaneously with the delivery of the executed Contract, shall furnish to the Owner and the Engineer in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The engineer will promptly reply to the Contractor in writing stating whether or not the Owner or the Engineer, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Engineer to promptly reply shall constitute notice of no reasonable objection. The Contractor shall not contract with any such proposed person or entity to whom the Owner or Engineer has made reasonable objection and the Contractor shall not be required to contract with anyone to whom

he has a reasonable objection. If the Owner or Engineer has a reasonable objection to any proposed person or entity, the Contractor shall submit a substitute to whom the Owner or the Engineer has no reasonable objection. The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Owner or Engineer makes reasonable objection to such substitution.

**29.2** The Contractor shall not award Work to Subcontractor(s), in excess of forty-nine (49%) percent of the Contract Price, without prior written approval of the Owner.

**29.3** The Contractor shall be fully responsible to the Owner for the acts and omissions of its Subcontractors, and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

**29.4** The Contractor shall not employ any Subcontractors that are not properly licensed with Lake Havasu City and the State of Arizona. Changes of Subcontractors listed with the Proposal shall be made only with the approval of the Owner.

**29.5** Nothing contained in these Contract Documents shall be construed as creating any contractual relationship between any Subcontractor and the Owner; the Contractor shall be as fully responsible to the Owner for the acts and omissions of Subcontractors, and of persons employed by them, as he is for the acts and omissions of persons directly employed by him.

**29.6** The Contractor shall, without additional expense to the Owner, utilize the services of specialty Subcontractors on those parts of the Work which are specified or required by State or local laws to be performed by specialty Subcontractors.

**29.7** The Contractor shall be responsible for the coordination of all trades, Subcontractors, material and people engaged upon this Work. The Owner will not undertake to settle any differences between the Contractor and his Subcontractors or between Subcontractors.

**29.8** The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the Work of Subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.

**29.9** Nothing contained in this Contract shall create any contractual relation between any Subcontractor and the Owner.

## **30.0 ENGINEER'S AUTHORITY**

**30.1** The Engineer shall act as the Owner's representative during the construction period. The Engineer shall decide questions which may arise as to quality and acceptability of materials furnished and Work performed and shall interpret the intent of the Contract Documents in a fair and unbiased manner. The Engineer will make periodic visits to the site and determine if the Work is proceeding in accordance with the Contract Documents.

**30.2** The Contractor will be held strictly to the intent of the Contract Documents in regard to the quality of materials, workmanship and execution of the Work. Inspections may be made at the factory or fabrication plant of the source of material supply.

**30.3** The Engineer shall not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety precautions and programs in connection with the Work and will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Engineer shall not be responsible or have control or charge over the acts or omissions of the Subcontractors, or any of their agents or employees, or any other person performing any of the Work.

**30.4** The Engineer shall promptly make decisions relative to interpretation of the Contract Documents.

**30.5** The Engineer will have the authority to reject Work which does not conform to the Contract Documents. Whenever, in its opinion, it is considered necessary or advisable for the implementation of the intent of the Contract Documents, the Engineer will have authority to require special inspection or testing of the Work in accordance with the other terms of this Contract whether or not such Work be then fabricated, installed or completed.

### **31.0 LAND AND RIGHTS-OF-WAY**

**31.1** Prior to issuance of Notice To Proceed, the Owner shall obtain all land and rights-of-way necessary for carrying out and for the completion of the Work to be performed pursuant to the Contract Documents, unless otherwise mutually agreed.

**31.2** The Owner shall provide to the Contractor information which delineates and describes the lands owned and rights-of-way acquired.

**31.3** The Contractor shall provide at its own expense and without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.

### **32.0 GUARANTEE**

**32.1** Except as otherwise specified, all Work shall be guaranteed by the Contractor against defects resulting from the use of inferior materials, equipment, or workmanship for a period of one (1) year from the date the Certificate of Substantial Completion is issued by the Owner, or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents.

**32.2** If, within any guarantee period, repairs or changes are required in connection with guaranteed Work, which, in the opinion of the Owner, is rendered necessary as the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract, the Contractor shall, promptly upon receipt of

notice from the Owner, and without expense, (1) place in satisfactory condition in every particular all of such guaranteed Work, correcting all defects therein; (2) make good all damage to the building, site or Work, or equipment or contents thereof, which in the opinion of the Owner, is the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the contract; and (3) make good any Work or material, or the equipment and contents of said building, site or Work disturbed in fulfilling any such guarantee. If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the Owner may have the defects corrected and the Contractor and his surety shall be liable for all expense incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

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## **GUARANTEE**

**32.3** The Contractor agrees to execute, and to cause each Subcontractor to execute, a written guarantee to the Owner, in substantially the following form:

GUARANTEE FOR:

We hereby guarantee, both jointly and severally, that the improvement which we have installed for the Owner of Project, specifically described as:

**Replacement and Refurbishment of the  
Horizontal Collector Well Pumps and Piping  
Project, Project No. B24-PW-108030-500434**

has been done in accordance with the Contract Drawings and Specifications.

We agree, both jointly and severally, to repair and replace any or all Work included in said improvement, together with any other adjacent work which may be displaced or damaged by so doing, that may prove to be defective in its workmanship or material within a period of one year from date of the Certificate of Substantial Completion, ordinary wear and tear and unusual abuse or neglect accepted.

In the event of our failure to comply with the above mentioned conditions within a reasonable period of time (as determined by the Owner) after being notified in writing by the Owner, we both jointly and severally, do hereby authorize the Owner to proceed to have said defects repaired and made good at our expense, and we will honor and pay the costs and charges therefore upon demand.

Signed \_\_\_\_\_

Countersigned \_\_\_\_\_

Local Representative to be contacted for service:

Name \_\_\_\_\_

Address \_\_\_\_\_

Phone No. \_\_\_\_\_

FAX \_\_\_\_\_

The guarantee form(s) shall be completed and returned with the acknowledgement of the Certificate of Completion.

The failure of the Contractor or any Subcontractor to execute, such guarantee shall not affect the right of the Owner to rely on and enforce the guarantee and the obligations respectively assumed by the Contractor and each Subcontractor under Subparagraph 32.1 and 32.2 hereof.

### **33.0 ARBITRATION**

**33.1** Provided both parties mutually agree, all claims, disputes and other matters in question arising out of, or relating to, the Contract Documents or the breach thereof, except for claims which have been waived by the making and acceptance of final payment as provided by Section 23, may be decided by arbitration in accordance with the American Arbitration Association or any other similar body. The foregoing Contract to arbitrate shall be specifically enforceable under the prevailing arbitration law (Arizona Revised Statutes Sections 12-1501, *et seq.*) of the State of Arizona. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof.

**33.2** Notice of the demand for arbitration shall be filed in writing with the other party to the Contract Documents and with the American Arbitration Association and a copy shall be filed with the Engineer. The party filing for arbitration may select which arbitration service to use. Demand for arbitration shall in no event be made on any claim, dispute or other matter in question which would be barred by the applicable statute of limitations.

**33.3** The Contractor shall carry on the Work and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

**33.4** The provisions of the Contract pertaining to arbitration are not binding upon Engineer and Engineer cannot be compelled to participate against his will in an arbitration arising out of a dispute over the Contract or Contract Documents unless Engineer so consents in writing to be a party to the arbitration.

### **34.0 TAXES AND CHARGES**

**34.1** The Contractor shall pay all State and local sales and use taxes on items, and in a manner as required by the laws and statutes of the State of Arizona and its political subdivisions. The Contractor shall withhold and pay any and all withholding taxes, whether State or Federal, and pay all Social Security charges, State Unemployment Compensation charges, industrial insurance, workers' compensation charges, and pay or cause to be withheld, as the case may be, any and all taxes, charges, or fees, or sums whatsoever, which are now or may hereafter be required to be paid or withheld under any laws.

### **35.0 MISCELLANEOUS CONDITIONS**

**35.1** In the event that either party to the Contract is required to institute arbitration or litigation to enforce its rights under the terms of the Contract, then the prevailing party in the arbitration or litigation shall be entitled to recover all costs and attorney's fees incurred.

**35.2** In the event that any provision contained in the Contract is found to be contrary to the applicable law, then it shall be severed and the remaining provisions of the Contract shall remain in full force and effect.

**35.3** The Contract shall be governed by the laws of the State of Arizona.

### **36.0 CONFLICTS WITHIN THE PLANS OR SPECIFICATIONS**

**36.1** In the event that a conflict is discovered between sections of the Specifications or between the Plans and the Specifications, the following list of priority shall be used to resolve the conflict:

- A. Executed Change Orders
- B. Addenda
- C. Contract
- D. Special Provisions
- E. General Conditions
- F. Instructions to Bidders
- G. Technical Specifications
- H. Plans
- I. Referenced Standard Specifications or Other Documents

### **37.0 NONDISCRIMINATION**

**37.1** The Contractor, with regard to the work performed pursuant to this contract, shall not discriminate on the grounds of race, color, sex, religion, creed, age, physical or mental disability, or national origin or ancestry in any contracts with the public and in the selection and retention of employees or subcontractors, nor in the procurement of materials and leases of equipment.

### **38.0 INTEGRATION**

**38.1** This Contract represents the entire Contract between the parties hereto and supersedes any and all prior negotiations or representations, either written or oral.

**38.2** Amendments or modifications to the Contract shall be in writing, signed by both parties, or by Change Orders.

**38.3** The Contract Documents shall not be construed to create any contractual relationship of any kind between the Engineer and the Contractor, but the Engineer shall be entitled to performance of obligations intended for his benefit, and to the enforcement thereof.

### **39.0 HAZARD COMMUNICATION PROGRAM**

**39.1** All contractors working on City projects shall submit a copy of their hazard communication plan to the Fire Prevention Office prior to commencement of work on any project. This will ensure that other individuals on the job site are not unknowingly exposed to a hazardous substance or chemical.

The Fire Prevention Office shall be provided a list of the hazardous substances and the material safety data sheets that are applicable to the work areas of those contract employees.

All contract labor within City facilities will be treated the same as regular employees with regard to this hazard communication standard.

**\*\* END OF SECTION \*\***



SECTION 00800  
**SPECIAL PROVISIONS**

**1.0 SCOPE**

These Special Provisions supplement and modify the General Conditions, Technical Specifications, and Plans. All requirements and provisions of the General Conditions, Technical Specifications and Plans apply except where modified by these Special Provisions.

**2.0 DEFINITION OF TERMS**

Wherever in these documents the word "OWNER" appears, it shall be understood to mean Lake Havasu City, Arizona, the governing body of which is the City Council. Wherever in these documents the word "CONTRACTOR" appears, it shall be understood to mean the party or parties contracting with the Owner to perform the Work. Wherever in these documents the word "ENGINEER" appears, it shall be understood to mean Lake Havasu City Public Works Department, Engineering Division, or their appointed representative.

**3.0 PRECONSTRUCTION CONFERENCE**

Within ten (10) days after the contract has been awarded, but before the start of construction, the ENGINEER will schedule a conference to be held at the site of the project for the purpose of discussing such matters as project supervision, onsite inspections, progress schedules and reports, payrolls, payments to Contractors, equal employment opportunity, contract change orders, insurance, safety, and any other items pertinent to the project. The Contractor shall arrange to have all supervisory personnel connected with the project on hand to meet with the representatives of the Owner and the Engineer.

**4.0 DRAWINGS OF RECORD**

Two sets of the Contract Documents are to be kept at the job site, maintained in good condition, and marked daily by the Contractor as the work proceeds. The Contract Documents shall be kept available for inspection by the OWNER at all times, and shall be kept up to date.

**5.0 SURVEYS**

The CONTRACTOR shall layout the WORK, in accordance with the drawings, shall establish all necessary lines, etc., required to complete the work in accordance with the Contract Documents. The CONTRACTOR shall employ an experienced and competent Arizona Registered Land Surveyor (R.L.S.) satisfactory to the OWNER to layout the WORK and to verify lines and elevations as the WORK progresses.

**6.0 WEATHER CONDITIONS**

In the event of temporary suspension of work, or during inclement weather, or whenever the OWNER shall direct, the Contractor will and will cause his Subcontractors to protect carefully his

and their work and materials against damage or injury from the weather. If, in the opinion of the OWNER, any work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of his subcontractors to so protect his work, such materials shall be removed and replaced at the expense of the Contractor.

## **7.0 SUBMITTALS**

Prior to construction and as soon as possible, the Contractor shall supply all submittals required by the Technical Specifications or as requested by the Owner.

## **8.0 INSPECTION OF THE WORK**

The Owner intends to provide a resident inspector for the project. The resident inspector will be available during the Contractors working time throughout the period of the Contract.

## **9.0 WATER AND POWER**

### **A. WATER**

Water is available from the Water Department at no cost to the Contractor. The Contractor shall make application and obtain a hydrant meter from the Water Department for the purpose of metering the use of water on the project. The Contractor shall adhere to all conditions stated in the Meter Application, including payment of a deposit for the meter, return of the meter to the Water Department each month during the project for reading, and notification to the Water Department prior to any change in the location of the hydrant meter. The maximum water to be drawn off a hydrant at any time is 200 gpm (water drawn from 4" hydrant whenever available). Water shall only be drawn off hydrants approved by the Lake Havasu City Water Superintendent or his authorized representative.

### **B. POWER**

All power for lighting, operation of Contractor's plant or equipment or for any other use as may be required for proper completion of the work to be performed under the provisions of these contract documents, shall be provided by the Contractor at his sole cost and expense.

## **10.0 BURNING OF VEGETATION**

No burning of vegetation will be allowed.

## **11.0 MATERIALS TESTING**

### **A. CONSTRUCTION TESTING**

All quality control testing must be provided by CONTRACTOR. The material and workmanship provided during construction will be tested on a regular basis by the CONTRACTOR. It shall be the responsibility of the CONTRACTOR, at no additional cost, to provide material samples for testing at the **OWNER's** request.

The CONTRACTOR shall be responsible for charges resulting from failed tests, costs for retesting shall be based upon hourly and/or individual test rates. In the event any portion of the project is rejected because of substandard work, all materials testing, engineering, and inspection costs associated with corrective measures shall be chargeable to the CONTRACTOR at the current respective rates.

### **B. PRELIMINARY MATERIALS TESTING**

All preliminary materials testing and mix design testing required by the specifications to ensure materials and mix designs are suitable for project use will be the responsibility of the CONTRACTOR at no additional cost to the OWNER.

## **12.0 CLEANUP AND POLLUTION CONTROL**

### **A. GENERAL**

The CONTRACTOR shall be responsible for the removal of all debris, litter and waste from the job site(s) and/or equipment maintenance area and the restoration of any and all areas affected, directly or indirectly by the construction, transportation of equipment or materials and/or by the acts of neglect or omission by his employees.

All debris, litter, etc., shall be disposed of in accordance with prevailing ordinance or law. Open burning of trash, debris, etc., will not be permitted.

Such clean-up operations shall be on a daily basis. All pavement, concrete, brush, rocks, excess materials, etc. accumulated or removed during the course of construction must be disposed of in those areas designated by the Engineer or his authorized representative, including but not limited to the Lake Havasu City Landfill. All costs for disposal, including gate or tipping fees, etc. are the responsibility of the Contractor. This material must be disposed of within ten (10) days of time of removal. If the areas in question are not cleaned up to the satisfaction of the ENGINEER, progress payments will be withheld until clean-up is completed and approved by the ENGINEER, or, in the case of private projects, other legal action will be taken.

### **B. TEMPORARY FACILITIES**

The CONTRACTOR shall provide temporary mailboxes and traffic control signs where necessary until completion of backfilling and clean-up.

**C. SOLID WASTES**

All solid wastes shall be removed and disposed of in accordance with prevailing ordinance or law. Clean-up shall be completed on a daily basis. All costs for disposal shall be the responsibility of the Contractor, and shall be considered incidental to the costs of the various bid items.

All spilled paving material shall be removed and disposed of prior to final acceptance and payment.

**D. MAINTENANCE AREAS**

Maintenance areas shall be kept clean during construction and shall be free of litter at all times. All empty containers, debris, waste, etc., shall be removed and disposed of prior to final acceptance. Upon inspection by the ENGINEER, the CONTRACTOR may be required to dress the surface of the ground, dependent upon the extent of spillage of petroleum products on the surface. If so directed, such dressing shall consist of scarifying the surface to a depth of six (6) inches and moving and compacting the soil in such a way as to blend the spill areas into clean soil and restore the surface by partial compaction.

**E. POLLUTION**

The CONTRACTOR shall be held responsible for acts leading to pollution of water, air or land by any means.

Open burning of trash, debris, etc., will not be permitted anywhere in the City limits.

The discharge of any pollutants upon the surface of the ground, or into any stream, ravine, wash or body of water which may result in pollution of the public water supply, or of groundwater contributory thereto, will not be permitted.

Violation of these conditions will be cause for the termination of work, and possible legal action.

**F. REMOVAL AND REPLACEMENT OF SIGNS, MAILBOXES, ETC.**

It is the responsibility of the CONTRACTOR to remove all poles, etc. which are located within the construction area and replace at the time of backfilling and clean-up in the locations determined by the Water Superintendent. In the case of landscaping or other private items located in the construction area, the CONTRACTOR shall hand-deliver a written notice to all residences in that area stating his intentions to perform construction activities and shall do so at least five (5) working days prior to work commencing. If, at the time of construction these items are still in the construction area, the CONTRACTOR is to remove and dispose of them properly. All signs and mailboxes shall be permanently installed within forty-eight (48) hours of completion of construction activities.

**G. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT**

At the time of the preconstruction conference, the contractor shall submit, for the Engineer's approval, a program which includes all the measures which the contractor proposes to take for the construction of permanent erosion control work specified in the contract and all the temporary control measures to prevent erosion and pollution of streams, lakes and reservoirs.

Permanent erosion control work and pollution prevention measures shall be performed at the earliest practicable time consistent with good construction practices. Temporary work and measures are not meant to be performed in lieu of permanent work specified in the contract.

Construction of drainage facilities as well as the performance of other contract work which will contribute to the control of erosion and sedimentation shall be carried out in conjunction with earthwork operations or as soon thereafter as possible.

Except for that approved in writing by the Engineer, the contractor shall perform no clearing and grubbing or earthwork until the contractor's program has been approved.

If in the opinion of the Engineer, clearing and grubbing, excavation, or other construction operations are likely to create an erosion problem because of the exposure of erodible earth material, the Engineer may limit the surface area to be disturbed until satisfactory control measures have been accomplished. Unless otherwise permitted by the Engineer, the contractor shall not expose an area of erodible earth material greater than 217,800 square feet at any one location.

The Engineer may order the contractor to provide immediate measures to control erosion and prevent pollution. Such measures may involve the construction of temporary berms, dikes, dams, sediment basins and slope drains; the use of temporary mulches, mats and seeds and the use of other devices, methods, items, etc., as necessary.

At any time the contractor proposes to change his/her schedule of operations, the contractor shall review and update his/her erosion and pollution control program and submit it to the Engineer for approval.

The contractor shall not be entitled to additional compensation or an extension of contract time for any delays to the work because of the contractor's failure to submit an acceptable erosion and pollution control program.

Erosion control and pollution prevention work specified in the contract which is to be accomplished under any of the various contract items will be paid for by the bid item. Any additional work required by the Owner will be paid for by the Force Account set up for this work.

The cost of any erosion control and pollution prevention work which may be proposed by the contractor in his/her program, in addition to that specified in the contract, will be

considered as included in the prices bid for contract items.

### **13.0 DUST CONTROL**

It shall be the Contractor's responsibility to provide adequate water for dust control. It is imperative that the air quality standards are maintained. In addition, dust could be quite hazardous in the everyday operations. It shall be the Contractor's responsibility to ensure that all regulations for air quality and safety are met.

### **14.0 SUPERVISORY PERSONNEL**

It is the intent of these Specifications to provide a completed project which will in every way reflect the work of competent journeyman mechanics in the various trades represented. The Contractor shall ensure that each portion of the work is supervised by a qualified person, well versed in the operation of the various tools required for the trade, the method in which the work is to be done, and a knowledge of the general requirements of the construction work. All work is to be done in accordance with the latest methods devised for such work to ensure the highest quality product.

### **15.0 SAFETY REQUIREMENTS**

The Contractor shall comply with all pertinent provisions of the Department of Labor "Safety and Health Regulations for Construction" (29 CFR Part 1518, 36 CFR 7340), with additions or modifications thereto, in effect during construction of this project.

### **THE FOLLOWING MEASURES OR PROVISIONS ARE TO BE ADHERED TO AT ALL TIMES DURING THE CONSTRUCTION OF THIS PROJECT:**

- A.** All heavy construction machinery to include trenching machines, bulldozers, backhoes, etc., must be equipped with a roll bar meeting the requirements of the above regulation.
- B.** Safety helmets will be worn by all personnel working at the site. In addition, all spectators and inspectors will be required to wear safety helmets in construction zone.
- C.** Steel toe safety shoes or boots will be worn by all personnel working at the site.

### **16.0 PRESERVATION OF BENCH MARKS AND MONUMENTS**

The Contractor shall exercise caution to ensure that permanent bench marks, monuments, established property corners, survey lines, and points are not damaged or disturbed by this work. If any survey monuments, property corners, survey lines or points are damaged or disturbed, the Contractor's representative shall immediately notify the inspector. All centerline survey monumentation located in pavement removal areas shall be replaced by an Arizona Registered Land Surveyor (R.L.S.) after completion of the pavement removal and replacement operations. All costs incurred to re-establish such points shall be borne by the Contractor.

## **17.0 DISPOSAL OF EXCESS MATERIAL**

Excess soil and unsuitable materials shall be removed from the site by the Contractor at his own expense and disposed of in accordance with the Contract Documents unless otherwise permitted herein. In the event the Contractor chooses to utilize local private lots to dispose of excess material, the Contractor must provide the Engineer with written permission from the lot owner prior to utilizing the lot. Placing material suitable for fill on vacant lots will require a Grading Permit in advance of placing the material.

## **18.0 REFERENCE STANDARD SPECIFICATIONS**

Where standard specifications or testing methods have been referred to, such as ASTM or AASHTO, the intent is to refer to the latest applicable issue or revision of such specifications or testing methods. The following abbreviations are used in these specifications.

AWWA	American Waterworks Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AI	Asphalt Institute
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute (formerly the USA Standards Institute)
ASTM	American Society for Testing and Materials
API	American Petroleum Institute
NSF	National Sanitation Foundation
S.P.W.C.	Standard Specifications for Public Works Construction. (Wherever written herein shall mean "Maricopa Association of Governments, Arizona Specification for Public Works Construction".) The "Sample Forms" and "Part 100 – General Conditions" of these Standard Specifications for Public Works Construction are excluded from the documents for this project.

## **19.0 CODES, ORDINANCES AND LOCAL SPECIFICATIONS**

All work under this project shall be performed in strict accordance with these specifications and the Standard Specifications for Public Works Construction (SPWC). Where any conflict occurs between these plans and specifications and the local codes and ordinances in effect at the time, such codes and ordinances shall take precedence over these plans and specifications only if these plans and specifications are inferior as to materials and workmanship called for by such codes

and ordinances.

## **20.0 INTERFERING STRUCTURES AND UTILITIES**

The Contractor shall notify Blue Stake (1-800-782-5348) at least three (3) working days prior to any excavations.

The Contractor shall exercise all possible caution to prevent damage to existing structures and utilities, whether above ground or underground. The Contractor shall notify all utility offices concerned at least seventy-two (72) hours in advance of construction operations in which a utility's facilities may be involved.

Any structure or utility damage caused by the work shall be repaired or replaced in a condition equal to or better than the condition prior to the damage. Such repair or replacement shall be accomplished at the Contractor's expense without additional compensation from the Owner.

If interfering structures or installations such as vaults, manholes, valves, utility poles, guy wires, or anchors are encountered, the Contractor shall notify the Engineer and contact the appropriate utility or structure owner at least seven (7) days in advance of construction to arrange for protection or relocation of the structure.

The Contractor shall remove, protect and/or replace all existing structures, utilities or other improvements and similar items within the proposed improvements at his own expense without additional compensation from the Owner unless specifically provided for as a pay item of work by the Specifications or as otherwise provided for on the Plans. Replacement shall be in a manner and in a condition at least equivalent to, or better than, the original condition.

If the Contractor encounters existing facilities which will prevent the construction of any facility and which are not properly shown on the Plans, he shall notify the Owner before continuing with the construction in order that the Owner may make such field revisions as necessary to avoid conflict with the existing structure. The cost of waiting or "down" time during such field revision shall be borne by the Contractor without additional cost to the Owner. If the Contractor fails to notify the Owner when an existing structure is encountered, but proceeds with the construction despite this interference, he does so at his own risk. In particular, when the location of the new construction will prohibit the restoration of existing structures to their original condition; the Contractor shall notify the Engineer and contact the utility or structure owner so a field relocation may be made if possible to avoid the conflict.

In the event of interruption to any utility service as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority. He shall cooperate with the said authority in restoration of service as promptly as possible and shall bear all costs of repair. In no case shall interruption of any utility service be allowed to exist outside working hours unless prior approval of the Owner is received.

Neither the Owner nor its officers or agents shall be responsible for damages to the Contractor as a result of the locations of the water and sewer lines or utilities being other than those shown



on the Plans or for the existence of water, sewer lines or utilities not shown on the Plans.

## **21.0 AIR QUALITY - OPERATING PERMITS**

The Contractor may be required to obtain registration certificates and/or operating permits for sources of air pollution.

Information concerning these certificates and permits may be obtained from:

The Office of Air Quality  
Arizona Department of Environmental Quality  
P.O. Box 600  
Phoenix, AZ 85001-0600  
(602) 207-2300

## **22.0 ADJUST UTILITIES TO FINISHED GRADE**

The Contractor shall be responsible for locating all manhole rims, valve boxes, meter boxes, utility vaults, etc., and setting them to finished grade. The Contractor shall adjust sewer and water facilities to finished grade in accordance with the specifications within seven (7) days after street surfacing has been completed on each street. All valves and/or manholes will be made visible and accessible for emergency use within 24 hours. It shall be the responsibility of the Contractor to coordinate with the various private utility companies so that they can adjust their facilities to finished grade at an appropriate time. Adjust all facilities in accordance with these specifications and the MAG Standard Details, as modified by Lake Havasu City.

## **23.0 SAFETY, HEALTH AND SANITATION PROVISIONS**

The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees as may be necessary to comply with the requirements and regulations of the Arizona State Department of Health.

The Contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions, on his own responsibility or as the Owner may determine, reasonably necessary to protect the life and health of employees on the job, the safety of the public and to protect property in connection with the performance of the work covered by the contract.

Precaution shall be exercised by the Contractor at all times for the protection of persons (including employees) and property. The Contractor shall comply with the provisions of all applicable laws, pertaining to such protection including all Federal and State occupational safety and health acts, and standards and regulations promulgated thereunder.

## **24.0 PUBLIC SAFETY AND TRAFFIC CONTROL**

Every attempt shall be made to provide public safety during the construction of the project. Traffic control shall be performed in accordance with Section 2650, Traffic Control, of the Technical Specifications.

During all construction operations, the Contractor shall construct and maintain such facilities as may be required to provide access for all property owners to their property. No person shall be cut off from access to his residence or place of business for a period exceeding two (2) hours, unless the Contractor has made a special arrangement with the affected persons. It shall be the Contractor's responsibility to notify all adjacent property owners of the construction activity and the schedule of such activities.

The CONTRACTOR shall submit for approval a traffic control and barricade plan within ten (10) days of receipt of Notification of Award of Contract. There shall be no deviations from the approved barricade plan unless a revised barricade plan is submitted and approved. The CONTRACTOR shall issue a news release once a week for duration of the project. The release will be published in Sunday's newspaper and shall indicate the area in which the CONTRACTOR will be performing work for that week.

Businesses must be notified forty-eight (48) hours prior to any restrictions on normal parking areas used by their employees or patrons.

The CONTRACTOR shall contact, cooperate with, and give notice to each resident, homeowner, business or school that will be affected by any part of the construction process, particularly concerning temporary interruptions to vehicular access.

Written notice of the approximate schedule and explanation of work shall be given to each resident, homeowner, business or school at least five (5) days prior to commencement of work in the area. Verbal door-to-door communication shall be made at least twenty-four (24) hours prior to construction to remind all affected parties of the construction to take place.

The OWNER shall receive a copy of all notifications to residents. In the event of complaints by residents, the OWNER may require the CONTRACTOR to provide documentation (ie. check list) showing the date & time of the verbal door-to-door communication.

In addition, the CONTRACTOR is responsible to answer and resolve any conflicts that may arise between a homeowner or business owner and himself during the construction process.

The CONTRACTOR shall provide and station competent flaggers whose sole purpose shall be to direct the movement of public traffic through or around the work. Proper advanced

warning signs shall be in place when flaggers are working and removed when work requiring flaggers is completed. Flaggers must be used to assist trucks for safe ingress and egress whenever truck movements may interfere with safe passage through the work zone.

All traffic control devices that are not in use or will not be used for a period greater than 72 hours or that are determined by the Engineer to be unnecessary, confusing, or causing an unsafe condition, shall be removed by the CONTRACTOR from the public right-of-way immediately upon notification by the Engineer.

Every attempt shall be made to provide public safety during the construction of the project. Traffic control shall be performed in accordance with Section 2650, Traffic Control, of the Technical Specifications. No person shall be cut off from access to his residence or place of business for a period exceeding six (6) hours, unless the Contractor has made a special arrangement with the affected persons. In addition, no work will be scheduled which will interrupt regular trash pickup to either residential or commercial properties. It will be the CONTRACTOR'S responsibility to coordinate his activities with the local trash haulers.

No streets, avenues, boulevards or cul-de-sacs will be closed to traffic unless prior arrangements have been made and approval has been obtained from the ENGINEER.

## **25.0 TEMPORARY FACILITIES ON SITE**

### **A. General**

Except as otherwise provided, the Owner shall bear no costs of temporary facilities and their removal.

### **B. Temporary Utility Services**

The Contractor shall provide temporary electric power as necessary for the execution of the Work, including that required by all Subcontractors. He shall make the necessary arrangements with Owner, shall bear all costs for these temporary services and shall furnish and install all necessary transformers, metering facilities and distribution centers from branch circuits as he may require.

The Contractor shall provide lighting and outlets in temporary structures throughout the project as may be required for safety, proper performance and inspection of the Work. If operations are performed during hours of darkness, or if natural lighting is deemed insufficient by Owner, the Contractor shall provide adequate floodlights, clusters and spot illumination. The use of permanently installed lighting fixtures, lamps and tubes for work will not be permitted except by special permission of Owner. The Contractor shall make arrangements with

Subcontractors for electrical services and lighting as may be necessary in the performance of their work.

Temporary water service lines, if required, shall be installed and removed by the Contractor, who shall pay all charges for making the connections, running the temporary lines, removing the temporary lines at the completion of the Work and disconnecting the services. All relocations required to clear the work of others shall be performed by the Contractor when requested by the Owner.

**C. Temporary Structures**

Prior to starting Work, the Contractor shall, as directed by Owner, provide and maintain suitable temporary office facilities for the duration of the Project as required for the Contractor's project administration; and all necessary sheds and facilities for the proper storage of tools, materials and equipment employed in the performance of the Work.

**D. Toilet Facilities**

The Contractor shall provide and maintain temporary toilet facilities for the duration of operations, which shall be maintained in a clean and sanitary condition acceptable to Owner and in full compliance with applicable regulations of any public authority.

**E. Telephones**

The Contractor shall provide, maintain and pay for telephone services for the duration of the Work as required for the Contractor's operation.

**F. Fence and Barricades**

The Contractor shall provide such protective fences and barricades as he may deem necessary for public safety and to protect his storage areas and the Work in place. The location and appearance of all fences shall be subject to the approval of the Owner.

**G. Contractor Parking**

The Contractor shall not park his equipment, nor allow his personnel to park, in any area except those specifically designated by the Owner.

**H. Temporary Living Quarters**

Temporary living quarters shall not be allowed on the job site or on publicly owned

properties. In addition, all Lake Havasu City Zoning Codes for the area in question shall be strictly adhered to.

**I. Removal of Temporary Construction**

The Contractor shall remove temporary office facilities, toilets, storage sheds and other temporary construction from the site as soon as, in Owner's opinion, the progress of Work permits. He shall recondition and restore those portions of the site occupied by the same to a condition equal to or better than it was prior to construction.

**26.0 ACCESS TO WASHES**

- A.** Unless otherwise mentioned herein, the Contractor must obtain written permission from the Owner prior to gaining access or utilizing washes or City parcels for any purpose. Request for access to washes and City parcels will be reviewed on a case by case basis. The Contractor shall have access to washes and City parcels via public streets and/or private easements only. For the purposes of this paragraph, "private easement" means an Contract by and between the Contractor and a property owner, in writing, authorizing the Contractor to travel across the property owner's real property in order to have ingress or egress to washes, parcels or any portion thereof. Such Contracts, if any, shall be filed with the Office of the City Engineer before the Contractor may exercise the rights thereunder granted. Access to any wash, parcels, or portion thereof by any means not in compliance with the terms of this paragraph shall be deemed a trespass and a breach of the terms of the Contract.
- B.** Violations of the provisions of subparagraph (a.) hereof, shall entitle the City to deduct the sum of One Thousand Dollars (\$1,000.00) from the monies due to Contractor as and for liquidated damages for each such violation. For the purposes of this paragraph, each entry by a vehicle upon land for which Contractor has not received permission to enter shall be deemed a separate violation of subparagraph (a.) hereof.

**27.0 COORDINATION AND COOPERATION WITH UTILITY COMPANIES AND OTHER TRADES**

**A. Coordination/Interruption**

The Contractor is responsible to coordinate work with all utility companies and other trades, on or affecting the job, for an efficient and effective execution of the complete project. The Contractor shall carefully examine all work that may conflict, and plan removal and/or installation details in advance of the construction to avoid any such conflict. Failure on the contractor's part to coordinate with any

and all utilities, public or private, shall preclude the City's consideration for additional time or cost.

**B.**    Permission Required

Utility mains and utility service to buildings shall not be cut off or otherwise interrupted without the Contractor obtaining permission from the Owner in each and every instance.

**C.**    Scheduling of Interruptions

Where utilities serve facilities or buildings in use, interruptions in service shall be scheduled during the hours when the facility is not in operation. Any overtime costs occasioned thereby shall be regarded as incidental to, and included within, the Contract Sum.

**D.**    General Requirements

Prior to interrupting any utility service, the Contractor shall ascertain that he has the proper materials, together with adequate workmen and equipment, to complete the Work with a minimum of delay.

**E.**    Project Electrical Service

The Contractor is responsible to coordinate with Unisource, Electric Division, to determine the extent of work to be performed by Unisource and by the Contractor to provide electric service for the finished product. The Contractor is also responsible to contact Unisource to determine the hardware required by Unisource to provide service to the final product. Unisource does not provide service to delta connections.

# **DIVISION II**

# **GENERAL REQUIREMENTS**



**SUMMARY OF  
WORK**

**PART 1 – GENERAL**

**1.1 Summary**

- A.** This Section summarizes the Work covered in detail in the complete CONTRACT DOCUMENTS.
- B. OWNER:** Lake Havasu City is contracting for work described in the CONTRACT DOCUMENTS.
  - a. Contract Identification: **Replacement and Refurbishment of the Horizontal Collector Well Pumps and Piping Project No. 108030**
- C. ENGINEER:** The CONTRACT DOCUMENTS were prepared by Jacobs Engineering, 1501 W. Fountainhead Pkwy, Suite 401 | Tempe, AZ 85282 | USA

**1.2 Project Description**

**A. Description of Contract**

This project consists of reconstruction of the three Lake Havasu City Horizontal Collector Well pumps, with minor repair work done to the above ground piping. Ground settlement resulted in the 20-inch to 48-inch discharge piping from the collector well to move, break, and leak. The new piping repairs would consist of fabricating a new 20-inch flanged steel tee to fit the location of the broken flanged DI tee.

The intent of this work is to rebuild the Horizontal Collector Well pumps into a fully functional and operating water supply. The Contractor shall be responsible to provide all work, materials, components, and labor to provide the City with a fully functioning collector well system when the work is completed.

**B. Work Covered by Contract Documents**

Includes all construction activities associated with the reconstruction of the collector well piping and pumps. The work also provides for the complete restoration of all the areas disturbed by construction operations.

**C. Drawings and Specifications**

All work shall be performed in accordance with the drawings, special provisions, supplemental technical specifications, and Standard



Technical Specifications for Public Works Construction as furnished by Lake Havasu City, and MAG, latest edition. Some Specifications have been revised and are different from specifications used in previous years. These changes reflect current design and construction conditions. It is the CONTRACTOR's responsibility to thoroughly review and adhere to the drawings and specifications.

### **1.3 Contractor's Use of Premises**

#### **A. Limited Use**

1. CONTRACTOR shall restrict the construction operations to the project site and temporary construction easements as shown on the contract documents. Unauthorized use of washes, City Parcels, and Private Property is not permitted.
2. Conduct operations so as to ensure the least inconvenience to OWNER and the general public.

### **1.4 Work Sequence**

- A. General: The general sequence of construction will be determined by the CONTRACTOR and submitted to the CITY for approval. See Section 00100, Item 15 for Time of Completion and Liquidated Damages.
- B. Continuous Service of Existing Facilities: Exercise caution and schedule operations to ensure that function of present facilities and adjacent facilities will not be disrupted.
- C. Prior to any construction activity in any area, the CONTRACTOR shall take digital photographs in sufficient detail to record the existing conditions of each area. The CONTRACTOR shall provide two copies of the photographs on a compact disk, according to Section 01325, to the Engineer for review and approval prior to commencing work in that area. Video of the areas will not be accepted as a substitute for photographs but may be submitted in addition.

### **1.5 Copies of Documents**

- A. Furnished Copies: After execution of Agreement, CONTRACTOR will be furnished at no cost, electronic files (PDF and CADD e-files) in addition to those used in execution of the Agreement.

### **1.6 List of Drawings**

#### **A. Contract Drawings**

1. Each sheet of the Contract Drawings will bear the following

title: Reconstruction of the Horizontal Collector Well Piping  
and Pumps

**PART 2 – PRODUCTS – Not Applicable.**

**PART 3 – EXECUTION – Not Applicable.**

**PART 4 – MEASUREMENT & PAYMENT – Not Applicable.**

**\*\* END OF SECTION 01110 \*\***

## **SECTION 01200**

### **MOBILIZATION/DEMOBILIZATION**

#### **PART 1 - GENERAL**

##### **1.1 Description**

###### **A. Description of Work**

The work to be performed in accordance with this section includes the movement of personnel, equipment, supplies, and incidentals to the project site; for the establishment of offices, buildings and other facilities necessary for work on the project; for premiums on bonds and insurance for the project and for all other work and operations which must be performed or costs incurred before beginning work on the various contract items.

Demobilization at the end of the job includes removal of tools, materials, equipment and facilities used by the **CONTRACTOR** during construction of the project. Also included is final cleanup to leave the site with a neat, clean appearance.

#### **PART 2 - MATERIALS**

##### **2.1 General**

Materials shall consist of equipment, buildings, and tools necessary to move to the project site to perform work. Material for bid items shall not be included in Mobilization.

#### **PART 3 - EXECUTION**

##### **3.1 General**

Setting up of offices, and the use of private property for storage or work area shall be executed in a legal manner in accordance with local and state codes and ordinances.

Use of private property will require a signed agreement with the property owner, and shall be submitted to Engineer for approval prior to use. Sign off from property owner regarding restored property conditions will be required

prior to project closeout.

## **PART 4 - MEASUREMENT AND PAYMENT**

### **4.1 Measurement**

No measurement will be made.

### **4.2 Payment**

Payment for mobilization will be made as follows:

- A.** When 5% of the total original contract amount is earned from other Bid Items, 50% of the amount bid for Mobilization, or 5% of the total original contract amount, whichever is the least, will be paid.
- B.** When 10% of the total original contract amount is earned from other Bid Items, 100% of the amount bid for Mobilization, or 10% of the total original contract amount, whichever is the least, will be paid.
- C.** Upon completion of all work on the project, payment of any amount bid for Mobilization in excess of 10% of the total original contract amount will be paid. Demobilization shall be considered incidental to the Mobilization Bid Item.

Table A

Payment for Mobilization on First Partial Payment	Not to exceed 2.5% of the Lump sum Base Bid
Subsequent payments for Mobilization	Not to exceed 2.5% of the Lump sum Base Bid
Payment for Mobilization on Final Partial Payment	Any remaining Mobilization in excess of 5% of the Lump Sum Base Bid

See Section 00310 Bid Schedule for Bid Items.

## **SECTION 01210**

### **MEASUREMENT AND PAYMENT**

#### **PART 1 - GENERAL**

##### **1.1 Description**

The outline of measurement and payment in this section is intended to provide a general guideline to the Contractor in preparing bids and submitting pay requests. The listing of work included in each bid item is not intended to include all work but is to provide general guidance to the Contractor for allocating costs. All work will be paid for on a unit price basis with payment made for the quantity of each item completed.

All materials required for construction shall be furnished by the Contractor unless specifically stated. Items not specifically measured and paid for shall be considered as subsidiary items required to complete the installation in accordance with the intent of the contract documents. The Contractor shall include in the unit price bid items, all costs associated with subsidiary items not being measured for payment.

##### **1.2 Authority**

Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

Take all measurements and compute quantities. The Engineer will verify measurements and quantities.

##### **1.3 Unit Quantities**

Quantities indicated in the Bid Form are for bidding and contract purpose only. Quantities and measurements supplied or placed in the Work and verified by the Engineer shall determine payment.

If the actual Work requires more or fewer quantities than indicated, provide the required quantities at the unit prices contracted.

## **PART 2 – UNITS AND METHODS OF MEASUREMENT**

### **2.1 General**

All items that are included in the bid for measurement and payment are included herein. All other items of work shall be considered subsidiary to construction and will not be measured for payment.

### **2.2 Units and Methods of Measurement**

#### **2.2.1 Mobilization, Bonds, and Insurance**

The Contract Lump Sum Price for this item shall constitute full compensation for furnishing all materials, labor, equipment and tools for all required bonds, insurance, mobilization of staff and equipment, and any other costs associated with complying with the contract administrative requirements and commencing work at the project site. This item also includes all work and materials necessary to complete the work as described in the plans and specifications. **Payment for this item shall be lump sum and shall not be requested until at least thirty days from the notice to proceed has elapsed.**

Payment for this item shall be made in accordance with Table A.

TABLE A

Payment for Mobilization on First Partial Payment	Not to exceed 2.5% of the Lump Sum Base Bid
Subsequent payments for Mobilization	Not to exceed 2.5% of the Lump Sum Base Bid
Payment For Mobilization on Final Partial Payment	Any remaining Mobilization in excess of 5% of the Lump Sum Base Bid

### **2.2.2 All Other Lump Sum Prices**

Payment for lump sum price items covers all the labor, materials, and services necessary to furnish and install the item.

Payment for lump sum prices shall include the work listed in Table 01210-1 for that item. The Contractor acknowledges that certain miscellaneous work items not described in Table 01210-1 are also part of that Bid item if necessary to complete the work. The intent of the total of the Bid items is to provide for all work, labor, equipment, transportation, and materials, complete, whether specifically mentioned or not. The Contractor agrees to accept as full payment the sum of these Bid item unit prices as full compensation for all work required by these Contract Documents.

### **2.2.3 Force Account Work**

The lump sum quantity shown in the "Force Account" shall be included in the Bid Schedule. Only the OWNER shall determine the use of monies in the "Force Account".

The OWNER will authorize the use of monies in the Force Account by Change Order. Unused Force Account monies will be removed from the Cost of the Work by Change Order.

**Table 01210-1**

<b>Bid Item</b>	<b>Description</b>	<b>Payment Includes</b>
1	Mobilization, Bonds, Insurance	As specified in Sections 01200 and Section 01210.
2	Setup, Roof Removal, Pump Removal, Equipment Protection	All work, equipment, tools, and materials to remove the HCW roof, replace the HCW roof at the end of the job, remove three existing pumps from the HCW, storage of the three pumps, and to provide protection from the elements to sensitive components inside the HCW building in accordance with the Drawings and Specifications.
3	Furnish and Install New 4,000 gpm Pump	All work, equipment, tools, and materials to provide the 4,000 gpm pump and appurtenances complete, installation and ready for operation, in accordance with the Drawings and Specifications
4	Furnish and Install New 6,000 gpm Pump	All work, equipment, tools, and materials to provide the 6,000 gpm pump and appurtenances complete, installation and ready for operation, in accordance with the Drawings and Specifications
5	Electrical Work	All work, equipment, tools, and materials to construct electrical and instrumentation and controls improvements in accordance with the Drawings and Specifications
6	Startup Testing	All work, materials, tools, to startup and do the final testing and inspections of the completed HCW, including Manufacturers Onsite Services in accordance with the Drawings and Specifications.



**Table 01210-1**

<b>Bid Item</b>	<b>Description</b>	<b>Payment Includes</b>
7	Demobilization, Roof Replacement	All work, equipment, tools, and materials to replace the HCW roof at the end of the job, and to demobilize and cleanup the site,
8	Force Account Work	As specified in Sections 01210 and Section 01300.
ADD ALT 1.1	Refurbish One Existing Pump	All work, equipment, tools, and materials to refurbish one existing pump, including transportation, re-installation, and ready for operation, as specified in accordance with the Drawings and Specifications
ADD ALT 1.2	Replace Broken 20-inch DI Tee With Fabricated Steel 20-inch Tee	All work, materials, tools, to inspect the existing 48-inch pipeline settlement and to fabricate a new 20-inch tee and field fit as specified.
ADD ALT 1.3	Force Account Work	As specified in Sections 01210 and Section 01300.

**\*\*END OF SECTION 01210\*\***

## **SECTION 01300**

### **FORCE ACCOUNT**

#### **PART 1 - GENERAL**

##### **1.1 Description of Work**

The work to be performed in accordance with this section includes additional work that is outside the general scope of the proposed project. The work to be performed shall be specifically requested in writing by the **OWNER** or the **ENGINEER**. As the project is completed, it is anticipated that the **OWNER** may request additional work to be performed that currently is not a part of this Contract and it is the intent that the requested work shall be performed in accordance with this section.

#### **PART 2 - MATERIALS**

##### **2.1 General**

Any materials utilized under this Section shall conform specifically with the appropriate Materials Section of these Specifications unless the **OWNER** specifically requests in writing a deviation from the Specifications. If the materials are not covered by an appropriate Specification of this document, then the **OWNER** will provide a written specification for the materials requested.

#### **PART 3 - EXECUTION**

##### **3.1 Workmanship**

Furnish all materials, equipment and labor required to complete the work. All workmanship shall meet or exceed the appropriate Specifications included in this document or any supplemental Specifications that may be provided. Perform work in accordance with the contract Plans or in accordance with any supplemental plans that may be provided by the **OWNER**.

#### **PART 4 - MEASUREMENT AND PAYMENT**

##### **4.1 Measurement**

The method of measurement shall be in accordance with the appropriate

specification or as included in specific written instructions from the **OWNER** or the **ENGINEER**.

## **4.2 Payment**

Payment for work performed under this section shall be made for those items specifically requested in writing by the **OWNER**. The value of any work performed in this Section shall be determined by one or more of the following methods in the order of precedence listed below.

- A.** Unit prices previously approved.
- B.** An agreed upon price.

The amount specified for Force Account in the Bid Documents is an estimate that is provided so each potential bidder has an equal opportunity in the bidding. The amount does not in any way represent what work may be requested or the quantity or value of the work. The **CONTRACTOR** shall only be compensated for the actual work requested and performed.

See Section 00310 Bid Schedule for Bid Items.

## **SECTION 01320**

### **PROJECT MEETINGS, SCHEDULES, AND REPORTS**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

- A.** This Section includes the following administrative and procedural requirements.
- B.** Project Meetings
  - 1.** Preconstruction conference.
  - 2.** Coordination schedules.
  - 3.** Progress meetings.
  - 4.** Coordination meetings.
- C.** Schedules and Reports
  - 1.** Initial coordination schedules.
  - 2.** Construction progress schedule.
  - 3.** Procurement schedule.
  - 4.** Construction progress reports.
  - 5.** Schedule of values.
  - 6.** Special reports.
- D.** Related Work Specified Elsewhere

Submittal ..... Section 01330

## 1.2 Project Meetings

### A. Preconstruction Conference

1. Engineer will conduct a meeting as described in Section 800, Special Provisions, Paragraph 3.0, to review items stated in the following agenda and to establish a working understanding between the parties as to their relationships during performance of the Work.
2. **Preconstruction conference shall be attended by the following.**
  - a. Contractor and his superintendent.
  - b. Engineer.
  - c. Representative(s) of Owner.
  - d. Representatives of principal Subcontractors and Suppliers.
3. **Meeting Agenda**
  - a. Construction schedules.
  - b. Critical Work sequencing.
  - c. Designation of responsible personnel.
  - d. Project coordination.
  - e. Procedures and Processing of:
    - (1) Field decisions.
    - (2) Substitutions.
    - (3) Submittals.
    - (4) Change Orders.
    - (5) Applications for Payment.

- f. Procedures for testing.
- g. Procedures for maintaining record documents.
- h. **Use of Premises:**
  - (1) Office, work, and storage areas.
  - (2) Owner's requirements.
- i. Construction facilities, controls, and construction aids.
- j. Temporary utilities.
- k. Safety and first-aid.
- l. Security.

**4. Location of Meeting:** To Be Determined.

**5. Reporting:**

- a. Within 5 working days after the meeting, Engineer will prepare and distribute minutes of the meeting to Owner and Contractor.
- b. Contractor shall provide copies to Subcontractors and major Suppliers.

**B. Coordination Schedules**

- 1. Engineer will conduct a meeting at least 10 days before submission of the first Application for Payment to update the initial coordination schedules requested under ARTICLE 1.3 this Section.
- 2. **The meeting shall be attended by:**
  - a. Contractor and his superintendent.
  - b. Representatives of principal Subcontractors and Suppliers.
  - c. Engineer.

- d. Representative(s) of Owner.

**C. Progress Meetings**

1. Engineer will schedule and conduct a meeting weekly and at other times requested by Engineer. Representatives of the Owner, Engineer, and Contractor shall be present at each meeting. With Engineer's concurrence, Contractor may request attendance by representatives of Subcontractors, Suppliers, or other entities concerned with current program or involved with planning, coordination, or performance of future activities. All participants in the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
2. Contractor and each Subcontractor represented shall be prepared to discuss the current construction progress report and any anticipated future changes to the schedule. Each Subcontractor shall comment on the schedules of Contractor and other Subcontractors and advise if their current progress or anticipated activities are compatible with that Subcontractor's Work.
3. If one Subcontractor is delaying another, Contractor shall issue such directions as are necessary to resolve the situation and promote construction progress.
4. **Meeting Agenda:**
  - a. Review of construction progress since previous meeting.
  - b. Field observations, interface requirements, conflicts.
  - c. Problems which impede construction schedule.
  - d. Off-site fabrication.
  - e. Delivery schedules.
  - f. Submittal schedules and status.
  - g. Site use.

- h.** Temporary facilities and services.
- i.** Hours of Work.
- j.** Hazards and risks.
- k.** Housekeeping.
- l.** Quality and Work standards.
- m.** Change Orders.
- n.** Documentation of information for payment requests.
- o.** Corrective measures and procedures to regain construction schedule if necessary.
- p.** Revisions to construction schedule.
- q.** Review of proposed activities for succeeding Work period.
- r.** Review proposed Contract modifications for:
  - (1)** Effect on construction schedule and on completion date.
  - (2)** Effect on other contracts of the Project.
- s.** Other business.

**5. Location of Meetings:** Meeting shall be held at the Lake Havasu Public Works Building.

Lake Havasu Public Works  
900 London Bridge Road  
Lake Havasu City, Arizona 86404

**6. Reporting:**



- a.** Within 5 working days after each meeting, Engineer will prepare and distribute minutes of the meeting to Owner and Contractor.
- b.** Contractor shall distribute copies to principal Subcontractors and Suppliers.

### **1.3 Schedules and Reports**

#### **A. Initial Coordination Schedules**

- 1.** Within 10 days after the Effective Date of the Agreement, Contractor shall submit to Engineer for review and acceptance:
  - a.** A preliminary procurement schedule of Equipment and Materials.
  - b.** A preliminary schedule of values for partial pay purposes.
  - c.** A preliminary schedule of Submittals, as stated in Section 01330.
  - d.** Preliminary cash requirement prediction.

#### **B. Baseline Construction Schedule**

- 1.** Within 20 days after issuance the Notice of Award of the Contract, Contractor shall submit to Engineer for review and acceptance a detailed baseline construction schedule employing the critical path scheduling method.
  - a.** The schedule shall show the Work in a horizontal bar chart, and indicate the start date, duration, and end date for each activity.
  - b.** The Contractor shall submit to the Engineer, 7 paper copies and 1 electronic copy in Suretrak® Version 3.0 or approved compatible format for review. Sheet size shall be a minimum 11 x 17-inches
  - c.** No single activity shall be more than 15 days in duration.

- d.** The Contractor shall include all work by Subcontractors in the baseline construction schedule.
  - e.** The schedule shall be resourced base and include work breakdown structures.
  - f.** The schedule shall indicate milestone from which the Contractor's progress will be measured for the purpose of determining liquidated damages.
  - g.** In addition to submitting the schedule on paper, the schedule shall be provided electronically in a format compatible with SureTrack® Version 3.0 scheduling software.
  - h.** Within each activity, indicate estimated completion percentage in 10% increments.
  - i.** Scale and spacing shall allow room for notations and revisions.
- 2.** After the construction schedule is approved, the schedule shall serve as the Contractor's Baseline Schedule for all Work on the project. Activity ID's shall not be changed without the Engineer's written permission from this point forward. New activity numbers will be allowed, but only for new work outside the original project baseline schedule activities.
- 3.** If necessary, the Contractor shall provide subschedules to define in more detail, critical portions of the baseline schedule, including inspections and tests.
- 4.** The Contractor shall coordinate the baseline construction progress schedule with the schedule of values, Submittal schedule, procurement schedule, progress reports, and payment requests.
- 5.** The Contractor shall revise the construction baseline schedule after each meeting, event, or activity where revisions have been recognized and accepted in accordance with the GENERAL CONDITIONS.

6. The Contractor shall update and submit 7 paper copies and 1 electronic copy in SureTrak® Version 3.0 compatible format of the revised schedule to the Engineer at least once each month to show actual progress compared to the originally accepted baseline construction schedule and any proposed changes in the schedule of remaining Work. The revised schedule shall be updated and submitted to the Engineer prior to each monthly payment request. Engineer's approval for payment will not be recommended to be paid by the Owner until the monthly revised schedule is accepted by the Engineer. Include the schedule with construction progress report (See Section 1320.1.3.D).

**C. Procurement Schedule**

1. After submittal of preliminary procurement schedule as stated above under "Initial Coordination Schedules", submit a detailed schedule for procurement of Equipment and Materials to be furnished by Contractor, Subcontractors, manufacturers, and Suppliers. Do not include minor items which are known to be regularly stocked by local suppliers or readily available upon short notice. Submit to Engineer for review with the construction progress schedule.
2. Engineer will review and comment on the schedule for procurement, and upon agreement with Contractor concerning any necessary revisions, the schedule will be accepted.
3. Procurement schedule shall coincide with the construction progress schedule and the Submittal schedule, and shall indicate the date each item will be needed at the Site and the time required for delivery after order is placed.
4. Update the accepted schedule for procurement at least once each month to show the status of orders placed, Submittals, and delivery. Submit with the construction progress report.
5. If requested by Engineer, submit copies of purchase orders placed by Contractor or Subcontractors.

#### **D. Construction Progress Reports**

- 1.** Submit a report on actual construction progress on a weekly basis. More frequent reports may be required should the Work fall behind the accepted schedule.
  - a.** Format shall be on 11 x 17-inch paper, submitted to Engineer electronically.
- 2.** Construction progress reports shall consist of the revised construction progress schedule and a narrative report which shall include but not be limited to the following:
  - a.** Comparison of actual progress to planned progress shown on originally accepted schedule.
  - b.** Summary of activities completed since the previous construction progress report.
  - c.** Identification of problem areas.
  - d.** A description of current and anticipated delaying factors, if any.
  - e.** Impact of possible delaying factors.
  - f.** Proposed corrective actions.
- 3.** Submit a construction progress report to Engineer with each application for partial payment. Work reported complete but not readily apparent to Engineer must be substantiated with supporting data when requested by Engineer.
- 4.** If a schedule update reveals that, through no fault of Owner, the Work is likely to be completed later than the Contract completion date, Contractor shall:
  - a.** Establish a plan for making up lost time.
    - (1)** Increase number of workers, or
    - (2)** Increase amount or kinds of tools, or

- (3)** Work overtime or additional shifts, or
  - (4)** A combination of 2 or more of the above 3 actions.
- b.** Submit plan to Owner and Engineer before implementing the plan.
- c.** Take actions as necessary to get the Work back on schedule at no additional cost to Owner.

**E. Schedule of Values**

- 1.** Submit as set forth in GENERAL CONDITIONS, based on the preliminary schedule of values.
- 2.** Coordinate preparation of schedule of values with preparation and content of construction progress schedule.
- 3. Content**
  - a.** Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
  - b.** Follow the construction progress schedule breakdown of Work activities as format for listing component items and assigning values.
  - c.** For each major line item list subvalues of major products or operations under the item.
    - (1)** Each item shall include a directly proportional amount of the Contractor's overhead and profit.
    - (2)** For items on which progress payments will be requested for stored materials received, but not installed, break down the value into:
      - (a)** The cost of the materials, delivered and unloaded, including taxes paid unless taxes are exempted.

(b) The total installed value.

- d. The sum of all values listed in the schedule shall equal the total Contract Price.

**F. Special Reports**

1. When an event of an unusual and significant nature occurs at the site, prepare and submit a special report. List the chain of events, persons participating, response by Contractor's personnel, an evaluation of the results or effects, and similar pertinent information. Advise the Owner in advance when such events are known or predictable.
2. Submit original report to Owner and copy to Engineer.

**PART 2 - PRODUCTS - Not Applicable.**

**PART 3 - EXECUTION - Not Applicable.**

**PART 4 - MEASUREMENT AND PAYMENT - Not Applicable.**

**\*\* END OF SECTION 01320 \*\***

## **SECTION 01325**

### **CONSTRUCTION PHOTOGRAPHS**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

- A.** This Section specifies administrative and procedural requirements for construction photographs.

##### **1.2 Submittals**

- A.** Submit CD's as specified in Section 01330, Submittals and in PART 3 - this Section.
- B.** Photographer shall submit a digital sample set of the type and quality required during construction, for review and acceptance by Engineer.

##### **1.3 Quality Assurance**

- A.** All photographs shall be taken and processed by a qualified photographer with experience in construction photography.

#### **PART 2 - PRODUCTS**

##### **2.1 Photographic Requirements**

Specified in PART 3, this Section.

#### **PART 3 - EXECUTION**

##### **3.1 Photographs**

- A.** Contractor shall be responsible for photographs of the entire construction site to show the existing and general condition of the site prior to construction. Each photo will be required to have a date stamp in the lower right corner.

**B.** Photographs shall be taken of the following areas and at the following times.

- 1.** Existing Site conditions before Site work is started. Number of views shall be adequate to cover the Site.
- 2.** Finished Project after completion of Work. Number of views shall be adequate to show the finished Work. It is particularly important to provide a view of the restoration of the property upon completion of construction.
- 3.** If Project is not completed during the Contract Time or authorized extensions, photographs shall continue to be taken at no increase in Contract Price.

**C.** The principal reason for obtaining photographs is so that items such as cracked curbs, and/or driveways, shrubs, trees, landscaping, decorative walls, privacy walls, mail boxes, lighting, broken pavement or sidewalks, or other problems along the construction route may be more clearly shown and recorded. This will to some degree preclude the possibility of post construction litigation between Contractor and property owners adjacent to the Work.

**D. Digital Images**

- 1.** Submit two (2) complete sets of digital image electronic files on a CD for each area of work prior to starting work.
  - a.** Provide images in JPEG format, with minimum sensor size of 5.0 mega pixels.
  - b.** Submit images that have same aspect ratio as the sensor, uncropped.
  - c.** The photos of each residence and areas adjacent shall be labeled electronically on each photograph by address.

**E. Identification**

- 1.** Each disk submitted shall be labeled with Project name, area and street
- 2.** Identify electronic media with date digital photographs were taken.



- F.** Deliver prints to Engineer.

Jacobs Engineering  
ATTN: Rick Edwards  
1501 W. Fountainhead Parkway, Suite 401  
Tempe, AZ 85282

### **3.2 Additional Photographs**

- A.** From time to time Engineer may issue requests for additional photographs, in addition to periodic photographs specified. Additional photographs will be paid for by Change Order, and are not included in the Contract Price or an Allowance.
- 1.** Engineer will give the photographer 3 days' notice, where feasible.
  - 2.** In emergency situations, the photographer shall take additional photographs within 24 hours of Engineer's request.
  - 3.** Circumstances that could require additional photographs include, but are not limited to:
    - a.** Substantial Completion of a major phase or component of Work.
    - b.** Owner's request for special publicity photographs.
    - c.** Special events planned at Project Site.
    - d.** Immediate follow-up when on-site events result in construction damage or losses.
    - e.** Photographs to be taken at fabrication locations away from Project Site.
    - f.** Extra record photographs at time of final acceptance.

### **PART 4 - MEASUREMENT AND PAYMENT - Not Applicable**

**\*\* END OF SECTION 01325 \*\***

## **SECTION 01330**

### **SUBMITTALS**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

**A.** This Section includes definitions, descriptions, transmittal, and review of Submittals.

**B.** Related Work Specified Elsewhere:

Project Meetings, Schedules, and Reports .....Section 01320  
Construction Photographs .....Section 01325  
Equipment and Materials.....Section 01600  
Substitutions.....Section 01631  
Contract Closeout.....Section 01780

##### **1.2 General Information**

###### **A. Definitions**

**1.** Shop Drawings, product data, and Samples are technical Submittals prepared by Contractor, Subcontractor, manufacturer, or Supplier and submitted by Contractor to Engineer as a basis for approval of the use of Equipment and Materials proposed for incorporation in the Work or needed to describe installation, operation, maintenance, or technical properties.

**a.** Shop Drawings include custom-prepared data of all types including drawings, diagrams, performance curves, material schedules, templates, instructions, and similar information not in standard printed form applicable to other projects.

**b.** Product data includes standard printed information on materials, products, and systems; not custom-prepared for this Project, other than the designation of selections from available choices.



2. Documents submitted to Engineer that do not conform to specified requirements shall be subject to rejection by Engineer, and upon request by Engineer, Contractor shall resubmit conforming documents. If conforming Submittals cannot be obtained, such documents shall be retraced, redrawn, or photographically restored as may be necessary to meet such requirements. Contractor's (or his Subcontractor's) failure to initially satisfy the legibility quality requirements will not relieve Contractor (or his Subcontractors) from meeting the required schedule for Submittals.

**C. Language and Dimensions**

1. All words and dimensional units shall be in the English language.
2. Metric dimensional unit equivalents may be stated in addition to the English units. However, English units of measurement shall prevail.

**D. Submittal Completeness**

1. Submittals shall be complete with respect to dimensions, design criteria, materials of construction, and other information specified to enable Engineer to review the information effectively.
2. Where standard drawings are furnished which cover a number of variations of the general class of Equipment, each drawing shall be annotated to indicate exactly which parts of the drawing apply to the Equipment being furnished. Use hatch marks to indicate variations that do not apply to the Submittal. The use of "highlighting markers" will not be an acceptable means of annotating Submittals. Annotation shall also include proper identification of the Submittal permanently attached to the drawing.
3. Reproductions or copies of Contract Drawings or portions thereof will not be accepted as complete fabrication or erection drawings. Contractor may use a reproduction of Contract Drawings for erection drawings to indicate information on erection or to identify detail drawing references. Whenever the Drawings are revised to show this additional Contractor information, Engineer's title block shall

be replaced with a Contractor's title block, and Engineer's professional seal shall be removed from the drawing. The Contractor shall revise these erection drawings for subsequent Engineer revisions to the Contract Drawings.

### **1.3 Technical Submittals**

#### **A. Items shall include, but not be limited to, the following:**

- 1.** Manufacturer's specifications.
- 2.** Catalogs, or parts thereof, of manufactured Equipment.
- 3.** Shop fabrication and erection drawings.
- 4.** Instruction books and operating manuals.
- 5.** Material lists or schedules.
- 6.** Performance tests on Equipment by manufacturers.
- 7.** Concrete mix design information.
- 8.** All drawings, catalogs or parts thereof, manufacturer's specifications and data, samples, instructions, and other information specified or necessary:
  - a.** For Engineer to determine that the Equipment and Materials conform with the design concept and comply with the intent of the Contract Documents.
- 9.** Equipment List.
- 10.** Hourly rate for equipment and labor.

#### **B. Schedule of Submittals**

- 1.** Schedule all submittals required prior to fabrication, manufacture, or installation for submission within 14 calendar days of the Notice to Proceed. Prepare for Engineer's concurrence, a schedule for submission of all Submittals specified or necessary for Engineer's approval of the use of Equipment and Materials proposed for incorporation in the Work or needed for proper installation, operation, or

maintenance. Submit the schedule with the procurement schedule and construction progress schedule. Schedule submission of all Submittals to permit review, fabrication, and delivery in time so as to not cause a delay in the Work of Contractor or his Subcontractors or any other contractors as described herein.

2. In establishing schedule for Submittals, allow 14 calendar days in Engineer's office for reviewing original Submittals and 5 calendar days in Engineer's office for reviewing resubmittals.
3. The schedule shall indicate the anticipated dates of original submission for each item and Engineer's approval thereof, and shall be based upon at least one resubmission of each item.
4. Schedule all Submittals required prior to fabrication or manufacture for submission within 45 calendar days of the Notice to Proceed. Schedule Submittals pertaining to storage, installation, and operation at the Site for Engineer's approval prior to delivery of the Equipment and Materials.
5. Resubmit Submittals the number of times required for Engineer's "Submittal Approved." However, any need for resubmittals in excess of the number set forth in the accepted schedule, or any other delay in obtaining approval of Submittals, will not be grounds for extension of the Contract Times, provided Engineer completes his reviews within the times specified.

#### **C. Transmittal of Submittals**

1. All Submittals for Equipment and Materials furnished by Contractor, Subcontractors, manufacturers, and Suppliers shall be submitted to Engineer by Contractor.
2. After checking and verifying all field measurements, transmit all Submittals to Engineer for approval as follows:
  - a. **Submittal Information Block:**
    - (1) Affix to all paper copies whether Submittal is prepared by Contractor, Subcontractor, or Supplier. Use transparent decal type Submittal

Information Blocks for Shop Drawings and use gummed paper type for product data Submittals. All Submittal Information Blocks needed for this Contract will be furnished to Contractor at no charge at the initial coordination conference.

**(2)** An example of the Submittal Information Block is included as an appendix to this Section.

- b.** Mark each Submittal by Project name and number, Contract title and number, and the applicable Specification Section and Article number. Include in the letter of transmittal the Drawing number and title, sheet number (if applicable), revision number, and electronic filename (if applicable). Unidentifiable Submittals will be returned for proper identification.
- c.** Check and include Contractor's approval for Submittals of Subcontractors, Suppliers, and manufacturers prior to transmitting them to Engineer. Contractor's approval shall constitute a representation to Owner and Engineer that Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, or Contractor assumes full responsibility for doing so, and that Contractor has coordinated each Submittal with the requirements of the Work and the Contract Documents.
- d.** At the time of each submission, call to the attention of Engineer in the letter of transmittal any deviations from the requirements of the Contract Documents.
- e.** Make all modifications noted or indicated by Engineer and return revised Submittals until approved. Direct specific attention in writing, or on revised Submittals, to changes other than the modifications called for by Engineer on previous Submittals. After paper copy Submittals have been approved, submit copies thereof for final distribution. Previously approved Submittals transmitted for final distribution will not be further reviewed and are not to be revised. If errors are discovered during manufacture or

fabrication, correct the Submittal and resubmit for review.

- f.** Following completion of the Work and prior to final payment, furnish record documents and approved Samples and Shop Drawings necessary to indicate "as constructed" conditions, including field modifications, in the number of copies specified. Furnish additional copies for insertion in Equipment instruction books and operating manuals as required. All such copies shall be clearly marked "PROJECT RECORD."
- g.** Keep a copy or sample of each Submittal in good order at the Site.

### **3. Quantity Requirements:**

- a.** Except as otherwise specified, transmit all Shop Drawings in the following quantities:
  - (1) Initial Submittal:** Electronic pdf copy to Engineer.
  - (2) Resubmittals:** Electronic pdf copy to Engineer.
  - (3) Submittal for final distribution:** Electronic pdf copy to Engineer.
  - (4) As-constructed documents:** Electronic pdf copy to Engineer.
- b.** Transmit Submittals of product data as follows:
  - (1) Initial Submittal:** Email
  - (2) Resubmittals:** Email
  - (3) Submittal for final distribution:** Email
- c.** **Transmit Submittals for reference only:** Email to Engineer.
- d.** Owner may copy and use for internal operations and staff training purposes any and all document Submittals required by this Contract and approved for final distribution, whether or not such documents are copyrighted, at no additional cost to Owner. If



permission to copy any such Submittal for the purposes stated is unreasonably withheld from Owner by Contractor or any Subcontractor, manufacturer, or Supplier, Contractor shall provide to Engineer 50 copies plus the number of copies required by Contractor at each final distribution issue.

- 4. Information to Manufacturer's District Office:**  
Contractor shall arrange for manufacturers and Suppliers of Equipment and Materials to furnish copies of all agreements, drawings, specifications, operating instructions, correspondence, and other matters associated with this Contract to the manufacturer's district office servicing the Owner. Insofar as practicable, all business matters relative to Equipment and Materials included in this Contract shall be conducted through such local district offices.

**D. Engineer's Review**

- 1.** Engineer will review and take appropriate action on Submittals in accordance with the accepted schedule of Submittals. Engineer's review and approval will be only to determine if the items of Equipment and Materials covered by the Submittals will, after installation or incorporation into the Work, conform to information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
- 2.** Engineer's review and approval will not extend to design data reflected in Submittals, which is peculiarly within the special expertise of Contractor or Contractor's Subcontractors or Suppliers. Review and approval of a component item as such will not indicate approval of the assembly in which the item functions.
- 3.** Engineer's review and approval of Shop Drawings, product data, or Samples will not relieve Contractor of responsibility for any deviation from requirements of the Contract Documents unless Contractor has in writing called Engineer's attention to such deviation at the time of submission, and Engineer has given written approval of the specific deviation. Approval by Engineer shall not relieve Contractor from responsibility for errors or omissions in Submittals.

## **E. Submittal Action Stamp**

- 1.** Engineer's review action stamp, appropriately completed, will appear on all Submittals of Contractor when returned by Engineer. Review status designations listed on Engineer's action stamp are defined as follows:

A - SUBMITTAL APPROVED: Signifies Equipment or Material represented by the Submittal conforms with the design concept and complies with the intent of the Contract Documents and is approved for incorporation in the Work. Contractor is to proceed with fabrication or procurement of the items and with related Work. Copies of the Submittal are to be transmitted to Engineer for final distribution.

B - SUBMITTAL APPROVED AS NOTED (RESUBMIT): Signifies Equipment and Material represented by the Submittal conforms with the design concept and complies with the intent of the Contract Documents and is approved for incorporation in the Work in accordance with Engineer's notations. Contractor is to proceed with fabrication or procurement of the items and with related Work in accordance with Engineer's notations and is to submit a revised Submittal responsive to notations marked on the returned Submittal or written in the letter of transmittal.

C - SUBMITTAL RETURNED FOR REVISION (RESUBMIT): Signifies Equipment and Material represented by the Submittal appears to conform with the design concept and comply with the intent of the Contract Documents but information is either insufficient in detail or contains discrepancies which prevent Engineer from completing his review. Contractor is to resubmit revised information responsive to Engineer's annotations on the returned Submittal or written in the letter of transmittal. Fabrication or procurement of items represented by the Submittal and related Work is not to proceed until the Submittal is approved.

D - SUBMITTAL NOT APPROVED (SUBMIT ANEW): Signifies Equipment and Material represented by the

Submittal does not conform with the design concept or comply with the intent of the Contract Documents and is disapproved for use in the Work. Contractor is to provide Submittals responsive to the Contract Documents.

**E - PRELIMINARY SUBMITTAL:** Signifies Submittals of such preliminary nature that a determination of conformance with the design concept or compliance with the intent of the Contract Documents must be deferred until additional information is furnished. Contractor is to submit such additional information to permit layout and related activities to proceed.

**F - FOR REFERENCE, NO APPROVAL REQUIRED:** Signifies Submittals which are for supplementary information only; pamphlets, general information sheets, catalog cuts, standard sheets, bulletins and similar data, all of which are useful to Engineer or Owner in design, operation, or maintenance, but which by their nature do not constitute a basis for determining that items represented thereby conform with the design concept or comply with the intent of the Contract Documents. Engineer reviews such Submittals for general content but not for basic details.

**G - DISTRIBUTION COPY (PREVIOUSLY APPROVED):** Signifies Submittals which have been previously approved and are being distributed to Contractor, Owner, Resident Project Representative, and others for coordination and construction purposes.

## **F. Instruction Books and Operating Manuals**

- 1.** Equipment instruction books and operating manuals prepared by the manufacturer shall include the following:
  - a.** Index and tabs.
  - b.** Instructions for installation, start-up, operation, inspection, maintenance, parts lists and recommended spare parts, and data sheets showing model numbers.
  - c.** Applicable drawings.



## **2. Field Samples and Mock-ups:**

- a.** Contractor shall erect field Samples and mock-ups at the Project Site and at a location acceptable to Engineer.
- b.** Size or area shall be as specified in the respective Specification Section.
- c.** Fabricate each Sample and mock-up complete and finished.
- d.** Remove mock-ups at conclusion of Work or when acceptable to the Engineer if not a permanent part of construction.

### **1.4 Information Submittals**

- A.** Informational Submittals are comprised of technical reports, administrative Submittals, and guarantees, which relate to the Work, but do not require Engineer approval prior to proceeding with the Work. Informational Submittals include:
  - 1.** Welder qualification tests.
  - 2.** Welding procedure qualification tests.
  - 3.** X-ray and radiographic reports.
  - 4.** Hydrostatic testing of pipes.
  - 5.** Field test reports.
  - 6.** Concrete cylinder test reports.
  - 7.** ASME pressure vessel test reports.
  - 8.** Certification on Materials:
    - a.** Steel mill tests.
    - b.** Brick and concrete masonry unit lab tests.
  - 9.** Soil test reports.

**10.** Piping stress analysis.

**11.** Warranties and guarantees.

**B. Transmittal of Informational Submittals**

**1.** All informational Submittals furnished by Subcontractors, manufacturers, and Suppliers shall be submitted to Engineer by Contractor unless otherwise specified.

**a.** Identify each informational Submittal by Project name and number, Contract title and number, and the Specification Section and Article number marked thereon or in the letter of transmittal. Unidentifiable Submittals will be returned for proper identification.

**b.** At the time of each submission, call to the attention of Engineer in the letter of transmittal any deviations from the requirements of the Contract Documents.

**2. Quantity Requirements:**

**a.** Technical reports and administrative Submittals except as otherwise specified:

**(1)** Engineer: Two copies.

**b.** Written Certificates and Guarantees:

**(1)** Engineer: Two copies.

**3. Test Reports:**

**a.** Responsibilities of Contractor, Owner, and Engineer regarding tests and inspections of Equipment and Materials and completed Work are set forth elsewhere in these Contract Documents.

**b.** The party specified responsible for testing or inspection shall in each case, unless otherwise specified, arrange for the testing laboratory or reporting agency to distribute test reports as follows:

- (1) Owner: Two copies.
- (2) Engineer: One copy.
- (3) Resident Project Representative: One copy.
- (4) Contractor: Two copies.
- (5) Manufacturer or Supplier: One copy.

**C. Engineer's Review**

- 1. Engineer will review informational Submittals for indications of Work or Material deficiencies.
- 2. Engineer will respond to Contractor on those informational Submittals, which indicate Work or Material deficiency.

**PART 2 - PRODUCTS - Not Applicable.**

**PART 3 - EXECUTION – Not Applicable.**

**PART 4 - MEASUREMENT AND PAYMENT - Not Applicable**

**\*\* END OF SECTION 01330 \*\***

## **SECTION 01420**

### **DEFINITIONS AND STANDARDS**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

###### **A. Definitions**

- 1.** Basic contract definitions used in the Contract Documents are defined in the GENERAL CONDITIONS. Definitions and explanations are not necessarily either complete or exclusive, but are general for the Work.
- 2.** General Requirements are the provisions or requirements of DIVISION 1 Sections, and which apply to the entire Work of the Contract.

- B. Related Information Specified Elsewhere:** Specification standards and associations applicable to the Work are specified in each Section.

##### **1.2 Specification Format and Content Explanations**

- A. Specification Format:** The Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's (CSI) Section Format and MasterFormat numbering system. Some portions may not fully comply and no particular significance will be attached to such compliance or noncompliance.

- 1. Divisions and Sections:** For convenience, a basic unit of Specification text is a "Section," each unit of which is numbered and named. These are organized with related Sections, into "Divisions," which are recognized as the present industry consensus on uniform organization and sequencing of Specifications. The Section title is not intended to limit meaning or content of Section, nor to be fully descriptive of requirements specified therein, nor to be an integral part of text.
- 2. Section Numbering:** Used for identification and to facilitate cross-references in Contract Documents. Sections are placed



in numeric sequence; however, numbering sequence is not complete, and listing of Sections in Table of Contents at beginning of the Project Manual must be consulted to determine numbers and names of Specification Sections in these Contract Documents.

3. **Page Numbering:** Numbered independently for each Section. Section number is shown with page number at bottom of each page, to facilitate location of text.
4. **Parts:** Each Section of Specifications generally has been subdivided into three basic "parts" for uniformity and convenience (PART 1 - GENERAL, PART 2 - PRODUCTS, and PART 3 - EXECUTION). These "Parts" do not limit the meaning of text within. Some Sections may not contain all three "Parts" when not applicable, or may contain more than three "Parts" to add clarity to organization of Section.
5. **Underscoring of Titles:** Used strictly to assist reader of Specification in scanning text for key words in content. No emphasis on or relative importance is intended except where underscoring may be used in body of text to emphasize a duty, critical requirement, or similar situation.
6. **Project Identification:** Project file number and identification are recorded at bottom of each page of Specifications to minimize possible misuse of Specifications, or confusion with other Project Specifications.

## **B. Specification Content**

1. These Specifications apply certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
  - a. **Imperative and Streamlined Language:** These Specifications are written in imperative and abbreviated form. This imperative language of the technical Sections is directed at the Contractor, unless specifically noted otherwise. Incomplete sentences shall be completed by inserting "shall," "the Contractor shall," and "shall be," and similar mandatory phrases by inference in the same manner as they are applied

to notes on the Drawings. The words "shall be" shall be supplied by inference where a colon (:) is used within sentences or phrases. Except as worded to the contrary, fulfill (perform) all indicated requirements whether stated imperatively or otherwise.

- b. Specifying Methods:** The techniques or methods of specifying requirements varies throughout text, and may include "prescriptive," "compliance with standards," "performance," "proprietary," or a combination of these. The method used for specifying one unit of Work has no bearing on requirements for another unit of Work.
  - c. Overlapping and Conflicting Requirements:** Where compliance with two or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, notify Engineer for a decision as specified in GENERAL CONDITIONS.
  - d. Abbreviations:** Throughout the Contract Documents are abbreviations implying words and meanings which shall be appropriately interpreted. Specific abbreviations have been established, principally for lengthy technical terminology and in conjunction with coordination of Specification requirements with notations on Drawings and in schedules. These are normally defined at first instance of use. Organizational and association names and titles of general standards are also abbreviated.
- C. Assignment of Specialists:** In certain instances, Specification text requires that specific Work be assigned to specialists in the operations to be performed. These specialists shall be engaged for performance of those units of Work, and assignments are requirements over which Contractor has no choice or option. These assignments shall not be confused with, and are not intended to interfere with, enforcement of building codes and similar regulations governing the Work, local trade and union jurisdictions, and similar conventions. Nevertheless, final responsibility for fulfillment of Contract requirements remains with Contractor.

- D. Trades:** Except as otherwise specified or indicated, the use of titles such as "carpentry" in Specification text, implies neither that the Work must be performed by an accredited or unionized tradesperson of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by tradespersons of that corresponding generic name.

### **1.3 Drawing Symbols**

- A.** Except as otherwise indicated, graphic symbols used on Drawings are those symbols recognized in the construction industry for purposes indicated. Refer instances of uncertainty to Engineer for clarification.

### **1.4 Industry Standards**

- A. Applicability of Standards:** Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference and are stated in each Section.
- 1.** Referenced standards, referenced directly in Contract Documents or by governing regulations, have precedence over nonreferenced standards which are recognized in industry for applicability to the Work.
  - 2.** Where compliance with an industry standard is required, standard in effect shall be as stated in GENERAL CONDITIONS.
  - 3.** Where an applicable code or standard has been revised and reissued after the date of the Contract Documents and before performance of Work affected, the Engineer will decide whether to issue a Change Order to proceed with the updated standard.
  - 4.** In every instance the quantity or quality level shown or specified shall be the minimum to be provided or performed. The actual installation may comply exactly, within specified tolerances, with the minimum quantity or quality specified, or it may exceed that minimum within reasonable limits. In complying with these requirements, indicated

numeric values are minimum or maximum values, as noted, or appropriate for the context of the requirements. Refer instances of uncertainty to the Engineer for a decision before proceeding.

5. Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.

- a. Where copies of standards are needed for performance of a required construction activity, Contractor shall obtain copies directly from the publication source.

- B. Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision.

**PART 2 - PRODUCTS - Not Applicable.**

**PART 3 - EXECUTION - Not Applicable.**

**PART 4 - MEASUREMENT AND PAYMENT - Not Applicable.**

**\*\* END OF SECTION 01420 \*\***

## **SECTION 01520**

### **FIELD OFFICES AND SHEDS**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

- A.** This Section includes requirements for temporary field offices and other structures required for office and storage space required by Contractor.

**B. Related Work Specified Elsewhere**

Equipment and Materials.....Section 01600  
Temporary Utilities and Facilities .....Section 01560

#### **PART 2 - PRODUCTS**

##### **2.1 Field Offices**

**A. General**

- 1.** Provide trailers, mobile buildings, or buildings constructed with floors raised aboveground, with steps, landings, and railings at entrance doors.
- 2.** Buildings shall be structurally sound, secure, and weathertight.
- 3.** Provide appropriate type fire extinguishers at each office and storage area.
- 4.** Maintain offices during progress of the Work.
- 5.** Install office spaces ready for occupancy 15 days after date stated in Notice to Proceed.

**B. Contractor's Office**

- 1.** Provide a field office for Contractor's superintendent on the Site.

2. It shall be of size required for general use, with lights, heat, furnishings, telephone service, and other necessary facilities and utilities required by Contractor's operations.

**C. Owners and Engineer's Office**

1. Provide a field office for the Owner and Engineers personnel on the Site.
2. It shall be of size required for general use, with lights, heat, furnishings, telephone service, and other necessary facilities and utilities required by Owner's and Engineer's operations.

**2.2 Storage Sheds and Trailers**

**A. On Site**

1. Provide temporary buildings or trailers needed for storage of Equipment and Materials installed under this Contract (and those furnished by Owner or others under separate contract).
2. Provide ventilation and heating as required by Equipment and Material stored.

**B. Off Site**

1. Advise Engineer of any arrangements made for storage of Equipment and Materials in a place other than Owner's Site. Furnish evidence of insurance coverage with Application for Payment in conformance with the GENERAL CONDITIONS.

**PART 3 - EXECUTION**

**3.1 Location, Installation and Maintenance**

**A. General**

1. Place temporary buildings, trailers, and stored materials in locations acceptable to Owner or Engineer.
2. Install field offices and sheds to resist winds and elements of the locality where installed.

3. Remove when no longer needed at the Site or when Work is completed.
4. Keep approach walks free of leaves, mud, water, ice, or snow.
5. At completion of Work, remove temporary buildings and trailers, foundations (if any), utility services, and debris.
6. Prepare ground or paved areas as specified in applicable Sections.

**PART 4 - MEASUREMENT AND PAYMENT - Not Applicable**

**\*\* END OF SECTION 01520 \*\***

## **SECTION 01530**

### **TEMPORARY BARRIERS AND CONTROLS**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

**A.** This Section includes General Requirements for:

- 1.** Safety and protection of Work.
- 2.** Safety and protection of existing property.
- 3.** Barriers.
- 4.** Environmental controls.
- 5.** Traffic control and use of roadways.

**B. Related Work Specified Elsewhere**

Temporary Utilities and Facilities .....Section 01560

#### **PART 2 - PRODUCTS – Not Applicable**

#### **PART 3 - EXECUTION**

##### **3.1 Safety and Protection of Work and Property**

**A. General**

- 1.** Provide for the safety and protection of the Work as set forth in GENERAL CONDITIONS. Provide protection at all times against rain, wind, storms, frost, freezing, condensation, or heat so as to maintain all Work and Equipment and Materials free from injury or damage. At the end of each day, all new Work likely to be damaged shall be appropriately protected.
- 2.** Notify Engineer immediately at any time operations are stopped due to conditions, which make it impossible to continue operations safely or to obtain proper results.



3. Construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations, floors, pits, trenches, manholes, and ducts free of water.
4. Protect floors from damage by proper covering and care when handling heavy equipment, painting, or handling mortar or other such materials. Use proper cribbing and shoring to prevent overloading of floors while moving heavy equipment. Provide metal pans under pipe-threading machines and clean such pans daily, keeping oil off floors. Restore floors to former condition where damaged or stained.
5. Concrete floors less than 28 days old shall not be loaded without written permission from Engineer.
6. Restrict access to roofs except as required by the Work. Where access is required, provide protection with plywood, boards, or other suitable materials.

**B. Property Other than Owner's**

1. Provide for the safety and protection of property as set forth in the GENERAL CONDITIONS. Report immediately to the owners thereof and promptly repair damage to existing facilities resulting from construction operations.
2. Names and telephone numbers of representatives of agencies and utilities having jurisdiction over streets and utilities in the Work area can be obtained from Engineer for the agencies listed below. Concerned agencies or utilities shall be contacted a minimum of 24 hours prior to performing Work, closing streets and other traffic areas, or excavating near underground utilities or pole lines.
  - a. Water.
  - b. Gas.
  - c. Sanitary sewers.
  - d. Storm drains.
  - e. Pipeline companies.

- f.** Telephone.
  - g.** Electric.
  - h.** Municipal streets.
  - i.** State highways.
  - j.** City engineer.
  - k.** Fire.
  - l.** Police.
- 3.** Operation of valves or other appurtenances on existing utilities, when required, shall be by or under the direct supervision of the owning utility.
  - 4.** Where fences are to be breached on private property, the owners thereof shall be contacted and arrangements made to ensure proper protection of any livestock or other property thus exposed.
  - 5.** The applicable requirements specified for protection of the Work shall also apply to the protection of existing property of others.
  - 6.** Before acceptance of the Work by Owner, restore all property affected by Contractor's operations to the original or better condition.

## **3.2 Barriers**

### **A. General**

- 1.** Furnish, install, and maintain suitable barriers as required to prevent public entry, protect the public, and to protect the Work, existing facilities, trees, and plants from construction operations. Remove when no longer needed or at completion of Work.
- 2.** Materials may be new or used, suitable for the intended purpose, but shall not violate requirements of applicable codes and standards or regulatory agencies.

3. Barriers shall be of a neat and reasonable uniform appearance, structurally adequate for the required purposes.
4. Maintain barriers in good repair and clean condition for adequate visibility. Relocate barriers as required by progress of Work.
5. Repair damage caused by installation and restore area to original or better condition. Clean the area.

**B. Tree and Plant Protection**

1. Preserve and protect existing trees and plants.
2. Provide temporary barriers around each, or around each group of trees and plants. Construct to a height of 6 feet around trees, and to a height to adequately protect plants.
3. Employ qualified tree surgeon to remove and to treat cuts.
4. Protect root zones of trees and plants as follows:
  - a. Do not allow vehicular traffic or parking.
  - b. Do not store materials or products.
  - c. Prevent dumping of refuse or chemically injurious materials or liquids.
  - d. Prevent puddling or continuous running water.
5. Carefully supervise excavating, grading and filling, and subsequent construction operations to prevent damage.
6. Remove and replace similar size & type (or agreed upon by homeowner), or suitably repair, trees and plants which are damaged or destroyed due to construction operations, and which were designated to remain.

**3.3 Environmental Conditions**

**A. Dust Control**

1. Provide proactive positive methods and apply dust control materials to minimize the raising of dust from construction operations; and to prevent airborne dust from dispersing into the atmosphere throughout the duration of the project day and night.
2. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
3. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

**B. Water and Erosion Control**

1. Provide methods to control surface water to prevent damage to the Project, the Site, or adjoining properties.
2. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
  - a. Hold the areas of bare soil exposed at one time to a minimum.
  - b. Provide temporary control measures such as berms, dikes, and drains.
3. Control fill, grading, and ditching to direct surface drainage away from excavations, pits, tunnels, and other construction areas; and to direct drainage to proper runoff.
4. Provide, operate, and maintain hydraulic equipment of adequate capacity to control surface and groundwater.
5. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the Site or to adjoining areas.
6. Provide temporary drainage where the roofing or similar waterproof deck construction is completed prior to the

connection and operation of the permanent drainage piping system.

**C. Debris Control and Clean-Up**

- 1.** Keep the premises free at all times from accumulations of debris, waste materials, and rubbish caused by construction operations and employees. Responsibilities shall include:
  - a.** Adequate trash receptacles about the Site, emptied promptly when filled.
  - b.** Periodic cleanup to avoid hazards or interference with operations at the Site and to maintain the Site in a reasonably neat condition.
  - c.** The keeping of construction materials such as forms and scaffolding neatly stacked.
  - d.** Immediate cleanup to protect the Work by removing splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from walls, floors, and metal surfaces before surfaces are marred.
- 2.** Prohibit overloading of trucks to prevent spillages on access and haul routes. Provide periodic inspection of traffic areas to enforce requirements.
- 3.** Final cleanup is specified in Section 01780 - CONTRACT CLOSEOUT.

**D. Pollution Control**

- 1.** Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by the discharge of hazardous or toxic substances from construction operations.
- 2.** Provide equipment and personnel, perform emergency measures required to contain any spillages, and remove contaminated soils or liquids. Excavate and dispose of any contaminated earth off-Site in approved locations, and replace with suitable compacted fill and topsoil.

3. Take special measures to prevent harmful substances from entering public waters, sanitary, or storm sewers.

### 3.4 Traffic Control and Use of Roadways

#### A. Traffic Control:

1. Provide, operate, and maintain equipment, services, and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow on haul routes, at Site entrances, on-Site access roads, and parking areas. This includes traffic signals and signs, flagmen, flares, lights, barricades, and other devices or personnel as necessary to adequately protect the public. Any traffic control devices used during nighttime hours shall have functioning flashing lights.
2. Remove temporary equipment and facilities when no longer required. Restore grounds to original, better, or specified condition when no longer required.
3. Provide and maintain suitable detours or other temporary expedients if necessary.
4. Bridge over open trenches where necessary to maintain traffic.
5. Consult with governing authorities to establish public thoroughfares, which will be used as haul routes and Site access. All operations shall meet the approval of owners or agencies having jurisdiction.

#### B. Maintenance of Roadways

1. Repair roads, walkways, and other traffic areas damaged by operations. **Keep traffic areas as free as possible of excavated materials and maintain in a manner to eliminate dust, mud, and hazardous conditions.**
2. All operations and repairs shall meet the approval of owners or agencies having jurisdiction.
3. The CONTRACTOR will provide dust control, be required to grade, smooth-out, fill holes, and generally maintain the streets where the pavement has been removed. This

maintenance will be done daily, if necessary, to allow local traffic to travel through the area on an acceptable surface.

**PART 4 - MEASUREMENT AND PAYMENT - Not Applicable.**

**\*\* END OF SECTION 01530 \*\***

## **SECTION 01560**

### **TEMPORARY UTILITIES AND FACILITIES**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

**A.** This Section includes requirements of a temporary nature not normally incorporated into final Work. It includes the following:

- 1.** Utility services.
- 2.** Construction and support facilities.
- 3.** Construction aids.
- 4.** Safety and health.
- 5.** Fire protection.

**B. Related Work Specified Elsewhere**

Temporary Barriers and Controls .....Section 01530  
Field Offices and Sheds.....Section 01520

##### **1.2 Quality Assurance**

**A. Reference Standards and Specifications**

**1. American National Standards Association (ANSI)**

A10 Series - Safety Requirements for Construction and Demolition.

**2. National Electrical Contractors Association (NECA)**

**3. Electrical Design Library - Temporary Electrical Facilities.**

**4. National Fire Protection Association (NFPA)**

10 - Portable Fire Extinguishers.



70 - National Electrical Code.

241 - Safeguarding Construction, Alterations, and Demolition Operations.

**B. National Electrical Manufacturers Association (NEMA).**

**C. Underwriters Laboratories (UL).**

**D. Regulations:** Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1. Building Code requirements.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, Fire Department, and rescue squad rules.
5. Environmental Protection Regulations.

**E. Standards**

1. Comply with NFPA 10 and 241, and ANSI A10 Series standards "Temporary Electrical Facilities."
2. Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70.

**F. Inspections:** Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

### **1.3 Submittals**

**A. Temporary Utilities**

Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

## **1.4 Project Conditions**

- A. Conditions of Use:** Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not allow hazardous, dangerous, unsanitary conditions, or public nuisances to develop or persist on the Site.

## **PART 2 - PRODUCTS**

### **2.1 Materials and Equipment**

- A.** Provide new materials and equipment. If acceptable to Engineer, undamaged previously used materials and equipment in serviceable condition may be used. Provide materials and equipment suitable for the use intended, of capacity for required usage, and meeting applicable codes and standards. Comply with requirements of DIVISIONS 2 through 16.

## **PART 3 - EXECUTION**

### **3.1 Temporary Utilities**

#### **A. General**

- 1.** Furnish, install, and maintain temporary utilities required for adequate construction, safety, and security. Modify, relocate, and extend systems as Work progresses. Repair damage caused by installation or use of temporary facilities. Remove on completion of Work or until service or facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### **3.2 Temporary Sanitary Facilities**

#### **A. Contractor-Furnished Facilities**

- 1.** Furnish, install, and maintain temporary sanitary facilities for use through construction period. Remove on completion of Work.
- 2.** Provide for all construction workers under this Contract and representatives at the Site.

3. Toilet facilities shall be of the chemical, aerated recirculation, or combustion type, properly vented, and fully enclosed with a glass- fiber-reinforced polyester shell or similar nonabsorbent material.
4. Drinking Water Fixtures: Provide containerized tap dispenser type drinking water units.
5. Supply and maintain toilet tissue, paper towels, paper cups and similar disposable materials as appropriate for each facility. Provide appropriate covered waste containers for used material.

### **3.3 Temporary Safety and Health**

- A. **General:** Contractor shall be responsible for development of safety and health programs for personnel at Project Site as specified in the GENERAL CONDITIONS.

### **3.4 Installation and Removal**

- A. **Relocation:** Relocate construction aids as required by progress of construction, storage limitations, or Work requirements and to accommodate requirements of Owner and other contractors at the Site.
- B. **Removal:** Remove temporary materials, equipment, and services when construction needs can be met and allowed by use of permanent construction, or at completion of the Project.
- C. **Repair:** Clean and repair damage caused by installation or by use of temporary facilities.

## **PART 4 - MEASUREMENT AND PAYMENT - Not Applicable.**

**\*\* END OF SECTION 01560 \*\***

## **SECTION 01580**

### **PROJECT IDENTIFICATION AND SIGNS**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

- A.** This Section includes basic requirements for temporary Project identification and informational signs required during construction.

- B. Related Work Specified Elsewhere**

Submittals .....Section 01330

##### **1.2 Quality Assurance**

- A.** Design sign and structure to withstand wind and environmental conditions of locality. Provide with finish adequate to withstand weathering, fading, chipping, and peeling for duration of construction.

##### **1.3 Submittals**

- A.** Submit as specified in Section 01330.
- B. Includes, but not limited to, the following**
  - 1.** Shop Drawings and product data as applicable.
  - 2.** Show content, layout, lettering, colors, structure, and foundation.

#### **PART 2 - PRODUCTS**

##### **2.1 Identification Signs**

- A. Project Identification**

- 1.** Construct to design, size, and material indicated.
- 2.** Construct structure and framing of wood, structurally adequate to resist design requirements of locality.

3. Construct sign surface of minimum 3/4-inch thickness exterior grade plywood with medium density overlay. Panels shall be of size to minimize joints. Overall size shall be 4' x 8'.
  4. Rough hardware shall be galvanized or aluminum.
  5. Coating: Paint as specified of colors selected by Engineer.
  6. Information Content:
    - a. Project title, logo, and name of Owner as shown on Contract Documents.
    - b. Names and titles of authorities.
    - c. Name and title of Engineer.
    - d. Name of prime Contractor and major Subcontractors.
- B. Contractor Identification:** If not part of Project identification sign, provide and install Contractor's standard sign.

## **2.2 INFORMATIONAL SIGNS**

### **A. Construction**

1. This includes signs for traffic, construction workers, and general public in regards to directions, warnings, hazards, locations of areas, facilities, equipment, and others of a similar nature.
2. Provide signs of design, size, color, and lettering as required by regulatory agencies. Signs shall be painted metal, wood, plastic, or fiberglass and of materials suitable for the conditions in which they are placed, such as weathering and fading.
3. Construct structure and framing of wood or metal, structurally adequate to resist design requirements of area of Project.

## **PART 3 - EXECUTION**

### **3.1 Installation**

#### **A. Project and Contractor Identification Sign**

- 1.** Install in appropriate location so as not to obstruct traffic, pedestrians, or construction operations.
- 2.** Erect on framing or foundation, and rigidly brace.
- 3.** Maintain sign in good repair, in a clean and neat condition.
- 4.** Remove upon completion of Project.

#### **B. Informational Signs**

- 1.** Install at appropriate locations and in sufficient quantities to assure visibility. Relocate as required by progress of Work.
- 2.** Maintain signs in good repair, in a neat, clean, readable condition.
- 3.** Remove all signs, framing, supports, and foundations upon completion of Project.

## **PART 4 - MEASUREMENT AND PAYMENT - Not Applicable.**

**\*\* END OF SECTION 01580 \*\***

## **SECTION 01600**

### **EQUIPMENT AND MATERIALS**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

- A.** This Section includes administrative and procedural requirements governing Contractor's selection of products for use in the Project.
- B. Related Work Specified Elsewhere**
  - 1.** For the applicability of industry standards to products specified: DIVISIONS 2 through 16.
  - 2.** For submittal of Contractor's construction progress schedule and the Submittal schedule: Section 01320 and Section 01330.
  - 3.** For handling requests for substitutions made after award of the Contract: Section 01631.

##### **1.2 Definitions**

- A.** Definitions used in this Article are not intended to change the meaning of other terms used in these Contract Documents, such as "specialties," "systems," "structures," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
  - 1.** "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "Material," "Equipment," "system," and terms of similar intent.
    - a.** "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
    - b.** "Foreign Products," as distinguished from "domestic products," are items substantially manufactured (50% or more of value) outside the United States and its

possessions. Products produced or supplied by entities substantially owned (more than 50%) by persons who are not citizens of, nor living within, the United States and its possessions are also considered to be foreign products.

2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. "Equipment" is a product with operational or non-operational parts, whether motorized, or manually operated, that may require service connections, such as wiring or piping.

### **1.3 Submittals**

- A. Submittal of preliminary procurement schedule is specified in Section 01320 - PROJECT MEETINGS, SCHEDULES, AND REPORTS.
- B. Submittals for products are specified in Section 01330 and in applicable Sections of DIVISIONS 2 through 16.

### **1.4 Quality Assurance**

- A. **Source Limitations:** To the fullest extent possible, provide products of the same kind from a single source.
- B. **Nameplates:** Along with required labels and operating data, manufacturer or producer's nameplates, imprints, or trademarks may be placed on surfaces exposed to view.
  1. **Labels:** Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
  2. **Equipment Nameplates:** Provide a permanent nameplate on each item of service-connected or power-operated Equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
    - a. Name of product and manufacturer including address (and telephone number).



- b.** Model and serial number.
- c.** Capacity.
- d.** Speed.
- e.** Ratings.

**C. Electronic Equipment Compliance:**

- 1.** Contractor warrants that all equipment, devices, items, systems, software, hardware, or firmware provided shall properly, appropriately, and consistently function and accurately process date and time data (including without limitation: calculating, comparing, and sequencing). This warranty supercedes anything in the Specifications or other Contract Documents, which might be construed inconsistently. This warranty is applicable whether the equipment, device, item, system, software, hardware, or firmware is specified with or without reference to a manufacturer's name, make, or model number.

**1.5 Transportation and Shipment**

**A. Shipment Preparation**

- 1.** Contractor shall require manufacturers and Suppliers to prepare products for shipment in a manner to facilitate unloading and handling, and to protect against damage, deterioration, or unnecessary exposure to the elements in transit and storage. Provisions for protection shall include the following:
  - a.** Crates or other suitable packaging materials.
  - b.** Covers and other means to prevent corrosion, moisture damage, mechanical injury, and accumulation of dirt in motors, electrical equipment, and machinery.
  - c.** Suitable rust-preventive compound on exposed machined surfaces and unpainted iron and steel.
  - d.** Grease packing or oil lubrication in all bearings and similar items.

- B. Marking:** Each product item shall be tagged or marked as identified in the delivery schedule or on Submittals. Complete packing lists and bills of material shall be included with each shipment. Each piece of every item need not be marked separately, provided that all pieces of each item are packed or bundled together and the packages or bundles are properly tagged or marked.

## **1.6 Product Delivery, Storage and Handling**

- A.** Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
- 1.** Schedule delivery to minimize long-term storage at the Site and to prevent overcrowding of construction spaces. Allow ample time to avoid delay of the Work.
  - 2.** Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3.** Deliver products to the Site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4.** Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected. Inspect shipment to assure:
    - a.** Product complies with requirements of Contract Documents and reviewed Submittals.
    - b.** Quantities are correct.
    - c.** Containers and packages are intact and labels are legible.
    - d.** Products are properly protected and undamaged.

- 5.** Store products at the Site in a manner that will facilitate inspection and measurement of quantity or counting of units. Mark deliveries of component parts of Equipment to identify the Equipment, to permit easy accumulation of parts, and to facilitate inspection and measurement of quantity or counting of units.
- 6.** Store heavy Materials away from the Project structure in a manner that will not endanger the supporting construction.
- 7.** Store products subject to damage by the elements above ground, under cover in a weather tight enclosure, and with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.
- 8.** Protect motors, electrical Equipment, plumbing fixtures, and machinery of all kinds against corrosion, moisture deteriorations, mechanical injury, and accumulation of dirt or other foreign matter.
- 9.** Protect exposed machined surfaces and unpainted iron and steel as necessary with suitable rust-preventive compounds.
- 10.** Protect bearings and similar items with grease packing or oil lubrication.
- 11.** Handle and store steel plate, sheet metal, and similar items in a manner to prevent deformation.
- 12.** For storage of pipe and other products on easements and rights-of-way in residential and commercial areas, do not exceed the minimum required by scheduled laying operations, and conform to all requirements of public authorities. Store or place pipe along roads, set back from shoulder or curb, and at an angle tending to deflect vehicles if struck. Place or block pipe to preclude its accidental movement.

**B. Handling**

- 1.** Provide equipment and personnel necessary to unload and handle products, by methods to prevent damage or soiling to products, or packaging.

2. Handle by methods to prevent bending or overstressing. Where lifting points are designated, lift components only at those points.
3. Provide additional protection to surrounding surfaces as necessary to prevent damage.

**C. Maintenance of Storage**

1. Inspect stored products on a scheduled basis.
2. Verify that storage facilities comply with manufacturer's product storage requirements, including environmental conditions continually maintained.
3. Verify that surfaces of products exposed to elements are not adversely affected; that any weathering of finishes is acceptable under requirements of Contract Documents.
4. For mechanical and electrical Equipment in long-term storage, provide manufacturer's service instructions to accompany each item, with notice of enclosed instructions on exterior of package. Service Equipment on a regularly scheduled basis.

- D. Protection After Installation:** Provide substantial coverings as necessary to protect installed products from damage from subsequent construction operations. Remove coverings when no longer needed or as specified.

**PART 2 - PRODUCTS**

**2.1 Product Selection**

- A. General Product Requirements:** Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise specified or indicated, new at the time of installation.
1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
  2. Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Continued Availability: Where, because of the nature of its application, Owner is likely to need replacement parts or additional amounts of a product at a later date, either for maintenance and repair or replacement, provide standard products for which the manufacturer has published assurances that the products and its parts are likely to be available to Owner at a later date.
4. Conform to applicable Specifications, codes, standards, and regulatory agencies.
5. Comply with size, make, type, and quality specified, or as specifically approved in writing by Engineer.
6. Manufactured and Fabricated Products:
  - a. Design, fabricate, and assemble in accordance with the best engineering and shop practices.
  - b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
  - c. Equipment and Materials shall be suitable for service conditions intended.
  - d. Equipment capacities, sizes, and dimensions indicated or specified shall be adhered to unless variations are specifically approved in writing by Engineer.
  - e. Provide labels and nameplates where required by regulatory agencies or to state identification and essential operating data.
7. Do not use products for any purpose other than that for which designed.
8. To the fullest extent possible, provide products of the same kind from a single source.

### **PART 3 - EXECUTION**

#### **3.1 Installation of Products**

- A.** Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place except as required for proper movement and performance, and accurately located and aligned with other Work.
  - 1.** Obtain and distribute copies of manufacturer's printed instructions and recommendations if not a part of Submittals, containers, or packaging to parties involved in the installation, including a copy to Engineer (and Resident Project Representative).
  - 2.** Maintain one complete set of instructions at the Site during installation and until completion.
  - 3.** Handle, install, connect, clean, condition, and adjust products in accordance with such instructions and in conformance with specified requirements. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.
- B.** Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Completion.

**PART 4 - MEASUREMENT AND PAYMENT** - Not Applicable

**\*\* END OF SECTION 01600 \*\***

## **SECTION 01631**

### **SUBSTITUTIONS**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

- A.** This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
- B.** Related Work Specified Elsewhere:
  - 1.** Requirements for submitting Contractor's Construction Schedule and the Submittal Schedule: SECTIONS 01320 and 01330.
  - 2.** Requirements governing Contractor's selection of products: SECTION 01600.

##### **1.2 Definitions**

- A.** Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions:** Changes in products, Materials, Equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:
  - 1.** Revisions to the Contract Documents requested by Owner or Engineer.
  - 2.** Specified options of products and construction methods included in the Contract Documents.

##### **1.3 Submittals**

- A. Substitution Request Submittal:** Engineer will consider written requests for substitution if received within 14 calendar days of Notice to Proceed. Requests received more than 14 calendar days after Notice to Proceed may be considered or rejected solely at the discretion of the Owner.

- 1.** Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for Change Order proposals. Requests for substitution shall not be submitted in the form of a Request for Information (RFI).
- 2.** Identify the Equipment or Material, the fabrication, or installation method to be replaced in each request. Include related Specification Section/Article and Drawing numbers.
- 3.** Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
  - a.** Statement indicating why specified product or method of construction cannot be provided.
  - b.** Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate the proposed substitution.
  - c.** A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  - d.** Product data, including drawings and descriptions of products and fabrication and installation procedures.
  - e.** Samples, where applicable or requested.
  - f.** Identification of available sales, maintenance, repair, and replacement services.
  - g.** A statement indicating the effect of the substitution on Contractor's construction progress schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on the overall Contract Times. If specified product cannot be provided within the Contract Times, provide letter from



manufacturer, on manufacturer's letterhead, stating lack of availability or delay in delivery.

- h.** An itemized estimate of costs that will result directly or indirectly from approval of the substitution, including:
  - (1)** A proposal of the net change, if any, in the Contract Price.
  - (2)** Costs of redesign required by the proposed change.
  - (3)** Costs of resulting claims as determined in coordination with other contractors having work on the Project affected by the substitution.
- i.** Statement indicating whether or not incorporation or use of the substitute is subject to payment of any license fee or royalty.
- j.** Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents, will perform adequately the functions and achieve the results called for by the general design, is similar in substance to that specified, and is suitable for same use as that indicated and specified.
- k.** Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.

- 4. Engineer's Action:** If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of the substitution within 14 calendar days of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance, if granted, will be in the form of a Change Order.

## **PART 2 - PRODUCTS**

### **2.1 Substitutions**

- A. Conditions:** Engineer will receive and consider Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by Engineer. If the following conditions are not satisfied, Engineer will return the requests without action except to record noncompliance with these requirements.
- 1.** Extensive revisions to the Contract Documents are not required.
  - 2.** Proposed substitution is in keeping with the general intent of the Contract Documents and will produce indicated results.
  - 3.** Substitution request is timely, fully documented, and properly submitted.
  - 4.** The specified product or method of construction cannot be provided within the Contract Times. Engineer will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
  - 5.** The requested substitution offers Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
  - 6.** The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
  - 7.** The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where Contractor certifies that the substitution will overcome the incompatibility.
  - 8.** The specified product or method of construction cannot be coordinated with other materials and where Contractor certifies that the proposed substitution can be coordinated.

9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where Contractor certifies that the proposed substitution provides the required warranty.

B. Engineer's review and acceptance of Submittals shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents. Engineer's acceptance of Submittals not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval of a substitution. Acceptance by Engineer shall not relieve Contractor from responsibility for errors or omissions in the Submittals.

**PART 3 - EXECUTION - Not Applicable.**

**PART 4 - MEASUREMENT AND PAYMENT - Not Applicable.**

**\*\* END OF SECTION 01631 \*\***

## **SECTION 01780**

### **CONTRACT CLOSEOUT**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

- A.** This Section includes administrative and procedural requirements for Contract closeout including, but not limited to, the following:
  - 1.** Inspection procedures.
  - 2.** Project record document submittal.
  - 3.** Instruction book and operating manual submittal.
  - 4.** Submittal of warranties.
  - 5.** Final cleaning.
- B.** Closeout requirements for specific construction activities are included in the appropriate Sections of the Specifications.
- C. Related Work Specified Elsewhere**
  - 1.** Prerequisites to Contract Completion and Final Acceptance: GENERAL CONDITIONS.
  - 2.** Submittals: SECTION 01330.

##### **1.2 Contract Completion**

- A. Preliminary Procedures:** Before requesting inspection for Notice of Completion, complete the following. List exceptions in the request.
  - 1.** In the Application for Payment that coincides with, or first follows, the date Final Acceptance is claimed, show 100% completion for the portion of the Work.
    - a.** Include supporting documentation for completion as indicated in these Contract Documents and a

statement showing an accounting of changes to the Contract Price.

- b.** If 100% completion cannot be shown, include a list of incomplete items, the value of incomplete Work, and reasons the Work is not complete.

- 2.** Advise Owner of pending insurance changeover requirements.
- 3.** Submit specific warranties, workmanship Bonds, maintenance agreements, final certifications, and similar documents.
- 4.** Obtain and submit releases enabling Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
- 5.** Submit record drawings, instruction books and operating manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
- 6.** Deliver tools, spare parts, extra stock, and similar items.
- 7.** Make final changeover of permanent locks and transmit keys to Owner. Advise Owner's personnel of changeover in security provisions.
- 8.** Complete start-up testing of systems and instruction of Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the Site, along with mockups, construction tools, and similar elements.
- 9.** Submit consent of Certificate of Completion from Contractor.

**B. Inspection Procedures:** On receipt of a request for inspection, Engineer will either proceed with inspection or advise Contractor of unfilled requirements. Owner will prepare the Notice of Completion following inspection or advise Contractor of construction that must be completed or corrected before the notice will be issued.

- 1.** Engineer will repeat inspection when requested and assured by Contractor that the work is complete.

2. Results of the completed inspection will form the basis of requirements for Final Acceptance.

### **1.3 Final Acceptance**

**A. Preliminary Procedures:** Before requesting final inspection for Notice of Completion of Final Acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Price.
3. Submit a certified copy of Engineer's final inspection list of items to be completed or corrected, endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by Engineer.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the Date of Contract Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
5. Submit consent of surety to final payment.
6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
7. Submit a final liquidated damages settlement statement.

**B. Reinspection Procedure:** Engineer will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to Engineer.

1. Upon completion of re-inspection, Owner will prepare a Notice of Completion of Final Acceptance. If the Work is incomplete,

Engineer will advise Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for Final Acceptance.

2. If necessary, re-inspection will be repeated.

#### 1.4 Record Document Submittals

- A. **General:** Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for Engineer's reference during normal working hours.
- B. **Record Drawings:** Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation. This will require an "as constructed" elevation of the manhole top and invert elevations of all pipes entering and leaving the manhole.
  1. Record information concurrently with construction progress.
  2. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work. Mark each document "PROJECT RECORD" in neat, large, printed letters.
  3. Mark new information that is important to Owner but was not shown on Contract Drawings or Shop Drawings.
  4. Note related Change Order numbers where applicable.
  5. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
  6. Upon completion of the Work, submit record drawings to Engineer for Owner's records.
  7. Include the following:
    - a. Depths of various elements of foundation in relation to finish first floor datum.

- b.** Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- c.** Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of construction.
- d.** Where Submittals are used for mark-up, record a cross-reference at corresponding location on Drawings.
- e.** Field changes of dimension and detail.
- f.** Changes made by Change Order or other Modifications.
- g.** Details not on original Contract Drawings.
- h.** As constructed information shall include a GPS coordinate of the sanitary manhole including the invert elevation of the pipes entering and leaving the manhole. The GPS level of accuracy shall be to centimeters. A registered land surveyor of the state of Arizona shall conduct the survey. This information shall be recorded on the record information set submitted to the Engineer. The information shall also be provided in an electronic format compatible with AUTOCAD latest release.
- i.** Provide a record location of all service laterals where they connect to the main sewer. The separation distance between the service lateral at the crossing of a water line shall be recorded by the Contractor on his record documents.

**C. Record Specifications:** Maintain one complete copy of the Project Manual including Addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and Modifications issued in printed form during construction.



1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
  2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
  3. Note related record drawing information and product data.
  4. Upon completion of the Work, submit record Specifications to Engineer for Owner's records.
  5. Include the following:
    - a. Manufacturer, trade name, catalog number, and Supplier of each product and item of Equipment actually installed, particularly optional and substitute items.
    - b. Changes made by Addendum, Change Order, or other Modifications.
    - c. Related Submittals.
- D. Record Product Data:** Maintain one copy of each product data Submittal. Note related Change Orders and markup of record drawings and specifications.
1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the Site and from the manufacturer's installation instructions and recommendations.
  2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
  3. Upon completion of markup, submit complete set of record product data to Engineer for Owner's records.

- E. Miscellaneous Record Submittals:** Refer to other Specification Sections for requirements of miscellaneous record keeping and Submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to Engineer for Owner's records.
- F. Warranties and Bonds:** Specified in GENERAL CONDITIONS, Section 01330.

**PART 2 - PRODUCTS - Not Applicable.**

**PART 3 - EXECUTION**

**3.1 Closeout Procedures**

- A. Operation and Maintenance Instructions:** Arrange for each installer of Equipment that requires regular maintenance to meet with Owner's personnel at Project Site to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
- 1.** Instruction books and operating manuals.
  - 2.** Record documents.
  - 3.** Tools.
  - 4.** Lubricants.
  - 5.** Fuels.
  - 6.** Identification systems.
  - 7.** Control sequences.
  - 8.** Hazards, hazardous chemicals data sheets.
  - 9.** Cleaning.

**10.** Warranties and bonds.

**11.** Maintenance agreements and similar continuing commitments.

**B. As part of instruction for operating Equipment, demonstrate the following procedures:**

**1.** Start-up.

**2.** Shutdown.

**3.** Emergency operations.

**4.** Noise and vibration adjustments.

**5.** Safety procedures.

**6.** Economy and efficiency adjustments.

**7.** Effective energy utilization.

### **3.2 Final Restoration**

**A. General:** The GENERAL CONDITIONS requires general cleaning during construction.

**1.** Remove temporary structures, tools, equipment, supplies, and surplus materials.

**2.** Remove temporary protection devices and facilities, which were installed, to protect previously completed Work.

**3.** Restore the entire construction area to pre-construction condition.

**B. Removal of Protection:** Remove temporary protection and facilities installed for protection of the Work during construction.

**C. Compliance:** Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the Site and dispose of lawfully.

**PART 4 - MEASUREMENT AND PAYMENT - Not Applicable.**

**\*\* END OF SECTION 01780 \*\***

# **DIVISION III**

# **TECHNICAL SPECIFICATIONS**



Expires 06/30/2025

## **SECTION 08000**

### **VERTICAL TURBINE PUMPS**

#### **PART 1 - GENERAL**

##### **1.1 Description of the Work**

- A.** The scope of this Section includes supply, installation, and startup of two new vertical line shaft turbine pumps for the LHC collector, and the refurbishment of one existing vertical turbine pump. The scope includes the following:
  - 1. Procurement of two new vertical line shaft turbine pumps, pump columns, line shafting, vertical hollowshaft motors, and all miscellaneous components of the pump system required for a fully functioning system. These pumps are tagged P1 and P3 and the locations are shown on the drawings.
  - 2. Existing fabricated discharge heads, existing pump concrete pedestals and sole plates, and existing motor starter and controls will be reused.
  - 3. One existing vertical turbine pump will be inspected, refurbished, and reused. This pump is tagged P2 and its location is shown on the drawings.
- B.** The pump supplier shall provide all pump, motor, column, and shafting components as a fully functioning unit.
- C.** Related Work Specified Elsewhere

Electrical.....Drawing E-1

##### **1.2 Definitions**

- A.** Terminology pertaining to pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

##### **1.3 Submittals**

- A.** Action Submittals:

1. Make, model, weight, and horsepower of each equipment assembly.
2. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
3. Performance data curves for full speed performance, showing head, capacity, horsepower demand, NPSH required, and pump efficiency over the entire operating range of the pump, from shutoff to maximum capacity. Indicate separately the head, capacity, horsepower demand, overall efficiency, and minimum submergence required at the design flow conditions.
4. Calculations:
  - a. Lateral vibration analysis for discharge head motor assembly and for column pipe bowl assembly over the specified speed range listed in the Data Sheets.
5. Pump maximum down-thrust or up-thrust in pounds.
6. Detailed structural, mechanical, and electrical drawings showing equipment dimensions, size, and locations of connections and weights of components.
7. Assembly and installation drawings including shaft size, seal, coupling, bearings, anchor bolt plan, parts nomenclature, and materials of construction lists.
8. Baseplate drawings, anchor bolt and sleeve details, and minimum foundation installation and leveling requirements.
9. Power and control wiring diagrams, including terminals and numbers.
10. Complete motor nameplate data, as defined by NEMA, motor manufacturer, including motor modifications.
11. Motor noise for the operating conditions.
12. Manufacturers published operating and maintenance instructions.
13. Factory finish system.

**B.** Informational Submittals:

1. Manufacturer's Certification of Compliance that factory finish system is identical to requirements specified herein.
2. Special shipping, storage and protection, and handling instructions.
3. Manufacturer's printed installation instructions.
4. Factory Functional and Performance Test Reports and Log. Factory test data for each pump shall be submitted, reviewed, and approved by Engineer prior to shipment of equipment.
5. Suggested spare parts list to maintain equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
6. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
7. Operation and Maintenance Data.
8. Manufacturer's Certificate of Proper Installation

## **PART 2 - MATERIALS**

### **2.1 General**

- A.** Pumps that have mechanical defects or do not meet the range of head capacity characteristics and efficiency requirements will be rejected after field testing and shall be replaced at the **CONTRACTOR'S** full expense.
- B.** Mechanical defects include improper tolerances, binding, excessive motor heating, or any other defect which will in time damage the pump or impair the efficiency of the pump.
- C.** The pump manufacturer is to supply the electrical motor, bowl assembly, as well as all component parts including the column pipe, shafting, and bearings. A sworn statement from the manufacturer that the entire pump assembly is from his company will be required.
- C.** All materials that will contact the well water shall comply with ANSI/NSF Standard 61.



## **2.2 Requirements and Descriptions**

### **A. Column Assembly**

70 ft. setting, ASTM A53, Grade B steel column pipe as listed and specified in the Pump Data Sheets attached to this Section.

### **B. Bowl Assembly**

1. As specified in the Data Sheets attached to this Section.

### **C. Electrical Motor**

1. Vertical hollowshaft motor manufactured for vertical line shaft pumps.
2. As specified in the Data Sheets attached to this Section.

### **D. Discharge Head**

1. The existing fabricated steel discharge heads, sole plates, and pump pedestals shall be reused.

### **E. Cone Strainer**

1. Cone strainer shall be a diameter to match the pump suction size and mounted on the pump bowls suction casing.

### **F. Pump and Motor Assembly Lateral and Torsional Vibrations:**

1. Pump and motor assembly shall have no natural frequencies within 20 percent of operating speed range.
2. Fundamental critical speed of rotating assembly shall be no less than 50 percent above the rated speed.
3. Pump manufacturer shall conduct an analysis of the lateral and torsional vibration of pump and motor assembly.

4. Excitation frequency range of the analysis shall include, but not be limited to, number of motor poles and number of impeller vanes.

#### **G. Shaft Seals**

1. Sealing system for vertical turbine pump shafts shall be a packed stuffing box as indicated in pump data sheet.
2. Stuffing Box:
  - a. Hold a minimum of five rows of packing and a lantern ring.
3. Packing Rings:
  - a. Three die-molded rings of braided PTFE material.
  - b. A.W. Chesterton Company; 1725 that is NSF 61 acceptable for potable water services.
4. Packing Nut:
  - a. Bronze.
5. Provide seal water flow collection and discharge as specified for the discharge head and detailed on Drawings.

#### **G. Accessories**

1. Equipment Identification Plate: 16-gauge stainless steel with 1/4-inch die-stamped equipment tag number securely mounted in a readily visible location.
2. Lifting Lugs: Equipment weighing over 100 pounds.
3. Anchor Bolts: Galvanized, as recommended by the manufacturer, but not less than 1-1/4-inch minimum diameter.

#### **H. Shaft and Bearings**

1. Stainless steel, ASTM A582, Type 416, size as required.
2. Line shaft in sections not exceeding 10 feet.
3. Couplings shall be threaded type, stainless steel, ASTM A276.

**I. Top Shaft:**

1. Stainless steel, ASTM A582, Type 416, size as required.
2. Provide shaft coupling in discharge head.

**J. Line Shaft Bearings:**

1. Fluted rubber, As specified in the Data Sheets attached to this Section.

**K. Factory Finishing**

1. Prepare and prime and finish coat in accordance with Section 09900, Protective Coatings.

**PART 3 - EXECUTION**

**3.1 Source Quality Control**

**A. Factory Tests**

1. Factory Tests and Adjustments: Test all equipment actually furnished in accordance with the American National Standard for Vertical Pump Tests Hydraulic Institute ANSI/HI 2.6.
2. Engineer shall be present to witness the Factory Functional/Performance Test. Notify Engineer 7 days in advance of testing.
3. Factory Test Report: Include test data sheets, curve test results, performance test logs, certified correct by a registered professional engineer.
4. Factory Functional/Performance Test: Perform test as specified in HI 2.6.

**B. Hydrostatic Tests**

1. Pump casing(s) tested at 150 percent of shutoff head. Test pressure maintained for not less than 5 minutes.

### **3.2 Disinfection**

- A.** All permanent equipment and material to be installed in the well shall be chlorinated just prior to installation following the guidelines of AWWA C654. This shall be done by spraying such areas with a solution having a chlorine residual of not less than 200 mg/L.
- B.** Before permanent equipment is installed, the caisson shall be chlorinated as described in AWWA C652 by adding chlorine to the caisson to produce a residual of approximately 10 mg/L and circulating the chlorinated water within the caisson for a time period of 24 hours. The caisson shall be pumped to waste while de-chlorinating the water to remove chlorinated water.

### **3.3 Pump and Motor Work**

#### **A. Removal and Installation**

1. Remove existing pumps, motors, column pipes, and all downhole equipment from the collector well. Follow all applicable guidelines in HI 14.4, Rotodynamic Pumps for Installation, Operation, and Maintenance. Transport one complete existing pump and motor assembly, P2, to the approved pump and motor service shops.
2. Install refurbished and new pump and motors following all applicable guidelines in HI 14.4, Rotodynamic Pumps for Installation, Operation, and Maintenance, and pump manufacturer written standard installation instructions.
3. Install refurbished and new pumps on existing pump pedestals using existing sole plates. Minor repairs of the existing pump pedestal should be anticipated by the Contractor. Major required repairs should be brought to the attention of the Owner immediately.

#### **B. Pump Shop Inspection and Refurbishment**

1. Conduct inspection of existing pump P-2 at the Owner approved shop.
2. Disassemble pump and inspect all internal components for wear and proper clearance. Generate a shop report reporting the findings and recommendations for refurbishment. Submit report to Owner for review and approval.
3. Work with the shop to implement the approved refurbishment activities.

**C. Discharge Head Refurbishment**

1. Disassemble discharge head packing box and inspect.
2. Replace lantern ring, packing rings and any other worn or required components as recommended by the pump shop.

**D. Manufacturers Representative**

1. An authorized technical representative of the pump manufacturer shall visit the Site to witness the following for new pumps placed in service and to certify in writing that the equipment has been properly installed, aligned, lubricated, adjusted, and readied for operation.
  - a. Installation of the equipment.
  - b. Inspection, checking, and adjusting the equipment.
  - c. Startup and field testing for proper operation.
  - d. Performing field adjustments to ensure that the equipment installation and operation comply with requirements.
2. Adjust pump assemblies such that driving units are properly aligned, plumb, and level with driven units and interconnecting shafts and couplings. Do not compensate for misalignment by use of flexible couplings.
3. Connect suction and discharge piping without imposing strain to pump flanges.

**E. Field Finishing**

1. As specified in Section 09900, Protective Coatings.

**E. Field Quality Control**

1. Field Functional/Performance Tests: Conduct on each pump. Perform testing after pump and well have been disinfected and cleared bacterial testing. Discharged water shall then be directed to the LHC treatment plant through existing buried piping.
2. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
3. Vibration Test:
  - a. Test with unit installed and in normal operation, and discharging to connected piping systems at rates between low flow discharge and high flow discharge conditions specified and with actual building structures and foundations provided. The unit shall not develop vibration exceeding 80 percent of limits specified in HIS 9.6.4.
4. Pump Operation:
  - a. Conduct test at pump operating speed.
  - b. Obtain a minimum of four test points with one at shutoff and one in a wide open condition.
  - c. Record and measure flow rate, discharge pressure, static water level prior to starting, and pumping water levels during operation for each test point.
  - d. Test for a minimum continuous period of 2 hours.  
If unit exhibits vibration in excess of limits specified, advise Owner immediately.
  - f. Flow Output: Measured by plant instrumentation and storage volumes.
  - g. Operating Temperatures: Monitor bearing areas on pump and motor for abnormally high temperatures.
  - h. Test Report Requirements: In accordance with HIS 14.6.

**F. Manufacturers Services**

1. Manufacturer's Representative: Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded.
  - a. 2 person-days for installation assistance and inspection.
  - b. 1 person-day for field functional/performance testing and completion of Manufacturer's Certificate of Proper Installation.

**G. Supplement:** The supplement listed below, following  
\*\*End of Section\*\* is a part of this Specification:

1. Vertical Turbine Pump Data Sheet.

**PART 4 MEASUREMENT AND PAYMENT**

**4.1 Measurement**

- A.** No measurement will be made for this item.

**4.2 Payment**

- A.** Payment will be made at the contract lump sum price bid and shall be considered full payment for providing labor and materials to perform this work.

**\*\*END OF SECTION\*\***

## VERTICAL TURBINE PUMP DATA SHEET

Tag Numbers: Pump 1, Pump 3

Pump Name: HCW Pump 1, HCW Pump 3

Manufacturers and Product: National, Goulds. Floway

### SERVICE CONDITIONS

Liquid Pumped (Material and Percent): Groundwater

Pumping Temperature (Fahrenheit): Normal      Max 90 Min     

Specific Gravity at 60 Degrees F: 1 Viscosity Range:     

pH:     

Abrasive (Y/N): Y Caused by: Typical well water

Possible Scale Buildup (Y/N): Y Caused by: Typical well water

Corrosive (Y/N): Y Caused by: Oxygenated water

Total dissolved solids (mg/L) 1,500.

Min. NPSH Available (Ft. Absolute):     

Altitude (Feet above Mean Sea Level): 460

Area Classification: Public Beach Recreational

Ambient Temperature (degrees F.): Typical for Arizona

Location: Indoor (Y/N): Y Outdoor (Y/N): N

### PERFORMANCE REQUIREMENTS PRIMARY DESIGN POINT, **Pump 1**

Capacity (US gpm): Rated: 3,000

Total Dynamic Head (Ft): Rated: 110

BHP at Rated Point: 105

Maximum Shutoff Head (Ft): 159



Min. Pump Hydraulic Efficiency at Rated Capacity (%): 80

Max. NPSH Required at Rated Capacity (Ft. Absolute): 27

Max. Pump Speed at Rated Capacity (rpm): 1190

Constant (Y/N): Y

Adjustable (Y/N): N

Reverse Rotation: Locked rotor with non-reverse ratchet.

#### PERFORMANCE REQUIREMENTS SECONDARY DESIGN POINT, **Pump 1**

Capacity (US gpm): Rated: 3,500

Total Dynamic Head (Ft): Rated: 98

BHP at Rated Point: 100

Maximum Shutoff Head (Ft): 159

Min. Pump Hydraulic Efficiency at Rated Capacity (%): 80

Max. NPSH Required at Rated Capacity (Ft. Absolute): 27

Max. Pump Speed at Rated Capacity (rpm): 1190

Constant (Y/N): Y

Adjustable (Y/N): N

Reverse Rotation: Locked rotor with non-reverse ratchet.

#### PERFORMANCE REQUIREMENTS PRIMARY DESIGN POINT **Pump 3**

Capacity (US gpm): Rated: 6,000

Total Dynamic Head (Ft): Rated: 110

BHP at Rated Point: 215

Maximum Shutoff Head (Ft): 249

Min. Pump Hydraulic Efficiency at Rated Capacity (%): 80

Inner Column: None

Line Shafting: Type 416 stainless steel Max. Bearing Span (Feet): 10

Line Shaft Bearings: Fluted synthetic rubber with bronze shells, water lubricated

Discharge Head:

Type: Refurbish Existing, Above ground discharge, 20-inch flanged.

Material: Fabricated steel, ASTM A36/A36M

Discharge Nozzle Size (inches): 20 Flange Standard/Class: ANSI 150

Plain End (Y/N): N Thrust Tie Lugs (Y/N): N

Impeller:

Type: Enclosed

Material: Bronze

Impeller Wear Rings: None

Head Shaft Material: Type 416 stainless steel Shaft Sleeve Material: None

Shaft Sealing: Packing (Y/N) Y Mechanical (Y/N) N

Seal Lubrication: Pumped groundwater

Coupling: Manufacturer Standard (Y/N) Y

Baseplate Material: Steel, Reuse Existing

Sole Plate (Y/N) Y Material 1 1/2-inch thick steel, ASTM A36, Reuse Existing

Motor Base Material: Steel, rabbeted fit

#### DRIVE MOTORS

All pumps shall use existing soft start starters

Pump 1 Horsepower: 150 Voltage: 460 Phase: 3

Pump 3 Horsepower: 250 Voltage: 460 Phase: 3

Inner Column: None

Line Shafting: Type 416 stainless steel Max. Bearing Span (Feet): 10

Line Shaft Bearings: Fluted synthetic rubber with bronze shells, water lubricated

Discharge Head:

Type: Refurbish Existing, Above ground discharge, 20-inch flanged.

Material: Fabricated steel, ASTM A36/A36M

Discharge Nozzle Size (inches): 20 Flange Standard/Class: ANSI 150

Plain End (Y/N): N Thrust Tie Lugs (Y/N): N

Impeller:

Type: Enclosed

Material: Bronze

Impeller Wear Rings: None

Head Shaft Material: Type 416 stainless steel Shaft Sleeve Material: None

Shaft Sealing: Packing (Y/N) Y Mechanical (Y/N) N

Seal Lubrication: Pumped groundwater

Coupling: Manufacturer Standard (Y/N) Y

Baseplate Material: Steel, Reuse Existing

Sole Plate (Y/N) Y Material 1 1/2-inch thick steel, ASTM A36, Reuse Existing

Motor Base Material: Steel, rabbeted fit

#### DRIVE MOTORS

All pumps shall use existing soft start starters. Reuse to the extent possible, existing motor leads to new smaller motors. Note this may require oversized junction boxes on/at the new motors.

Pump 1 Horsepower: 150 Voltage: 460 Phase: 3

Pump 3 Horsepower: 250 Voltage: 460 Phase: 3

Synchronous Speed (rpm): 1,190

Service Factor: 1.15

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: WPI Y

Mounting Type: Vertical Hollow Shaft Y Nonreverse Ratchet (Y/N) Y

ABMA 9 and ABMA 11, B-10 Motor Bearing Life (hrs): \_\_\_\_\_

REMARKS \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **SECTION 09900**

### **PROTECTIVE COATINGS**

#### **PART 1 - GENERAL**

##### **1.1 Summary**

- A.** This Section includes coating of exterior and interior surfaces throughout the Project and which are listed in PART 2 with systems specified in PART 2.
- B.** Coating systems include surface preparation, prime coat (first coat), finish coats (second and third coats), inspection, cleaning, and touch-up of surfaces and equipment. Shop preparation, prime coat, and finish coats to be shop-applied, may be specified elsewhere or referenced to this Section so that a complete system is specified and coordinated.
  - 1.** Where surface preparation and first (prime) coat are specified in other Sections to be shop-applied, such as for structural steel, or equipment, only the touch-up and finish coats are a part of field painting. Surface preparation is the required degree of preparation prior to application of first (prime) coat regardless if done in shop or field.
  - 2.** If materials are provided without shop primer then surface preparation, first, second, and third coats are a part of field painting.
  - 3.** Concealed surfaces are generally not required to have finish-coats unless otherwise specified, but prime coat should be applied and touched up prior to concealment.
  - 4.** Where Equipment and Materials are provided with shop-applied finished coating system, only touch-up is a part of field painting.
  - 5.** Refer to applicable Sections to determine whether surface preparation and first coat, or complete coating system, is to be shop-applied.

**C. Related Work Specified Elsewhere**

- 1. Shop Painting and Coatings:** All applicable Divisions.
- 2. Factory Prefinished Items:** All applicable Divisions.

**D. Colors**

- 1.** Color of finish coatings shall match accepted color Samples.
- 2.** When second and finish coats of a system are of same type, tint or use an alternate color on second coat to enable visual coverage inspection of the third coat. When first and second coats only are specified and are of same or different types, tint or use an alternate color on first coat to enable visual coverage inspection of the second coat.
- 3.** Contract Price shall include the following approximate number of finish coat colors to form a basis for bidding:
  - a. Epoxy:** Eight colors, with 50% deep tone colors.
  - b. Ceramic:** Two colors, with 50% deep tone colors.

**1.2 Quality Assurance**

**A. Reference Standards and Specifications**

**1. American National Standards Institute (ANSI)**

ANSI A 13.1 - Scheme for the Identification of Piping Systems.

ANSI Z 53.1 - Safety Color Code for Marking Physical Hazards.

**2. American Society for Testing and Materials (ASTM)**

ASTM D4258 - Surface Cleaning Concrete for Coating.

ASTM D4261 - Surface Cleaning Concrete Unit Masonry for Coating.

**3. Society for Protective Coatings (SSPC) Surface Preparation Specifications**

SP1 - Solvent Cleaning: Removes oil, grease, soil, drawing and cutting compounds, and other soluble contaminants.

SP2 - Hand Tool Cleaning: Remove loose material. Not intended to remove adherent mill scale, rust, and paint.

SP3 - Power Tool Cleaning: Removes loose material. Not intended to remove all scale or rust.

SP5 - White Metal Blast Cleaning: Removes all scale, rust, foreign matter. Leaves surface gray-white uniform metallic color.

SP6 - Commercial Blast Cleaning: Two-thirds of each square inch free of all visible residues; remainder only light discoloration.

SP10 - Near-White Metal Blast Cleaning.

SP11 - Power Tool Cleaning to Bare Metal.

**4. American Waterworks Association (AWWA)**

Standard for Painting and Repainting Steel Tanks, Stand-Pipes, Reservoirs, and Elevated Tanks for Water Storage, D-102.

**5. American Concrete Institute (ACI)**

ACI 515.1R Guide to the Use of Waterproofing, Damp-proofing, Protective and Decorative Barrier Systems for Concrete

**B. Include on label of container:**

1. Manufacturer's name, product name, and number.
2. Type of paint and generic name.
3. Color name and number.

4. Storage and temperature limits.
5. Mixing and application instructions, including requirements for precautions which must be taken.
6. Drying, recoat, or curing time.

**C. Prepainting Conference**

1. Before Project field painting starts, representatives for the Owner, Contractor, coating applicator, and coating manufacturer's technical representative shall meet with Engineer.
2. Agenda for the meeting will include details of surface preparations and coating systems to ensure understanding and agreement by all parties for compliance.

**D. Warranty**

1. The coating manufacturers and applicators shall warrant their products and applications respectively against defects for a period of five (5) years under normal use. The warranty shall be in printed form.

**E.** In the event a problem occurs with coating system, surface preparation, or application, coating applicator and coating manufacturer's technical representative shall promptly investigate the problem and submit results to Engineer.

**F.** Stated VOC shall be unthinned maximum VOC certified by manufacturer.

**G.** A coating report shall be completed daily by Contractor at each phase of the coating system starting with surface preparation. These shall be submitted on the form attached at the end of this Section.

**1.3 Submittals**

- A.** Submit as specified in Section 1330.
- B.** Includes, but not limited to, the following:



1. Schedule of products and paint systems to be used. Schedule shall include the following information:
  - a. Surfaces for system to be applied.
  - b. Surface preparation method and degree of cleanliness.
  - c. Product manufacturer, name, and number.
  - d. Method of application.
  - e. Dry-film mil thickness per coat of coating to be applied.
2. Color charts for selection and acceptance.
3. Technical and material safety data sheets.
4. Certification by coating manufacturer(s) that all coatings are suitable for service intended as stated on each coating system sheet. If manufacturer has an equivalent product as that specified, but it is not suitable for the intended purpose, he shall submit the recommended product for approval at no increase in cost, and state reasons for substitution.
5. Contractor shall certify in writing to the Engineer that applicators have previously applied all the systems in this Specification and have the ability and equipment to prepare the surfaces and apply the coatings correctly.

#### **1.4 Delivery, Storage, and Handling**

##### **A. Delivery of Materials**

1. Deliver in original unbroken sealed containers with labels and information legible and intact. Containers shall also have correct labels with required information.
2. Allow sufficient time for testing if required.
3. Open and mix on the premises and in the presence of the Engineer. Any rejected material shall be at once removed from the premises. Colors shall be as selected by Engineer.

## **B. Storage of Materials**

1. Store only acceptable materials on Project site in enclosed structures to protect them from weather and excessive heat and cold. Store in accordance with County and State Safety Codes.
2. Provide separate area and suitable containers for storage of coatings and related coating equipment.
3. Dispose of used or leftover containers, thinners, rags, brushes, and rollers in accordance with applicable regulations.

## **1.5 Regulatory Requirements**

- A. In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the local and regional jurisdiction. Notify Engineer of any coating specified herein that fails to conform to the requirements for the location of the project or location of application.
- B. **Lead Content:** Use only coatings that are totally lead free except for zinc-rich primers which shall not have a lead content over 0.06% by weight of nonvolatile content.
- C. **Chromate Content:** Do not use coatings containing zinc-chromate or strontium chromate.
- D. **Asbestos Content:** Materials shall not contain asbestos.
- E. **Mercury Content:** Materials shall not contain mercury or mercury compounds.

## **1.6 Project Conditions**

- A. This Project is in a location in which drifting coatings, if spray-applied, could contaminate adjacent surfaces or vehicles nearby. All containment precautions and application methods shall be taken into consideration and implemented to prevent the above from occurring.

## **1.7 Inspection Service**

- A.** Owner will engage in the services of an independent NACE certified coating inspection service, Level III certification.
- B.** Inspection service will provide full-time inspection of all field surface preparation and coating applications to ensure full compliance with the requirements of this Specification. The presence of the inspection service shall not relieve Contractor for compliance with Specifications or authorized changes.
- C.** Inspection service will document all work, including nonconformance, using forms acceptable to Owner and Engineer. All documentation and reports will be prepared and signed by the Inspection service representative, and submitted to Engineer on a daily basis. At the completion of all coating applications, Inspection service representative will also submit a conformance report certifying that all Work relative to coatings complies with the Specifications or authorized change.
- D.** Inspection service will be responsible for field verification and recommendations of the following field coating operations:
  - 1.** Surface preparation methods, equipment.
  - 2.** Substrate conditions, moisture content of concrete, substrate profiles, and surface temperatures.
  - 3.** Temperature, humidity, and wind conditions at times of coating applications.
  - 4.** Specified or approved coating verification.
  - 5.** Application equipment.
  - 6.** Coating wet and dry film thickness.
  - 7.** Proper coating curing.
  - 8.** Coating system failure, causes, and remedy.

- E. Inspection service representative will discuss with Engineer, Owner, and Contractor all recommended Specification deviations, changes in products, or application methods.

## **PART 2 - MATERIALS**

### **2.1 Acceptable Manufacturers**

- A. Acceptable manufacturers are as follows:
  - 1. Sauereisen
  - 2. Carboline
  - 3. Raven Lining Systems
  - 4. Ameron Protective Coatings Systems Group, Ameron Corp.
  - 5. Devoe Coating Company, Division of ICI.
  - 6. Futura Coatings, Inc.
  - 7. The Glidden Company.
  - 8. International Protective Coatings.
  - 9. Keeler & Long, Inc.
  - 10. Kop-Coat, Inc., Division of Carboline.
  - 11. Pittsburgh Paints, PPG Industries Inc.
  - 12. Santile, Division of Carboline Company, Inc.
  - 13. Tnemec Company, Inc.
  - 14. Polyken

### **2.2 General**

- A. Materials furnished for each coating system must be compatible to the substrate.

- B.** When unprimed surfaces are to be coated, entire coating system shall be by the same coating manufacturer to assure compatibility of coatings.
- C.** When shop-painted surfaces are to be coated, ascertain whether finish materials will be compatible with shop coating. Inform Engineer/ Architect of any unsuitable substrate or coating conditions.
- D.** Coating system shall be as specified below or to the manufacturer's standard, whichever is more stringent.

### **2.3 Areas of Application**

- A.** Submerged Concrete Surfaces, exposed to H<sub>2</sub>S vapor:
  - 1.** Surface Preparation and coating system: In accordance with manufacturer's recommendations.
  - 2.** Applied to all concrete surfaces including floors, walls, baffles and ceilings.
  - 3.** Product and Manufacturer:
    - a.** Sauereisen 210
    - b.** Raven 405
    - c.** Plasite 5371
    - d.** Or approved equal.
- B.** Ferrous Metals including all Structural Steel, Miscellaneous Ferrous Metals, and all Ferrous Piping; Interior Non-submerged:
  - 1.** Surface Preparation: SSPC-SP6 Commercial Blast Cleaning as specified in Paragraph 3.1.
  - 2.** Interior non-submerged applies to areas that are housed within a building and/or within a non-process, enclosed structure.
  - 3.** Product and Manufacturer: Provide one of the following:
    - a.** Tnemec:
      - 1)** Shop Primer: 66 H.B. Epoxoline – two coats, 2-3 dry mils per coat
      - 2)** Field Primer or Field Touchup: 66 H.B. Epoxoline – one coat, 2-3 dry mils per coat.
      - 3)** Finish: 69 H.B. Epoxoline II – two coats, 4-5 dry mils per coat.
    - b.** Or approved equal

- C.** Ferrous Metals, Including all Ferrous Piping; Exterior Non-submerged:
- 1.** Surface Preparation: SSPC-SP6 Commercial Blast Cleaning as specified in Paragraph 3.1.
  - 2.** Exterior non-submerged applies to areas that are not housed within a building or structure, and that are not located within process and / or water carrying structures or tanks.
  - 3.** Product and Manufacturer: Provided one of the following:
    - a.** Tnemec:
      - 1)** Primer: 66 H.B. Epoxoline – tow coats, 2-3 dry mils per coat.
      - 2)** Intermediate: 69 H.B. Epoxoline II – one coat, 4-5 dry mils.
      - 3)** Finish: 75 Endura-Shield – tow coats, 1.5-2 dry mils per coat
    - b.** Or approved equal.
- D.** Galvanized Metal and Non-Ferrous Metal; Interior Non-Submerged:
- 1.** Surface Preparation: SSPC-SP1 Solvent Cleaning, as specified in Paragraph 3.1.
  - 2.** Interior non-submerged applies to areas that are housed within a building and/or within a non-process, enclosed structure.
  - 3.** Product and Manufacturer: Provide one of the following:
    - a.** Tnemec:
      - 1)** Primer: 66 H.B. Epoxoline – one coat, 3-4 dry mils
      - 2)** Finish: 69 H.B. Epoxoline II – one coat, 4-5 dry mils.
    - b.** Or approved equal.
- E.** All Aluminum in Contact with Dissimilar Materials:
- 1.** Surface Preparation: Remove all foreign matter.
  - 2.** Product and Manufacturer: Provide one of the following:
    - a.** Tnemec:
      - 1)** 66 H.B. Epoxoline – two coats, 2.0 – 3.0 dry mils per coat
    - b.** Or approved equal.
- F.** PVC Piping, CPVC Piping, Fiberglass, Fiberglass Insulation Covering; Exterior:
- 1.** Surface Preparation: Sand as specified by the coating manufacturer.

2. Exterior applies to areas that are not housed within a building and/or within an enclosed structure.
  3. Product and Manufacturer: provide one of the following
    - a. Tnemec:
      - 1) Primer/Intermediate: 66 H.B. Epoxoline – one coat each, 2.0 – 3.0
      - 2) Finish: 75 Endura-Shield – one coat, 3.0 dry mils
    - b. Or approved equal.
- G.** PVC Piping, CPVC Piping, Fiberglass, Fiberglass Insulation Covering; Interior Non-Submerged:
1. Surface Preparation: Sand as specified by the coating manufacturer.
  2. Product and Manufacturer: Provide one of the following:
    - a. Tnemec:
      - 1) Primer/Intermediate/Finish: 66 H.B. Epoxoline – one coat each, 2.0 – 3.0 dry mils per coat.
    - b. Or approved equal.
- H.** Steel and Galvanized Steel Pipe; Buried Exterior:
1. Surface Preparation: SSPC-SP10, Near-White Blast, as specified in Paragraph 3.1.
  2. Product and Manufacturer: Provide one of the following:
    - a. Tnemec:
      - 1) Primer: 66-1211 Epoxoline – two coats, 3-4 dry mils per coat.
      - 2) Field Primer or Field Touchup: Surface preparation as specified.
      - 3) Finish: 46-413 Tneme-Tar – two coats, 10.0 dry mils per coat.
    - b. Or approved equal.
- I.** Submerged or Intermittently Submerged Ferrous Metals; Interior and Exterior:
1. Definition: Submerged shall apply to all metals below the maximum water surface elevation in open top structure unless otherwise noted or otherwise shown; and to all metals within liquid or residual solids carrying structures that are covered, including all metals on the underside of the covers unless otherwise noted or otherwise shown; and to all metals within an enclosed process structure. This shall apply to all metals whether intermittently or

continuously submerged.

2. Surface Preparation: SSPC-SP 10 Near-White Blast Cleaning as specified in Paragraph 3.1.
  - a. Tnemec:
    - 1) Primer: 69-1211 Epoxoline II – tow coats, 3-4 dry mils per coat.
    - 2) Intermediate: 69 H.B. Epoxoline II – tow coats, 5 dry mils per coat.
    - 3) Finish: 69 H.B. Epoxoline II – two coats, 5 dry mils per coat.
  - b. Or approved equal.

**J. Special Requirements for Aluminum:**

1. Aluminum surfaces bearing in or embedded in concrete and fayin surfaces of bolted aluminum joints ,except anchor bolts, shall be given two coats of 66 H.B. Epoxoline Primer, or approved equal. The primer shall be allowed to dry between coats and before concrete is poured against it.
2. Where aluminum metals are placed in contact with or fastened to ferrous or stainless steel metals, the contact surfaces of each shall receive the protective coating specified for that metal and a gasket shall be placed between the two contact surfaces. The gasket material shall be non-conductive commercial grade neoprene, 60 durometer, 0.03-inch in thickness unless otherwise specified. Bolts shall be isolated using one piece non-conductive sleeves and washers as manufactured by PSI Products, Inc., Burbank, California: Parker Seal Col, Culvert City, California, or approved equal.

**K. Galvanizing:** All galvanizing, where called for in the Contract Documents, shall be hot-dip process conforming to ASTM A-123:

1. Surface Preparation: All surfaces to be clean and free of contaminants prior to application of the coating system.
2. Prime Coat: Series 104 H.S. Epoxy; one coat 4-5 mils DFT.
3. Finish Coat: Series 104 H.S. Epoxy; one coat 4-54 mils DFT.

**L. Concrete Semi-Gloss Latex:**

1. Surface Preparation: All surfaces to be clean and free of contaminants prior to application of the coating system.



2. Prime Coat: Series 7 Tneme-Cryl; one coat 2-3 mils DFT.
3. Finish Coat: Series 7 Tneme-Cryl; one coat 2-3 mils DFT.

**M.** Ductile and Cast Iron (Exterior Exposure):

1. Surface Preparation: Solvent scrub with stiff bristle brush followed by brush-off abrasive blast cleaning to a minimum surfaces profile depth of 1.5 mils.
2. Prime Coat: Series 69-1255 (beige) H.B. Epoxoline II; one coat 3-5 mils DFT.
3. Finish Coat: Series 73 Endura-Shield; one coat 3-4 mils DFT.

**N.** Ductile and Cast Iron (Interior Exposure):

1. Surface Preparation: Clean, dry, and free of contaminants
2. Prime Coat: Series 135 Chembuild; one coat 4-6 mils DFT.
3. Finish Coat: Series 69 H.B. Epoxoline II; one coat 4-6 mils DFT.

**O.** Ductile and Cast Iron (Buried):

1. Surface Preparation: Solvent scrub with stiff bristle brush followed by brush-off abrasive blast cleaning to a minimum surface profile depth of 1.5 mils.
2. Prime Coat: Series 69-1255 (beige) H.B. Epoxoline II; one coat 3-5 mils DFT.
3. Finish Coat: Series 69 H.B. Epoxoline II; one coat 4-6 mils DFT.

**P.** Ductile and Cast Iron (Immersion):

1. Surface Preparation: Solvent scrub with stiff bristle brush followed by brush-off abrasive blast cleaning to a minimum surface profile depth of 1.5 mils.
2. Prime Coat: Series 66 H.B. Epoxoline; one coat 4-6 mils DFT.
3. Finish Coat: Series 69 H.B./ Epoxoline II; one coat 4-6 mils thick.

**Q.** Stainless Steel Duct (Buried):

1. Surface Preparation: SSPC-SP6 Commercial Blast Cleaning or manufacturer's recommendations, whichever is more stringent.
2. Prime Coat: Polyken 1019 or 1027, or approved equal.
3. Finish Coat: Polyken 905 tape, or approved equal.

## **2.4 Surfaces Not to be Coated**

- A.** Do not field paint any of the following items unless specifically noted otherwise.
1. Factory finished equipment, except for touch-up.
  2. Metal surfaces of aluminum, stainless steel, copper, bronze and similar finished materials.
  3. Equipment nameplates, valve stems, moving shafts and linkages.

## **2.5 Color Coding of Piping**

- A. Color Coding of Piping:** Exterior and interior by color coding entire pipe.
1. **General**
    - a. Coat piping with solid colors as specified below for entire length of pipe in exposed finished and unfinished areas. Exclude areas in pipe chases and furred areas.
    - b. Coat all other piping in colors matching adjacent surfaces. If adjacent area is unfinished, paint in color determined by Engineer/Architect.
    - c. Identify piping with letters, arrows and bands as specified below. Apply after completion of finish coating.

## 2. Color Scheme

Description	Pipe and Band Color	Letter and Arrow Color
Potable Water (hot or cold)	Light blue	Black
Nonpotable or Raw Water	Light blue with red bands	Black
Seal Water	Dark blue with red bands	White
Low Pressure (Air) Aeration supply	Light green	Black
Sewage	Light gray	Black
Sludge	Light brown	White
Scum	Dark brown	White
Drain	Dark gray	White
Sample	Light gray with green bands	Black
Sprinkler Piping	Red	White

In addition, special painting of the following items will be required.

Item	Color
Valve handwheels and levers	Red

Number at least 2 inches high shall be painted on or adjacent to all accessible valves, pumps, flowmeters, and other items of equipment which are identified on the drawings or in the specifications by number.

## 3. Location of Letters, Arrows and Bands

- a. Place letters, arrows and bands on piping near connections to equipment, adjacent to valves or fittings, on both sides of walls penetrated, and at intervals not to exceed 25 feet.
- b. Place arrows adjacent to or below letters depending upon visibility. Place arrows in direction of flow. For dual-flow piping, indicate both directions.

- c. Locate letters to be visible from normal line of vision above floor level. Letter locations subject to approval of Engineer/Architect.
- d. Band to be full circumference of pipe.

#### 4. Letter, Arrow and Band Size

- a. Block-style letters, all capitals, conforming to ANSI A13.1 and as follows:

Outside Diameter of Letters Pipe or Covering	Size of Letters and Arrows	Width of Banding
Less than 3/4"	Approved metal tag or band	6"
3/4" to 1-1/4"	1/2"	8"
1-1/2" to 2"	3/4"	8"
2-1/2" to 6"	1-1/4"	12"
8" to 10"	2-1/2"	24"
Over 10"	3-1/2"	32"

- 5. Vent lines, electrical conduit and related electrical accessories shall be painted to match adjacent wall surfaces as directed by ceiling space shall be painted same as surfaces adjacent to the wall surfaces.

### **PART 3 - EXECUTION**

#### **3.1 Surface Preparation**

- A. Prepare surfaces for each coating system conforming to SSPC or ASTM surface preparation specifications listed.
  - 1. If grease or oils are present, SSPC-SP1 must precede any other method specified.
  - 2. Remove surface irregularities such as weld spatter, burrs, or sharp edges prior to specified surface preparation.
  - 3. Undertake specified surface preparation in accordance with the coating manufacturer's recommendations.

- B.** Depth of profile will be as specified or as recommended by the manufacturer for each system, but in no instance shall it exceed one-third of the total dry film thickness of complete system.
- C.** Prepare only those areas which will receive the first coat of the system on the same day.

  - 1.** On steel substrates, apply coating before rust bloom forms.
- D.** Concrete surfaces shall be adequately cured in accordance with SECTION 3300 and a minimum of 28 days old prior to coating application.
- E.** Abrasives for blasting shall be free of oil, washed and dry, unused silica sand, coal, copper or nickel slag that have sharp and hard cutting surfaces. Abrasives approved by Powertech Laboratories are strongly recommended.
- F.** Sharp projections and weld splatter shall be ground smooth. All areas ground smooth shall be reblasted prior to the coating application.
- G.** Sharp edges shall be ground round and smooth to radius =  $1/8$  prior to the coating applications for structural steel in Highly Corrosive Areas and for Immersion Services.
- H.** After abrasive blasting, steel surfaces must be completely dust free (cleaned by vacuum and/or blown off with oil/water-free compressed air), oil and grease free, and have a chloride concentration of less than  $3 \mu\text{g}/\text{cm}^2$ .
- I.** Unless otherwise specified, the steel profile must be 1.5 - 2.5 mils in depth and jagged as opposed to a peen pattern.
- J.** All welds shall be stripe coated by brush with the primer, prior to the application of the full primer coat. Note that inorganic zinc coatings shall not be applied by brush except to very small areas. Stripe coating shall be by spray.
- K.** Unless approved by the Paint Manufacturer to the contrary, the blast surface shall be primed prior to the development of rust bloom or other contaminants and not later than 8 hours after surface preparation.

- L. Oxidation of the steel due to deleterious conditions may necessitate reblasting or sweepblasting the surface to restore the specified cleanliness standard.

### **3.2 Application**

- A. Apply coatings in accordance with coating manufacturer's recommendations.
- B. All work shall be undertaken by skilled applicators who are qualified to perform the required work and have a minimum of 5 years experience in similar applications. The work shall be done in a manner comparable to the best standards of practice found in that trade. All materials shall be evenly applied so as to be free from sags, runs, crawls, wrinkles, holidays, or any other defects. All coats shall be of the minimum of brush marks. When finished and dried, brush strokes shall appear in one direction only, and there shall be no curved brush marks showing. All coats shall be thoroughly dry before the succeeding coat is applied. All coats that are intended to hide shall be given another coat if the coating does not properly hide the undercoat.
- C. Use properly designed brushes, rollers, and spray equipment for all applications.
- D. Spraying shall be done in the cross lap method of spraying, streaking first in one direction and shortly later spraying across this section at right angles to the first set of passes.
- E. On unprimed surfaces apply first coat of the system the same day as surface preparation.
- F. Dry film thickness of each system shall meet the minimum specified. Maximum dry film thickness shall not exceed the minimum more than 20% or coating manufacturer's requirements if less. Where a dry film thickness range is specified, the range shall not be less than or exceeded.
- G. Shop and field painting shall remain 3 inches away from unprepared surface of any substrate such as areas to be welded or bolted.

#### **H. Environmental Conditions:**

1. Do not apply coatings when inclement weather or freezing temperature may occur within coating curing time requirements. Atmospheric temperature must be maintained between 60°F and 85°F for at least 48 hours prior to and during application, unless otherwise approved by coating manufacturer.
2. Wind velocities for exterior applications shall be at a minimum to prevent overspray or fallout and not greater than coating manufacturer's limits.
3. Relative humidity must be less than 85% and the temperature of the surface to be painted must be at least 5°F above the dew point.
4. Provide adequate ventilation in all areas of application to ensure that at no time does the content of air exceed the Threshold Limit Value given on the manufacturer's Material Safety Data Sheets for the specific coatings being applied.

- I. Recoat Time:** In the event a coating, such as an epoxy, has exceeded its recoat time limit, prepare the applied coating in accordance with manufacturer's recommendations.

#### **J. Protection**

1. Cover or otherwise protect surfaces not to be painted. Remove protective materials when appropriate.
2. Provide signs to indicate fresh paint areas.
3. Provide daily cleanup of both storage and working areas and removal of all paint refuse, trash, rags, and thinners. Dispose of leftover containers, thinners, rags, brushes, and rollers which cannot be reused in accordance with applicable regulations.
4. Do not remove or paint over Equipment data plates or code stamps on piping.

5. Mask, remove, or otherwise protect finish hardware, machined surfaces, grilles, lighting fixtures, and prefinished units as necessary.
6. Provide cover to prevent paints from entering orifices in electrical or mechanical equipment.

### **3.3 Inspection**

- A. Contractor shall provide and use a wet film gauges to check each application approximately every 15 minutes in order to immediately correct film thickness under or over that specified.
- B. Contractor shall provide and use a dry film gauge to check each coat mm (mil) thickness when dry, and the total system mm (mil) thickness when completed.
- C. Use holiday or pinhole detector on systems over metal substrates to detect and correct voids when indicated on system sheet.
- D. Furnish a sling psychrometer and perform periodic checks on both relative humidity and temperature limits.
- E. Check temperature of the substrate at regular intervals to be certain surface is 5°F or more above the dew point.

### **3.4 Cleaning and Repairs**

- A. Remove spilled, dripped, or splattered paint from surfaces.
- B. Touch up and restore damaged finishes to original condition. This includes surface preparation and application of coatings specified.

## **PART 4 - MEASUREMENT AND PAYMENT**

- 4.1 **Measurement:** No measurement will be made for this item, Protective Coatings.
- 4.2 **Payment:** Payment will be made at the contract lump sum price bid and shall be considered full payment for providing labor and materials to perform this work.



## COATING REPORT

Contract Name: \_\_\_\_\_ Contract No.: \_\_\_\_\_  
Coating Contractor: \_\_\_\_\_ Foreman: \_\_\_\_\_  
Unit or Surface Identification: \_\_\_\_\_  
Unit or Surface Location: Exterior: \_\_\_\_\_, Interior: \_\_\_\_\_

### Surface Preparation:

Date \_\_\_\_\_; Air Temp \_\_\_\_\_°F; Relative Humidity \_\_\_\_\_%  
Method of Surface Preparation: \_\_\_\_\_  
Profile achieved \_\_\_\_\_ mils (if applicable).

### Touch-Up:

Date \_\_\_\_\_; Time \_\_\_\_\_; Air Temp \_\_\_\_\_°F; Surface Temp \_\_\_\_\_°F  
Relative Humidity \_\_\_\_\_%; Dew Point \_\_\_\_\_°F  
Coating Used \_\_\_\_\_; Dry Film Obtained \_\_\_\_\_ mils.

### First Coat:

Date \_\_\_\_\_; Time \_\_\_\_\_; Air Temp \_\_\_\_\_°F; Surface Temp \_\_\_\_\_°F  
Relative Humidity \_\_\_\_\_%; Dew Point \_\_\_\_\_°F  
Coating Used \_\_\_\_\_; Dry Time Before Recoat \_\_\_\_\_ hrs.  
Dry Film Obtained \_\_\_\_\_ mils.

### Second Coat:

Date \_\_\_\_\_; Time \_\_\_\_\_; Air Temp \_\_\_\_\_°F; Surface Temp \_\_\_\_\_°F  
Relative Humidity \_\_\_\_\_%; Dew Point \_\_\_\_\_°F  
Coating Used \_\_\_\_\_; Dry Time Before Recoat \_\_\_\_\_ hrs.  
Dry Film Obtained \_\_\_\_\_ mils.

### Third Coat:

Date \_\_\_\_\_; Time \_\_\_\_\_; Air Temp \_\_\_\_\_°F; Surface Temp \_\_\_\_\_°F  
Relative Humidity \_\_\_\_\_%; Dew Point \_\_\_\_\_°F  
Coating Used \_\_\_\_\_; Dry Film Obtained \_\_\_\_\_ mils.

**\*\*END OF SECTION 9900\*\***

## **SECTION 16000**

### **GENERAL ELECTRICAL REQUIREMENTS**

#### **PART 1 GENERAL**

##### **1.1 DESCRIPTION OF WORK**

- A.** Furnish and install all electrical Work as shown on the Drawings and specified. Work includes electrical connections to equipment, motors, wiring devices, disconnects, conduit, conductors, and adjustment to existing control panels.

##### **1.2 RELATED WORK**

- A.** Refer to all drawing sheets for the scope of the electrical work.

##### **1.3 QUALITY ASSURANCE**

- A.** All work to be completed to latest edition of National Electrical Code.
- B.** All material to be U.L. listed.
- C.** All equipment to conform to ANSI and NEMA standards.

##### **1.4 SHOP DRAWINGS**

- A.** Submit complete Shop Drawings for:
  - 1.** Conduit, Fittings and accessories, (See Section 16111)
  - 2.** Wire, Cable and accessories (See Section 16120)
  - 3.** Grounding (See Section 16450)

##### **1.5 CERTIFICATES AND FEES**

- A.** The Electrical Contractor will pay for all fees, connection charges, permits and inspections.

##### **1.6 GROUNDING**

- A.** All grounding, as a minimum, will be according to the latest edition of the National Electrical Code, Article 250. Provide a full-size grounding conductor in all conduits.

## **1.7 DELIVERY, STORAGE AND HANDLING**

- A.** Deliver all materials and equipment direct to the job site utilizing Contractor's personnel and not to the Owner's receiving area.
- B.** Store all materials and equipment in a dry area, protected from the weather. Verify location of storage areas with the Owner.

## **1.8 EXISTING CONDITIONS**

- A.** Visit the site and become familiar with existing conditions and limitations.
- B.** Perform all cutting necessary to install the electrical work indicated and all patching, painting, etc. to return the finished surfaces to the original condition. All wiring devices to be installed flush unless noted otherwise.

## **PART 2 EXECUTION**

### **2.1 GENERAL**

- A.** Install all electrical Work as shown on the Drawings.
- B.** Utilize conduit for all feeders, branch circuiting, and control wiring.

**\*\* END OF SECTION 16000 \*\***

## **SECTION 16111**

### **CONDUIT, FITTINGS AND ACCESSORIES**

#### **PART 1 - GENERAL**

**1.1 Description:** This Section includes all conduit, fittings and accessories.

**1.2 References**

**1. American National Standards Institute (ANSI)**

ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated.

**2. American Society For Testing and Materials (ASTM)**

ASTM A123 - Zinc (Hot Galvanized) Coating on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.

ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

**3. National Electrical Code (NEC)**

**4. National Electrical Manufacturers Association (NEMA)**

FB1 - Fittings and Supports for Conduit and Cable Assemblies.

RN1 - Polyvinyl-Chloride Externally Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing.

**5. Underwriters' Laboratories, Inc. (UL)**

1 - Flexible Metal Electric Conduit.

6 - Rigid Metal Electrical Conduit.

263 - Fire Tests of Building Construction and Materials.

360 – Liquid tight Flexible Steel Conduit

514A - Metallic Outlet Boxes, Electrical.

514B - Fittings for conduit and Outlet Boxes.

514C - Nonmetallic Outlet Boxes, Flush Device Boxes and Covers.

**6. Steel Structures Painting Council (SSPC)**

SP3 - Power Tool Cleaning.

SP11 - Power Tool Cleaning to Bare Metal.

- 7.** All electrical and control equipment and material shall bear the recognized Underwriters Laboratories, Inc. (UL) seal of approval. It is Vendor's responsibility to obtain local inspection approval for all non-UL labeled equipment and pay all fees in connection with the same.

**1.3 Submittals**

- . Submit as specified in SECTION 1330.

**PART 2 - MATERIALS**

**2.1 Acceptable Manufacturers**

**A. Rigid Steel Conduit**

1. Allied Tube and Conduit Corporation.
2. LTV Steel.

**B. Rigid Steel Conduit with Bonded Polyvinyl Chloride (PVC) Jacket**

1. OCAL Inc.
2. Robroy Industries.
3. Perma-Cote Industries.

**C. Liquid-tight: Flexible Metal Conduit:**

1. Anamet, Inc.

2. Electri-Flex Company.

**D. Rigid Polyvinyl Chloride (PVC) Conduit**

1. Kraloy Plastic Pipe Company.
2. Certain-Teed Products Corporation.
3. Carlon Products Division

**E. InnerDuct for Fiber Optic Cable**

Smoothwall, HDPE Innerduct may be used only and exclusively for underground installation of fiber optic cable.

1. Kraloy Plastic Pipe Company.
2. Certain-Teed Products Corporation.
3. Carlon Products Division

**E. Rigid Steel Conduit Fittings**

**1. Heavy-duty Cast Malleable Iron Fittings**

- a. Appleton Electric Company.
- b. Crouse Hinds Company.

**2. Conduit Expansion and Deflection Fittings**

- a. O-Z /Gedney Company.

**F. Rigid Steel Conduit Boxes**

**1. Indoor and Outdoor Boxes**

- a. Hoffman Engineering Company of Anoka, Minnesota.

**2. Conduit Hubs**

- a. Appleton Electric Company.
- b. Myers Industries, Inc. (ITT).
- c. Crouse-Hinds Company.
- d. O-Z /Gedney Company.

**G. Supports**

- 1. B-Line Company.
- 2. Midland-Ross Corporation.
- 3. Unistrut Products Corporation.
- 4. U.S. Gypsum Company.
- 5. Van-Huffel Tube Corporation.

**H. Wall Entrance Seals**

- 1. O-Z/Gedney Company.

**I. Explosion-proof Fittings**

- 1. Crouse-Hinds Company
- 2. Appleton Electric Company

**J. Fire-stopping Materials**

- 1. 3M, (Minnesota Mining and Manufacturing Company)
- 2. Thomas and Betts
- 3. Hilti
- 4. Dow Corning

**K. Duct Seal**

- 1. Ideal Industries
- 2. 3M, (Minnesota Mining and Manufacturing Company)

## **2.2 Design Requirements**

- A.** Each length of threaded conduit furnished with coupling on one end and metal or plastic thread protector on other end.
- B.** UL listed and labeled conduit, on each length, fittings and accessories.
- C.** Sizes of conduit, fittings and accessories as indicated, specified or as required by Electrical Codes and Standards.
- D.** Provide and meet the requirements of the following sections for the conduit, fittings and accessories indicated.

## **2.3 Rigid Steel Conduit**

- A.** Conform to ANSI C80.1 and UL-6.
- B.** Mild ductile steel, circular in cross section with uniform wall thickness sufficiently accurate to cut clean threads.
- C.** Each length threaded on both ends with threads protected.
- D.** All scale, grease, dirt, burrs and other foreign matter removed from inside and outside prior to application of coating materials.
- E.** Galvanized by the hot-dip process as follows:
  - 1.** Interior and exterior surfaces coated with a solid, unbroken layer of 99% virgin zinc by dipping.
  - 2.** Coating not to show fixed deposits of copper after four 1-minute immersions in a standard copper sulfate solution.
  - 3.** One coat of zinc chromate finish on inside and outside surfaces to prevent oxidation and white rust.
- F.** Couplings and elbows fabricated, coated and finished by the same process as conduit.

## **2.4 Rigid Steel Conduit and Fittings with Bonded Polyvinyl Chloride (PVC) Jacket**

- A.** Conform to hot-dipped galvanized rigid steel conduit as specified in NEMA-RN1, RIGID STEEL CONDUIT, this Section, and as follows.



- B.** Prior to application of PVC coating, clean interior and exterior surfaces to remove contaminants to provide a suitable surface for bonding.
- C.** Bond the PVC coating to the conduit. Extruded PVC jackets are unacceptable.
- D.** Coated externally with PVC to a nominal 40 mils, 0.035-inch to 0.045-inch.
- E.** Uniformly coat around outside diameter and full length of the conduit.
- F.** Coat the prethreaded ends with a urethane coating having a nominal thickness of 2 mils (0.002-inch).
- G.** Coat the interior surfaces of all conduits and feed-through fittings (except where prohibited by design) with a two-part, chemically cured, urethane coating having a nominal thickness of 2 mils (0.002-inch).
- H.** Exceed the tensile strength of coating with bond between metal and jacket.
- I.** Couplings, elbows, and other conduit fittings, boxes, cover-plates, supports, hardware and related items shall be treated and coated with the same process as conduit.
- J.** Each coupling and fitting shall include a PVC sleeve that overlaps the conduit.
- K.** Length of the overlapping sleeve equals diameter of the conduit or 2 inches, whichever is least.
- L.** Final cured PVC coating capable of withstanding a minimum electrical potential of 2000V.
- M.** All conduit accessories, clamps, and hardware that are uncoated shall be stainless steel.

## **2.5 Liquid-Tight Flexible Metal Conduit**

- A.** Conform to UL-360.

- B.** Liquid-tight conduit with flexible galvanized-steel core and a synthetic rubber, polyvinyl chloride, or thermoplastic covering.
- C.** Spiral encased copper bonding conductors for conduit in sizes 1-1/4 inches and smaller.
- D.** External grounding jumper as required.
- E.** Polyvinyl chloride (PVC) jacket, Type HA or Type O.R. "Seal-Tite" for oil-resistant applications.

## **2.6 Rigid Polyvinyl Chloride (PVC) Conduit**

- A.** Fabricated from self-extinguishing high-impact polyvinyl chloride designed for aboveground and underground installations.
- B.** Type EPC Schedule 80 heavy-wall rigid conduit.
- C.** Fittings and accessories fabricated from same materials as conduit.
- D.** Solvent-cement-type joints as recommended by manufacturer.

## **2.7 Rigid Steel Fittings**

### **A. Heavy-Duty Cast Malleable Iron Fittings**

- 1.** Mogul type for conduit sizes 1-1/2 inches and larger.
- 2.** LBD or roller action type LB for right angle fittings for conduit sizes 2 inches and larger.
- 3.** Full-threaded hubs and rubber-gasketed covers.
- 4.** Zinc, cadmium-plated or bronze hardware bolts and screws for assembly.
- 5.** Finish with cadmium-plated or galvanizing.
- 6.** Standard and junction fittings.

### **B. Conduit Expansion Fittings**

#### **1. Line of Conduit Type**

- a. Galvanized expansion fittings for rigid conduit movement up to 4 inches.
- b. Insulated metal bushing on ends of the conduit, bonding jumper, and with expansion head sealed with a high-grade graphite packing.
- c. O-Z/Gedney Company, Type AX with Type AJ bonding jumper or Thomas and Betts Corporation, Type XJG.

**2. End Type**

- a. For conduit terminating in a junction box.
- b. O-Z/Gedney Company, Type EXE with Type BJ-E bonding jumper.

**C. Conduit Expansion and Deflection Fittings**

- 1. Provide for movement of 3/4-inch from normal in all directions between two rigid conduits.
- 2. Integral bonding jumper.
- 3. O-Z/Gedney Company, Type DX.

**D. Conduit Wall Entrance Seals**

- 1. Provide where required or indicated.
- 2. O-Z/Gedney Company Type FSK.

- E.** Conform to NEMA Type 3R enclosure in all nonhazardous areas except as specified or indicated otherwise.

**2.8 Fittings, Couplings and Boxes for Rigid Steel Conduit**

**A. Fittings**

- 1. Explosion-proof or weather-proof as specified.
- 2. Cast malleable iron.
- 3. Threaded cover to conform to NEC.

4. Full thread hubs.
5. Seal compound well for seal.
6. Drain seals as indicated or required to provide a continuous automatic drain of water.
7. Chico compound for all sealing fittings.
8. PVC jacketed in corrosive areas and where indicated.

**B. Couplings**

1. Explosion-proof or weather-proof as specified.
2. Flexible.
3. Conform to NEC.
4. Threaded, steel or bronze end fittings securely fastened to the core and braided to ensure electrical continuity.
5. Vinyl plastic coating in severely corrosive locations as indicated.

**2.9 Rigid Steel Conduit Boxes**

**A. Indoor Boxes**

1. Hot-dipped galvanized steel.
2. Galvanized steel covers.
2. For special boxes where it is not possible to provide hot-dip galvanizing, apply organic zinc-rich primer at 3 mils dry film thickness after SSPC-SP3 Power Tool Cleaning.
3. Minimum gage requirements:

No surface area exceeds	No single dimension exceeds	Steel Gage
1000 sq in.	40 in.	14

1500 sq in.	60 in.	12
over 1500 sq in.	over 60 in.	10

4. Explosion-proof or weather-proof as specified.
5. Threaded conduit entrances or rigid conduit hubs on all boxes.
6. Include piano-hinged, gasketed cover, and interior mounting panel when used for enclosing terminal blocks and control relays.
9. Oiltight JIC boxes modified for NEMA Type 3R or Type 4 enclosure for non-explosion-proof areas.

#### **B. Outdoor Boxes**

1. 11-gauge minimum galvanized steel with drip lip and galvanized-steel covers fastened with bronze or cadmium-plated screws or bolts, or cast iron with galvanized finish and flanged bolted covers.
2. For special boxes where it is not possible to provide hot-dip galvanizing, apply organic zinc-rich primer at 3 mils dry film thickness after SSPC-SP3 Power Tool Cleaning.
3. Threaded conduit entrances or rigid conduit hubs on all boxes.
4. Rubber or neoprene gasket for cover.
5. Explosion-proof or weather-proof as specified. Conform to NEMA Type 3R enclosure for non-explosion-proof applications in all outdoor installations unless indicated otherwise.
6. Include piano-hinged, gasketed cover, and interior mounting panel when used for enclosing terminal blocks and control relays.
7. Oiltight JIC boxes modified for NEMA Type 3R or Type 4 enclosure in non-explosion-proof applications.

#### **B. Metallic Barriers**

1. Designed not to separate phases of a power circuit.

- 2.** Provide as indicated for the isolation of power circuits from other type circuits.
- C.** Box size as required, or as indicated, for each particular installation.
- D.** Include provisions for mounting cable supports where indicated, specified or as required by NEC.
- E.** Provide as required for cable pulling, junctions, terminals, and for mounting of switches, outlets and control devices.

## **2.10 Support System**

- A.** Fabricated from structural steel or manufactured framing members equal to "Unistrut" P-3000 series as manufactured by Unistrut Corporation.
- B.** Minimum 12 gage.
- C.** Construct as required to rigidly support all conduit runs and boxes.
- D.** Hot-dip galvanized steel conduit clamps or stainless steel, sized for the specific conduit size, to support all exposed metallic conduit.
- E.** Nonmagnetic clamps to support nonmetallic conduits.
- F.** Provide stainless steel rods, anchors, inserts, bolts, washer, and nuts.
- G.** Materials shall be compatible with the equipment supported.
- H.** Manufactured Framing Members

### **1. Wet Locations**

- a.** Channel hot-dipped galvanized after all manufacturing operations are completed.
  - b.** Galvanizing zinc weight of 2 ounces per square foot on surface to conform to ASTM A123 and ASTM A153.

## **2.11 Fire-stopping and Duct Seal**

**A. Fire-stopping**

1. Weather-resistant silicone sealant.
2. Provide 4-hour fire rating.
3. UL tested system.

**B. Duct Seal**

1. Non-corrosive, permanently soft compound.
2. Nontoxic.
3. Provide flexible re-enterable and repairable seal around cables in conduit.
4. Prevent air movement and drafts through conduits.
- 5.

**PART 3 - EXECUTION**

**3.1 Preparation**

- A.** Provide suitable protection for conduit risers against damage during construction.
- B.** Cap ends of all conduits before concrete is poured.
- C.** Cap all conduits and provide pullstring after cleaning where conduits are to be left empty by this contract.
- D.** Carefully ream ends of all conduit lengths after cutting to eliminate sharp burrs.
- E.** Clean out all conduit before pulling wire.
- F.** Clean out all conduits immediately after concrete work is finished.

**3.2 Installation**

**A. General Requirements**

**1. Location**

- a.** Install conduit as near as possible to the routing indicated.
  - b.** Shift locations as required to avoid interference with other equipment and piping being installed.
  - c.** Where routing of conduit is not indicated, such as for lighting home run circuits and other systems requiring small conduit runs, route conduit as specified subject to approval by Engineer.
- 2.** Do not use conduit in sizes smaller than 3/4-inch, except 1/2-inch may be used for connections to control devices and thermocouples where necessary.

**3. Holes and Sleeves**

- a.** Provide through floors, walls and roofs as necessary for conduit runs, including approved flashing and weather proofing at outside walls and on roofs.
- b.** Install sleeves or forms for all openings in new work.
- c.** Provide the required inserts and holes, completely sleeved, bonded, curbed, flashed and finished off in an approved manner, whether in concrete, steel grating, metal panels or roofs.
- d.** Core-drill all holes required in existing building work using a dustless method.
- e.** Place nonshrinking grout or Dow Corning 3-6548 Silicone RTV (or equivalent General Electric RTF 762) foam as specified, in the following locations:
  - (1)** All holes in concrete, walls, floor and roof slabs after installation of conduit.
  - (2)** All unused holes and sleeves as approved by Engineer.
- f.** Install wall entrance seals where conduit enters the building or vaults from exterior underground.



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- 7.** Comply with applicable requirements of NEC pertaining to installation of conduit systems.
- 8.** Place drainage fittings or weep holes at unavoidable low points where moisture can collect.
- 9.** Install an entire conduit system that is electrically continuous with bonding jumpers provided as necessary to conform to NEC.
- 10.** Install expansion fittings at all building expansion joints and every 100 feet of continuous conduit.
- 11.** Provide all spare or empty conduits with pullstrings for future use.

**B. Rigid Steel Conduit**

**1. Exposed**

- a.** Install where specified or indicated on drawings.
- b.** Install above grade outdoors.
- c.** Install horizontal runs as high above floor as possible and in no case lower than 7 feet above floor, walkway or platforms in passage areas.
- d.** Run conduit parallel or perpendicular to walls, ceiling, beams, and columns unless indicated otherwise.
- e.** Route to clear all doors, windows, access wells, and openings.
- f.** Group parallel runs in neatly aligned banks where possible with minimum of 1-inch clearance between conduits.
- g.** Maintain 6-inch clearance between conduit and coverings on all hot lines; steam, hot water, etc.
- h.** Do not exceed a distance of 8 feet between supports on horizontal or vertical runs.

- i. When terminating at cable tray, attach conduit to tray and electrically bond conduit with ground wire to the cable tray. Install duct seal in conduits around cables to prevent ingress of water.

## **2. Concealed**

- a. Conceal conduit for lighting, convenience outlets, and other circuits in walls, ceiling and floors where possible.
- b. Do not install conduit in concrete where conduit outside diameter exceeds one-third of concrete thickness.
- c. Install parallel runs with a minimum spacing of three conduit diameters between conduits.
- d. Use expansion and deflection fitting with bonding jumpers at all concrete expansion joints.
- e. Tie securely in place to prevent movement when concrete is poured.
- f. Install in floor slabs in as straight a run as possible. Conduit crossovers are not permitted unless conduit total outside diameter is one-third of the concrete thickness or less.
- g. Use long radius elbows except on risers where curved portion of elbow would extend above the finished floor or foundation.
- h. Make all joints watertight after installation by coating all finished joints with coal tar solution applied at 15 mils minimum dry film.

**(1)** Kop-Coat - No. 50.

**(2)** Tnemec - 46-449.

## **3. Buried**

- a. Place where indicated.

- b.** Use PVC jacketed conduit or rigid PVC Schedule 80 as indicated.
- c.** Make all joints watertight by field-applied coat of vinyl plastic compound or PVC welding solution furnished by the conduit manufacturer.
- d.** Use bender one size larger for conduit sized 1 inch or less and conventional bender for conduit sized above 1 inch.
- e.** Use strap wrench to tighten conduit. Repair damaged coating with liquid patching compound recommended by conduit manufacturer.
- f.** Install in as straight a run as possible between termination points of exact routing to be determined in the field and subject to approval by Engineer.
- g.** Bury conduits a minimum of 24 inches (to top of conduit) below finish grade unless indicated otherwise or required by code.
- h.** Slope conduit away from conduit risers where possible.
- i.** Maintain 6-inch separation from underground piping.
- j.** Use long radius bends at all risers unless indicated otherwise.
- k.** After trench bottom has been finished to grade, lay conduit. Backfilling shall be as specified in DIVISION 2.
- l.** Cap ends of all conduit risers before backfilling.
- m.** Provide watertight seal around wires where conduit terminates in pull box.
- n.** Use PVC coated rigid galvanized steel conduit when making transitions from buried to above ground conduit runs.

**C. Liquid-Tight Flexible Metal Conduit**

1. Use between rigid conduit and motor terminal boxes except where conduit runs down from above and cannot be conveniently supported by a floor flange.
2. Place between rigid conduit or conduit box and control device cases where direct connection is not desirable for reasons of equipment movement, vibration, or for ease of maintenance.
3. Install at all points of connection to equipment mounted on supports to allow for expansion and contraction.
4. Conform to NEC with installation of conductors.
5. Install at locations where rigid conduit connections are impractical.
6. Use minimum length consistent with manufacturer's standard lengths, the acceptable bending radius, and with required movement of equipment.
7. Maximum length of 3 feet unless otherwise approved by Engineer.
8. Install an external bonding jumper to conform to NEC on conduit sized 1-1/2 inches and larger.

**D. Flexible Metal Conduit**

1. Use between rigid conduit and devices, except in hazardous areas and areas subject to dampness, water, and corrosive fumes. Do not use with vapor-tight fixtures. Use in accordance with the National Electrical Code Article 350.
2. Use in lieu of direct connection of rigid conduit where it is not desirable for reasons of equipment movement, vibration, or for ease of maintenance.
3. Install as required for expansion and contraction.
4. Use minimum length consistent with manufacturers' standard lengths, the acceptable bending radius, and with required movement of equipment.

5. Maximum length of 3 feet unless otherwise approved by Engineer.
6. Install in sizes smaller than 3 inches.
7. Install an external bonding jumper to conform to the National Electrical Code on conduit sized 1-1/2 inches and larger.

**E. Conduit Fittings**

1. Installations of special fittings as required.
2. All materials shall be compatible.
3. Install as required.

**F. Boxes**

1. Install special boxes as indicated of size required for conduits and cables entering and leaving box.
2. Install where required for pull or junction boxes and for mounting or connecting to switches, outlets, intermediate terminal blocks or control devices.
3. Provide 1/4-inch weep holes in interior boxes where conduits enter from exterior or buried installation.

**G. Supports**

1. Construct with sufficient rigidity to hold all mounted equipment and material in permanent and neat alignment.
2. Design to provide 1/4-inch space between equipment housings and walls or columns upon which they are mounted.
3. Do not exceed load requirements in NEC and NEMA standards.
4. After Power Tool Cleaning SSPC-SP11, paint all welds, field cuts and damaged areas with organic zinc-rich primer at 3 mils dry film thickness.
  - a. Ameron - 68HS.

- b.** Carboline - Carbozinc 858.
  - c.** Porter - Zinc-Lock 308.
  - d.** Tnemec-Tneme Zinc 90-93.
- 5.** Use electrogalvanized steel conduit clamps and nonmagnetic conduit clamps to support electrogalvanized steel conduit and nonmagnetic conduit, respectively.
- 6.** Provide stainless steel rods, anchors, inserts, bolts, washers and nuts.

**I. Explosion-proof Fittings**

- 1. Install explosion-proof fittings in the rigid steel conduit system as required by the NEC.
- 2. Install necessary fittings where not indicated, but required by code.

**PART 4 MEASUREMENT AND PAYMENT**

**4.1 Measurement**

- A.** No measurement will be made for this item.

**4.2 Payment**

- A.** Payment will be made at the contract lump sum price bid and shall be considered full payment for providing labor and materials to perform this work.

**\*\* END OF SECTION 16111 \*\***



## **SECTION 16120**

### **WIRE, CABLE, AND ACCESSORIES**

#### **PART 1 - GENERAL**

##### **1.1 Description**

- A.** This Section includes furnishing and installing (including terminations) of all electrical wire, cable, and accessories.

**B. Related Work Specified Elsewhere**

Lighting .....	Section 16500
Grounding .....	Section 16450
Field Testing .....	Section 16950

##### **1.2 References**

**1. American Society for Testing and Materials (ASTM)**

ASTM B3 - Soft or Annealed Copper Wire.

ASTM B8 - Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

ASTM B33 - Tinned Soft or Annealed Copper Wire for Electrical Purposes.

ASTM B172 - Rope-Lay-Stranded Copper Conductors, Having Bunch Stranded Members, for Electrical Conductors.

ASTM B189 - Lead-Coated and Lead-Alloy-Coated Soft Copper Wire for Electrical Purposes.

**2. Insulated Cable Engineers Association (ICEA)**

S-19-81 - Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

S-61-402 - Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

S-66-524 - Cross-Linked Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

S-68-516 - Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

S-81-570 – 600-Volt Rated Cables of Ruggedized Design for Direct Burial.

S-105-692 – 600Volt Single Layer Thermoset Insulated Utility Underground Distribution Cables.

T-29-520 – Vertical Cable Tray Flame Tests at 210,000 Btu.

**3. National Electric Manufacturers Association (NEMA) and Insulated Cable Engineers Association (ICEA)**

WC55/S-82-552 – Instrumentation Cables and T.C. Wire.

WC57/S-73-532 – Standard for Control Cables.

WC70/95-658 - Non-Shielded Power Cables Rated 2000V or Less.

**4. Institute of Electrical and Electronic Engineers (IEEE)**

48 - Test Procedures and Requirements for High Voltage Alternating-Current Cable Terminations.

**5. National Fire Protection Association**

National Electrical Code (NEC) NFPA-70.

Standard for Electrical Safety in the Workplace, NFPA 70E

**6. Underwriters Laboratories, Inc. (UL)**

44 - Rubber-Insulated Wires and Cables.

83 - Thermoplastic-Insulated Wires and Cables.

263 - Fire Tests of Building Construction and Materials.

854 - Service Entrance Cables.

1277 - Electrical Power and Control Tray Cables with Optional Optical Fiber Members.

- 7. National Electrical Safety Code, IEEE C2.**
- 8. Occupational Safety and Health Administration, OSHA.**
- 9.** All electrical and control equipment and material shall bear the recognized Underwriters Laboratories, Inc. (UL) seal of approval. It is Vendor's responsibility to obtain local inspection approval for all non-UL labeled equipment and pay all fees in connection with the same.

### **1.3 Submittals**

- A.** Submit as specified in Section 1330.
- B.** Includes, but not limited to, the following:
  - 1.** Data sheets for each wire and cable type specified.
  - 2.** Data sheets for wire and cable accessories.
  - 3.** Cable manufacturer's approval of splicing and terminating materials.
  - 4.** Cable manufacturer's approval of pulling compounds.
  - 5.** Cable manufacturer's installation requirements such as maximum pulling tensions, sidewall pressures, minimum bending radii, etc.
  - 6.** Other equipment and materials to be used.

## **PART 2 - MATERIALS**

### **2.1 Acceptable Manufacturers**

#### **A. Wire and Cable**

Acceptable manufacturers for each wire and cable type will be manufacturers that have been manufacturing the specified cable for a minimum of five years and meet all the requirements listed on the Wire and Cable Specification Sheets.

**B. Wire and Cable Accessories**

**1. Cable Connectors for Control and Instrument Cable**

- a.** AMP Special Industries.
- b.** Hollingsworth Solderless Terminal Company.
- c.** Panduit Corporation.
- d.** Minnesota Mining and Manufacturing (3M).
- e.** Thomas and Betts Company, Inc.

**2. Cable Connectors for Power Cable**

- a.** AMP Special Industries.
- b.** Thomas and Betts Company, Inc.
- c.** Minnesota Mining and Manufacturing (3M).
- d.** Panduit Corporation.

**3. Termination and Splice Kits**

- a.** Minnesota Mining and Manufacturing (3M).
- b.** Raychem.

**4. Tape and Insulation Putty:** Minnesota Mining and Manufacturing (3M).

**5. Cable Ties**

- a.** AMP Special Industries.
- b.** Dennison Manufacturing Company.
- c.** Panduit Corporation.
- d.** Minnesota Mining and Manufacturing (3M).
- e.** Thomas and Betts Company, Inc.

## **6. Cable Supports**

- a.** O-Z/Gedney Company.
- b.** Hubbell, Kellems Grips.

## **7. Terminal Blocks**

- a.** Allen-Bradley.
- b.** Buchanan.
- c.** Phoenix Contact.
- d.** Weidmuller.

## **8. Cable Identification Tags**

- a.** Allen Marking Products, Kansas City, MO.
- b.** Floy Tag and Manufacturing Co., Seattle, WA.
- c.** Panduit Corporation (Panduit).
- d.** Specialty Products Company, Rock Hill, SC.
- e.** Thomas and Betts Company, Inc. (Thomas and Betts).

## **9. Cable Fire and Smoke Stop Fittings**

- a.** Crouse Hinds.
- b.** Nelson Electric.
- c.** O-Z/Gedney Company.

## **2.2 Wire and Cable**

### **A. Building Wires**

- 1.** Conductors: stranded for 12 AWG and larger. Minimum size: 12 AWG.

2. Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90.

**B. MC, Metal Clad Cables**

1. Conductors:
  - .1 Grounding conductor: copper.
  - .2 Circuit conductors: copper, size as indicated.
2. Insulation: Chemically cross-linked thermosetting polyethylene rated type RW90, 600 V.
3. Inner jacket.
4. Armour: continuous aluminum.
5. Overall covering: flame retardant polyvinyl chloride material meeting requirements of Vertical Tray Fire Test.

**C. Instrument Cable – Shielded Twisted Pairs/Triads**

1. Conductors: stranded for 16 AWG and larger. Minimum size: 16 AWG.
2. Copper conductors: size as indicated, with 600 V insulation of PVC material rated RW90. Color code shall use pigmented compounds, white and black for pairs, white, black and red for triads. Each conductor shall include sequential numbers printed on surface of conductors.
3. Conductor jacket: nylon.
4. Shields: aluminized mylar or polyester tape with tinned copper drain wire.
5. Jacket: Polyvinyl chloride (PVC).

**D. Control Cables**

1. Class B or C soft annealed stranded copper conductors, sized as indicated, with cross-linked thermosetting polyethylene, outer PVC jacket rated for outdoor use.

2. 600 V type: with cross-linked polyethylene type, RW90 (x-link) and overall jacket.

**E. Temperature Rating**

Cables shall be suitable for operation with a maximum conductor temperature of 90°C, continuous, wet or dry locations.

**F. Insulation and Jacket Thickness**

See references, Section 1.2.

**G. Factory Tests**

See references, Section 1.2, including the flame test requirement, ICEA T-29-520 and UL 1277.

**H. Certification**

Cables shall be certified to be in conformance with all applicable codes and standards as referenced.

All cables shall include surface identification showing manufacturer's name, insulation type, conductor size, conductor type, voltage rating and UL label.

**2.3 Connectors**

**A. General Requirements**

1. Designed and sized for specific cable being connected.
2. Solderless, pressure-type connectors constructed of non-corrodible tin-plated copper.
3. Rated current-carrying capacity equal to or greater than the cable being connected.
4. Application tooling for connectors shall contain die or piston stops to prevent over-crimping and cycling or pressure relief to prevent under-crimping. Dies of all application tooling shall provide dot or wire size coding for quality control verification. All tooling shall be manufactured by the connector manufacturer.

**B. Power Connectors (10 AWG and Smaller) 600V and Below**

1. "Scotchlok" preinsulated spring wire connectors.
2. Buchanan open-end copper splicing caps, applied with "Lok-Seal" tool, with nylon snap-on insulators.

**C. Power Connectors (sizes 8-4 AWG) 600V and Below**

1. Noninsulated ring-tongue type.
2. Ring tongue sized to match terminal stud size.
3. Brazed barrel seam.
4. Application tooling designed to crimp the wire barrel (conductor grip) with a one-step crimp.

**D. Power Connectors (sizes 2 AWG - 750 kcmil) 600V and Below**

1. Non-insulated one-hole rectangular tongue for sizes 2 AWG through 3/0 AWG and two-hole rectangular tongue for 4/0 AWG through 750 kcmil.
2. Application tooling shall be hydraulically operated.

**E. Control, Instrument, and Specialty Cable Connectors**

1. Tin-plated copper.
2. Vinyl preinsulated spring-type spade terminals. (Hollingsworth "Mini Spring Spades"; Thomas and Betts "Locking-Fork"; Panduit "Locking Fork.")
3. Sized to match terminal stud size.
4. Have insulation grip sleeve to firmly hold to cable insulation.
5. Insulation grip sleeve shall be funneled to facilitate wire insertion and prevent turned-back strands.
6. Application tooling designed to crimp the wire barrel (conductor grip) and the insulation grip sleeve with a one-step crimp.



## **2.4 Motor Lead Termination/Splice (Low-Voltage, 600v and Below, Power Cable)**

- A.** Splices shall be made using compression-type connectors bolted together. The compression-type connectors shall be properly sized for the cables.
- B.** Splice to be covered with heat-shrinkable tubing connector insulators or slip-on rubber boot or sleeve.
- C.** Splicing shall be done in accordance with the instructions provided with the Raychem brand MCK Motor Connector Kit or 3M Company 5300 Series Motor Lead Splice Kit.

## **2.5 Cable Supports**

- A.** Cable supports for cables in vertical conduit risers shall be O-Z/Gedney Type "R" wedging plug type or approved equal.
- B.** Kellems basket type wire mesh grip for cables in vertical installations.

## **2.6 Cable Ties**

- A.** Nylon self-locking type.
- B.** Have a normal service temperature range of -40°C to 85°C.
- C.** Be weather-resistant and sun-light resistant type for outdoor use.
- D.** Meet requirements of Military Specifications MIL-S-23190D.
- E.** AMP Special Industries "AMP-TY," Dennison Manufacturing Company "BAR-LOK," Panduit Corporation "PAN-TY," Thomas & Betts "TY-RAP," or Minnesota Mining and Manufacturing 3M Brand cable ties.

## **2.7 Terminal Blocks**

- A. For mounting in terminal boxes (TBs)**
  - 1.** Designed and sized for the cables being terminated.
  - 2.** Block rated 600V.

3. Binding screw-type terminals for power cables and strap screw or tubular clamp terminals for control and instrument cables.
4. Rated current carrying capacity equal to or greater than the cable being terminated.
5. Marking strip.

**B. For Mounting in Cabinets, Panels, Control Boards, Etc.**

1. Designed and sized for the cables being terminated.
2. Block rated 600V.
3. Binding screw type terminals for power cables and current transformer circuits and strap screw or tubular clamp terminals for control and instrument cables.
4. Rated current carrying capacity equal to or greater than the cable being terminated.
5. Marking strip on blocks for power cables and control and instrument cables.
6. Short-circuit strips with one shorting screw for each terminal for current transformer circuits.

**2.8 Cable Identification Tags**

- A. Designed to provide a permanent wire and cable identification system.
- B. Show complete cable number. Cable numbers are defined in the Cable Schedule and/or Contract Drawings.
- C. Cable numbers may be stamped or typed in a legible and permanent manner. Hand-lettering is not acceptable.
- D. Character size for cable numbers shall be a minimum of 1/8-inch.
- E. Material shall be nonmetallic and impervious to moisture and resistant to fading in sun-light.
- F. Be securely attached to cables and accessible for inspection.

- G.** Cable identification tags, marking and attachment methods shall be subject to approval of the Engineer.

## **2.9 Fastenings**

- 1.** One hole malleable iron straps to secure surface cables 2 inch diameter and smaller. Two hole steel straps for cables larger than 2 inches.
- 2.** Channel type supports for two or more cables.
- 3.** Threaded rods: 3/8 inch dia. stainless steel to support suspended channels.

## **PART 3 – EXECUTION**

### **3.1 Installation**

#### **A. Wire and Cable**

##### **1. General Requirements**

- a.** Install in conduit, duct system or tray as indicated.
- b.** Do not subject cable to pulling tensions or sidewall pressures in excess of manufacturer's recommendations.
- c.** Attach pulling grips over the cable sheath to prevent slipping of the insulation.
- d.** Do not subject cable to bending radius less than those recommended by the cable manufacturer or as noted below (whichever is greater) during or after installation:
  - (1)** Eight times the cable outside diameter for 600V or lower rated cables.
- e.** Install intermediate splices only as indicated or as required to avoid subjecting cable to excessive pulling tension or sidewall pressures. Cable splicing locations

shall be approved by Engineer prior to cable installation.

- f.** Support cables at connections or termination points such that any strain on cable will not be transmitted to the connection or termination.
- g.** Install cable supports in vertical runs of conduit, at boxes and at terminations in equipment, and as required to meet intermediate support requirements of National Electrical Code (NEC).
- h.** All pulling compounds shall be approved by wire and cable manufacturer as being compatible with cable materials.
- i.** Attach a cable identification tag to each cable at all termination or end points.
- j.** Install fire and smoke stop fittings at all cable penetration of fire rated walls, floors and ceilings.

**2. Power (600V and Below), Control, Instrument, and Specialty Cable**

- a.** Install metallic barrier in all tray and boxes to separate power, control and instrumentation from low-level signal (50V or less) instrumentation circuits where run in the same box.
- b.** Cables in vertical trays shall be secured every 3 feet or less.
- c.** Tie together with cable ties all single conductor cable on each individual circuit in each junction box, and equipment at intervals not to exceed 6 feet.
- d. Attach a cable identification tag to each cable.**
  - (1)** At each terminal to identify the circuit and cable.
  - (2)** Use nylon ties and identification tabs color coded as follows:

- (a) 480V circuits - Red.
- (b) 277, 240, or 208Vac circuits - Orange.
- (c) 120V circuits - White.
- (d) Control cables - Natural Nylon.

**e. Insulation Color Coding**

- (1) Conductors shall be coded or numbered over the entire length.
- (2) Colors shall not be changed between source and device. No white wire shall be used in lighting and convenience outlets except as a grounded neutral conductor.

**f. Tag each individual conductor or wire with wire markers as follows:**

- (1) With terminal designation indicated on schematic diagrams or given on manufacturer's equipment drawings.
- (2) At each terminal.
- (3) In addition to specified circuit tags.

**g. Terminate and ground, control, instrument, and specialty cable shields as indicated and recommended by the manufacturer of the equipment being connected. In general, ground the shields at the control boards for control cables and at the receiving end equipment for instrumentation and specialty cables.**

**h. Control and instrument cable splices shall be as follows:**

- (1) Made only in junction or terminal boxes.
- (2) Made on terminal blocks with marking strips.

- (3) Conductor color coding shall be maintained.
    - (4) For shielded cables, shield continuity and isolation shall be maintained.
  - i. **Power cable (600V or below) splices and motor terminations shall be as follows:**
    - (1) Made only in junction or terminal boxes.
    - (2) Splices shall be made using compression type connectors bolted together.
    - (3) Splice to be covered with a heat-shrinkable connector insulator.
  - j. **Lighting Cable:** Install as specified in this Division.
  - k. **Ground Cable:** Install as specified in this Division.
  - l. Install fire and smoke stop fittings at all cable penetrations of fire-rated walls, floors, and ceilings.

### **3. Cable Connections and Terminations**

- a. Make up clean and tight to assure a low-resistance joint.
- b. Make only in terminal boxes, equipment or other accepted enclosures and not in conduit.
- c. Install all connectors with tooling manufactured by the connector manufacturer and as specified.

### **3.2 Field Quality Control**

- A. Manufacturer's Field Services:** Provide as specified in DIVISION 1.
- B. Field Testing:** Specified in Section 16950.

## **PART 4 - MEASUREMENT AND PAYMENT**

### **4.1 Measurement**

- A.** No measurement will be made for this item.

#### **4.2 Payment**

- A.** Payment will be made at the contract lump sum price bid and shall be considered full payment for providing labor and materials to perform this work.

**\*\* END OF SECTION 16120 \*\***

## **SECTION 16450**

### **GROUNDING**

#### **PART 1 - GENERAL**

##### **1.1 Description**

- A.** This Section includes the following:
- 1.** Facility ground grid and ground rod system.
  - 2.** Ground riser extensions to structural steel, electrical equipment, and mechanical equipment.

##### **1.2 References**

**1. American Society For Testing and Materials (ASTM)**

ASTM B8 - Concentric-Lay Stranded-Copper Conductors, Hard, Medium-Hard, or Soft.

**2. National Electrical Safety Code (NESC)**

**3. National Fire Protection Association (NFPA)**

70 - National Electrical Code.

70E – Standard for Electrical Safety in the Workplace

**4. Underwriters' Laboratories (UL)**

467 - Electrical Grounding and Bonding Equipment.

**5. Occupational Safety and Health Administration, OSHA.**

- 6.** All electrical and control equipment and material shall bear the recognized Underwriters Laboratories, Inc. (UL) seal of approval. It is Vendor's responsibility to obtain local inspection approval for all non-UL labeled equipment and pay all fees in connection with the same.



### **1.3 Submittals**

- A.** Submit as specified in Section 1330.
- B.** Includes, but not limited to, catalog cuts for the following:
  - 1.** Ground Rods.
  - 2.** Cable.
  - 3.** Grounding Lugs.

## **PART 2 - MATERIALS**

### **2.1 Acceptable Manufacturers**

#### **A. Ground Rods**

- 1.** Joslyn Manufacturing and Supply Company.
- 2.** Copperweld Bimetallics Group.
- 3.** Knight-Metalcraft, Division of Whitaker Cable.
- 4.** ITT Blackburn Company, a Division of International Telephone and Telegraph Corporation.
- 5.** Harger

#### **B. Cable-to-Equipment Ground Lugs**

- 1.** Burndy Corporation (Burndy).
- 2.** Knight-Metalcraft, Division of Whitaker Cable.
- 3.** Harger

### **2.2 Wire and Cable**

- A.** Type BC2 as specified in this Division (Section 16120).
- B. Conductor Sizes**
  - 1.** As indicated for specific connections.

2. For required connections not indicated, use conductor size not less than No. 4/0 AWG if buried in earth or cast in concrete, or No.2 AWG at other locations, unless otherwise noted.

### **2.3 Ground Rods**

- A. Copper-clad steel or copper-alloy sectional-type rods.
- B. One end pointed to facilitate driving.
- C. 3/4-inch diameter x 10 feet long with diameter and length stamped near top of rod.

### **2.4 Connection Materials**

- A. Cable-to-cable and cable-to-rod cable-to-connector connections of exothermic-welding-type process.
- B. **Cable-To-Equipment Ground Lugs**
  1. Compression type.
  2. Bolted to equipment housing with silicon bronze bolts and lock washers.

### **2.5 Coatings**

- A. **Coal Tar**
  1. Kop Coat - No. 50.
  2. Tnemec - 46-449.

## **PART 3 - EXECUTION**

- 3.1 **Inspection:** Do not cover up connections before they are inspected by Engineer.

### **3.2 Installation**

- A. **Wire and Cable**
  1. Install using as few joints as possible.

2. Protect against abrasion by several wrappings of rubber tape at all points where cable leaves concrete in exposed areas.
3. Suitably protect cable against damage during construction.
4. Replace or suitably repair cable if damaged by anyone before final acceptance.
5. All Connections to be metal to metal. Remove all paint, grease, dirt, etc. before making connections.

**6. In Exposed Installations**

- a. Route runs as indicated.
- b. Route along the webs of columns and beams, and in corners where possible for maximum physical protection.
- c. Support at intervals of 3 feet or less with nonmagnetic clamp-type supports.
- d. Where exposed and no natural protection available, provide physical protection as required to protect ground conductor.

**7. In Buried Installations**

- a. Lay in bottom of trench or in other excavations at least 30 inches below finished grade.
- b. Maintain clearance of at least 12 inches from all underground metal piping or structures, except where connections thereto are specifically indicated.
- c. Backfill as specified in DIVISION 2.

**B. Ground Rods**

1. Install rods as indicated by driving and not by drilling or jetting.
2. Drive rods into undisturbed earth where possible.

3. Where rods must be installed in excavated areas, drive rods into earth after compaction of backfill is completed.
4. Drive to a depth such that top of rods will be approximately 18 inches below final grade or subgrade, and connect main grid ground cable thereto.

**C. Connections**

1. Conform to manufacturer's instructions.
2. Chemically degrease and dry completely before welding.
3. Apply one coat of coal tar coating at 15 mils dry film thickness to all exothermic-welded connections to be buried.
4. **Make connections to equipment as follows:**
  - a. Make up clean and tight to assure a low-resistance connection with resistance not exceeding 1 ohm.
  - b. Install so as not to be susceptible to mechanical damage during operation or maintenance of equipment.
  - c. Provide direct copper connection to buried ground grid system.
  - d. Prior to making connections remove all paint, grease, etc. from connection location.

**D. Metallic Conduit Grounds**

1. Adequately and properly ground at all terminal points and wherever isolated from equipment or grounded steel.
2. Where extending into floor-mounted equipment from below, connect to equipment ground bus or frame.
3. Where extending into manholes, handholes, or cable trenches, connect to the ground riser or cable at that structure using grounding bushings.

**E. Rack Grounds**

1. Ground at intervals not to exceed 20 feet.
2. Ground all continuous runs as well as isolated sections at least at one point.

**F. Box Grounds:** Unless grounded by conduit system, ground all boxes by direct copper connection to the buried ground grid system.

**G. Motor Grounds:** Ground all motors with "identified" ground conductor in addition to conduit system. Route in conduit with phase conductors unless external ground is indicated.

**3.3 Field Testing:** Specified in Section 16950.

**PART 4 MEASUREMENT AND PAYMENT**

**4.1 Measurement**

**A.** No measurement will be made for this item.

**4.2 Payment**

**A.** Payment will be made at the contract lump sum price bid and shall be considered full payment for providing labor and materials to perform this work.

**\*\* END OF SECTION 16450 \*\***