

CITY OF ANN ARBOR
INVITATION TO BID



Water Treatment Plant
Ammonia Feed System Modifications

ITB No. 4571

Due Date: Friday, March 8, 2019, at 2:00 p.m. (Local Time)

Public Services Area/Water Treatment Services Unit
Administering Service Area/Unit

Issued By:

City of Ann Arbor
Procurement Unit
301 E. Huron Street
Ann Arbor, MI 48104

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NOTICE OF PRE-BID CONFERENCE

A pre-bid conference for this project will be held on **Thursday, February 14, 2019, at 2:00 p.m.** at **919 Sunset Road, Ann Arbor, MI 48103**. A site visit will follow the pre-bid conference to allow bidders the opportunity to view the project site.

Attendance at this conference is highly recommended. Administrative and technical questions regarding this project will be answered at this time. The pre-bid conference is for information only. Any answers furnished will not be official until verified in writing by the Financial Service Area, Procurement Unit. Answers that change or substantially clarify the bid will be affirmed in an addendum.

INSTRUCTIONS TO BIDDERS

General

Work to be done under this Contract is generally described through the detailed specifications and must be completed fully in accordance with the contract documents. All work to be done under this Contract is located in or near the City of Ann Arbor.

Any Bid which does not conform fully to these instructions may be rejected.

Preparation of Bids

Bids should be prepared providing a straight-forward, concise description of the Bidder's ability to meet the requirements of the ITB. Bids shall be written in ink or typewritten. No erasures are permitted. Mistakes may be crossed out and corrected and must be initialed and dated in ink by the person signing the Bid.

Bids must be submitted on the "Bid Forms" provided with each blank properly filled in. If forms are not fully completed it may disqualify the bid. No alternative bid will be considered unless alternative bids are specifically requested. If alternatives are requested, any deviation from the specification must be fully described, in detail on the "Alternate" section of Bid form.

Each person signing the Bid certifies that he/she is the person in the Bidder's firm/organization responsible for the decision as to the fees being offered in the Bid and has not and will not participated in any action contrary to the terms of this provision.

Questions or Clarifications / Designated City Contacts

All questions regarding this ITB shall be submitted via email. Emailed questions and inquires will be accepted from any and all prospective Bidders in accordance with the terms and conditions of the ITB.

All questions shall be due on or before **Monday, February 18, 2019, 4:00 p.m. local time** and should be addressed as follows:

Specification/Scope of Work questions emailed to **Emily Schlanderer, PE** at ESchlanderer@a2gov.org.

Bid Process and Compliance questions emailed to cspencer@a2gov.org.

Any error, omissions or discrepancies in the specification discovered by a prospective contractor and/or service provider shall be brought to the attention of Emily Schlanderer, PE at ESchlanderer@a2gov.org after discovery as possible. Further, the contractor and/or service provide shall not be allowed to take advantage of errors, omissions or discrepancies in the specifications.

Addenda

If it becomes necessary to revise any part of the ITB, notice of the Addendum will be posted to Michigan Inter-governmental Trade Network (MITN) www.mitn.info and/or City of Ann Arbor web site www.A2gov.org for all parties to download.

Each Bidder must in its Bid, to avoid any miscommunications, acknowledge all addenda which it has received, but the failure of a Bidder to receive, or acknowledge receipt of; any addenda shall not relieve the Bidder of the responsibility for complying with the terms thereof.

The City will not be bound by oral responses to inquiries or written responses other than written addenda.

Bid Submission

All Bids are due and must be delivered to the City of Ann Arbor Procurement Unit on or before **Friday, March 8, 2019 at 2:00 p.m. EST**. Bids submitted late or via oral, telephonic, telegraphic, electronic mail or facsimile **will not** be considered or accepted.

Each Bidder must submit one (1) original Bid and **two (2)** Bid copies in a sealed envelope clearly marked: **ITB No. 4571 – Water Treatment Plant Ammonia Feed System Modifications**.

Bids must be addressed and delivered to:

City of Ann Arbor
Procurement Unit,
c/o Customer Services, 1st Floor
301 East Huron Street
Ann Arbor, MI 48107

All Bids received on or before the Due Date will be publicly opened and recorded immediately. No immediate decisions are rendered.

The following forms provided within this ITB Document must be included in submitted bids.

- **City of Ann Arbor Prevailing Wage Declaration of Compliance**
- **City of Ann Arbor Living Wage Ordinance Declaration of Compliance**
- **Vendor Conflict of Interest Disclosure Form**
- **City of Ann Arbor Non-Discrimination Ordinance Declaration of Compliance**

Bids that fail to provide these completed forms listed above upon bid opening will be rejected as non-responsive and will not be considered for award.

Hand delivered bids will be date/time stamped/signed by the Procurement Unit at the address above in order to be considered. Normal business hours are 9:00 a.m. to 3:00 p.m. Monday through Friday, excluding Holidays. The City will not be liable to any Bidder for any unforeseen circumstances, delivery or postal delays. Postmarking to the Due Date will not substitute for receipt of the Bid. Each Bidder is responsible for submission of their Bid.

Additional time for submission of bids past the stated due date and time will not be granted to a single Bidder; however, additional time may be granted to all Bidders when the City determines in its sole discretion that circumstances warrant it.

Award

The City intends to award a Contract(s) to the lowest responsible Bidder(s). On multi-divisional contracts, separate divisions may be awarded to separate Bidders. The City may also utilize alternatives offered in the Bid Forms, if any, to determine the lowest responsible Bidder on each division, and award multiple divisions to a single Bidder, so that the lowest total cost is achieved for the City. For unit price bids, the Contract will be awarded based upon the unit prices and the lump sum prices stated by the bidder for the work items specified in the bid documents, with consideration given to any alternates selected by the City. If the City determines that the unit price for any item is materially different for the work item bid than either other bidders or the general

market, the City, in its sole discretion, in addition to any other right it may have, may reject the bid as not responsible or non-conforming.

The acceptability of major subcontractors will be considered in determining if a Bidder is responsible. In comparing Bids, the City will give consideration to alternate Bids for items listed in the bid forms. All key staff and subcontractors are subject to the approval by the City.

Qualifications

The City will evaluate Proposals based on cost as well as experience. Contractors that have not included the required list of similar work experience and associated references in Section 5 of the Bid Form may have their bid rejected.

As part of the proposal, Bidders shall provide documentation that the Bidder's company has at least 10 years of experience performing construction on similar projects, specifically, the completion of mechanical projects involving handling of ammonia or other hazardous gas feed systems and coordination of specialty subcontractors.

Bidders shall also submit the attached form, "Section 5-References," which identifies a minimum of three projects completed in the past 10 years on similar projects, including construction cost, contractor and subcontractor information, that demonstrate similar work experience and complexity to that included within these contract documents.

Official Documents

The City of Ann Arbor officially distributes bid documents from the Procurement Unit or through the Michigan Intergovernmental Trade Network (MITN). Copies of the bid documents obtained from any other source are not Official copies. Addenda and other bid information will only be posted to these official distribution sites. If you obtained City of Ann Arbor Bid documents from other sources, it is recommended that you register on www.MITN.info and obtain an official Bid. Bidders do not need to be shown on the plan holders list provided by MITN to be considered an official plan holder.

Bid Security

Each bid must be accompanied by a certified check, or Bid Bond by a surety licensed and authorized to do business within the State of Michigan, in the amount of 5% of the total of the bid price.

Withdrawal of Bids

After the time of opening, no Bid may be withdrawn for the period of ninety (90) days

Contract Time

Time is of the essence in the performance of the work under this Contract. The available time for work under this Contract is indicated on page C-1, Article III of the Contract. If these time requirements can not be met, the Bidder must stipulate on Bid Form Section 3 - Time Alternate its schedule for performance of the work. Consideration will be given to time in evaluating bids.

Liquidated Damages

A liquidated damages clause, as given on page C-2, Article III of the Contract, provides that the Contractor shall pay the City as liquidated damages, and not as a penalty, a sum certain per day for each and every day that the Contractor may be in default of completion of the specified work, within the time(s) stated in the Contract, or written extensions.

Liquidated damages clauses, as given in the General Conditions, provide further that the City shall be entitled to impose and recover liquidated damages for breach of the obligations under Chapter 112 of the City Code.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

Human Rights Information

All contractors proposing to do business with the City shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the Section 9:158 of the Ann Arbor City Code. Breach of the obligation not to discriminate as outlined in Section 5, beginning at page GC-2 shall be a material breach of the contract. Contractors are required to post a copy of Ann Arbor's Non-Discrimination Ordinance attached at all work locations where its employees provide services under a contract with the City.

Wage Requirements

Section 4, beginning at page GC-1, outlines the requirements for payment of prevailing wages and for payment of a "living wage" to employees providing service to the City under this contract. The successful bidder and its subcontractors must comply with all applicable requirements and provide proof of compliance.

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. Use of the Prevailing Wage Form provided in the Appendix section or a City-approved equivalent will be required along with wage rate interviews.

For laborers whose wage level are subject to federal, state and/or local prevailing wage law the appropriate Davis-Bacon wage rate classification is identified based upon the work including within this contract. **The wage determination(s) current on the date 10 days before bids are due shall apply to this contract.** The U.S. Department of Labor (DOL) has provided explanations to assist with classification in the following resource link: www.wdol.gov.

For the purposes of this ITB the Construction Type of Heavy will apply.

Conflict Of Interest Disclosure

The City of Ann Arbor Purchasing Policy requires that prospective Vendors complete a Conflict of Interest Disclosure form. A contract may not be awarded to the selected Vendor unless and until the Procurement Unit and the City Administrator have reviewed the Disclosure form and determined that no conflict exists under applicable federal, state, or local law or administrative regulation. Not every relationship or situation disclosed on the Disclosure Form may be a disqualifying conflict. Depending on applicable law and regulations, some contracts may awarded on the recommendation of the City Administrator after full disclosure, where such action is allowed by law, if demonstrated competitive pricing exists and/or it is determined the award is in the best interest of the City. A copy of the Vendor Conflict of Interest Disclosure Form is attached.

Major Subcontractors

The Bidder shall identify on Bid Form Section 4 each major subcontractor it expects to engage for this Contract if the work to be subcontracted is 15% or more of the bid sum or over \$50,000,

whichever is less. The Bidder also shall identify the work to be subcontracted to each major subcontractor. The Bidder shall not change or replace a subcontractor without approval by the City.

Debarment

Submission of a Bid in response to this ITB is certification that the Bidder is not currently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from participation in this transaction by any State or Federal departments or agency. Submission is also agreement that the City will be notified of any changes in this status.

Disclosures

After bids are opened, all information in a submitter's bid is subjected to disclosure under the provisions of Michigan Public Act No. 442 of 1976, as amended (MCL 15.231 et seq.) known as the "Freedom of Information Act." The Freedom of Information Act also provides for the complete disclosure of contracts and attachments thereto except where specifically exempted.

Bid Protest

All Bid protests must be in writing and filed with the Purchasing Agent within five (5) business days of the award action. The bidder must clearly state the reasons for the protest. If a bidder contacts a City Service Area/Unit and indicates a desire to protest an award, the Service Area/Unit shall refer the bidder to the Purchasing Agent. The Purchasing Agent will provide the bidder with the appropriate instructions for filing the protest. The protest shall be reviewed by the City Administrator or designee whose decision shall be final.

Any inquiries or requests regarding this procurement should be only submitted in writing to the designated City contacts provided herein. Attempts by the Offeror to initiate contact with anyone other than the Designated City Contacts provided herein that the prospective Offeror believes can influence the procurement decision, e.g., Elected Officials, City Administrator, Selection Committee Members, Appointed Committee Members, etc., may lead to immediate elimination from further consideration.

Cost Liability

The City of Ann Arbor assumes no responsibility or liability for costs incurred by the Bidder prior to the execution of a contract with the City. By submitting a bid, a bidder agrees to bear all costs incurred or related to the preparation, submission and selection process for the bid.

Reservation of Rights

The City of Ann Arbor reserves the right to accept any bid or alternative bid proposed in whole or in part, to reject any or all bids or alternatives bids in whole or in part and to waive irregularity and/or informalities in any bid and to make the award in any manner deemed in the best interest of the City.

Idlefree Ordinance

The City of Ann Arbor adopted an idling reduction Ordinance that goes into effect July 1, 2017. The full text of the ordinance (including exemptions) can be found at: www.a2gov.org/idlefree.

Under the ordinance, No Operator of a Commercial Vehicle shall cause or permit the Commercial Vehicle to Idle:

- (a) For any period of time while the Commercial Vehicle is unoccupied; or

- (b) For more than 5 minutes in any 60-minute period while the Commercial Vehicle is occupied.

In addition, generators and other internal combustion engines are covered

- (1) Excluding Motor Vehicle engines, no internal combustion engine shall be operated except when it is providing power or electrical energy to equipment or a tool that is actively in use.

Environmental Commitment

The City of Ann Arbor recognizes its responsibility to minimize negative impacts on human health and the environment while supporting a vibrant community and economy. The City further recognizes that the products and services the City buys have inherent environmental and economic impacts and that the City should make procurement decisions that embody, promote, and encourage the City's commitment to the environment.

The City encourages potential vendors to bring forward emerging and progressive products and services that are best suited to the City's environmental principles.

SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

Bidders shall submit with their Bid, responses to the following. Responses shall be prepared to numerically match the itemized list as follows:

1. Bidder shall submit a formal/written safety program.
2. Bidder shall describe the job site safety program for this project and specific safety policies in which employees must be in compliance.
3. Bidder shall provide the organizations most current OSHA 300 logs or reasons why this organization is exempt from OSHA 300 reporting.
4. Bidder shall provide the organization's most recent OSHA recordable incident rate, DART rate, and lost workday rate.
5. If applicable, bidder shall provide the organization's excavation and trench safety program. Within this program, please identify the organization's Qualified Person for excavation and trench safety that will be on-site daily.
6. Bidder shall identify the project safety team, their qualifications, duties and city(s) of residence.
7. Bidder shall identify any major accidents or incidents that resulted in major injury or deaths that have occurred on a project site controlled by the firm, or any subcontractor(s) (at any contractual level), that had any major injury or death on a project site? If so, describe how the organization has revised the program.

INVITATION TO BID

City of Ann Arbor
Guy C. Larcom Municipal Building
Ann Arbor, Michigan 48107

Ladies and Gentlemen:

The undersigned, as Bidder, declares that this Bid is made in good faith, without fraud or collusion with any person or persons bidding on the same Contract; that this Bidder has carefully read and examined the bid documents, including City Nondiscrimination requirements and Declaration of Compliance Form, Living Wage requirements and Declaration of Compliance Form, Prevailing Wage requirements and Declaration of Compliance Form, Vendor Conflict of Interest Form, Notice of Pre-Bid Conference, Instructions to Bidders, Bid, Bid Forms, Contract, Bond Forms, General Conditions, Standard Specifications, Detailed Specifications, all Addenda, and the Plans (if applicable) and understands them. The Bidder declares that it conducted a full investigation at the site and of the work proposed and is fully informed as to the nature of the work and the conditions relating to the work's performance. The Bidder also declares that it has extensive experience in successfully completing projects similar to this one.

The Bidder acknowledges that it has not received or relied upon any representations or warrants of any nature whatsoever from the City of Ann Arbor, its agents or employees, and that this Bid is based solely upon the Bidder's own independent business judgment.

The undersigned proposes to perform all work shown on the plans or described in the bid documents, including any addenda issued, and to furnish all necessary machinery, tools, apparatus, and other means of construction to do all the work, furnish all the materials, and complete the work in strict accordance with all terms of the Contract of which this Bid is one part.

In accordance with these bid documents, and Addenda numbered _____, the undersigned, as Bidder, proposes to perform at the sites in and/or around Ann Arbor, Michigan, all the work included herein for the amounts set forth in the Bid Forms.

The Bidder declares that it has become fully familiar with the liquidated damage clauses for completion times and for compliance with City Code Chapter 112, understands and agrees that the liquidated damages are for the non-quantifiable aspects of non-compliance and do not cover actual damages that may be shown and agrees that if awarded the Contract, all liquidated damage clauses form part of the Contract.

The Bidder declares that it has become fully familiar with the provisions of Chapter 14, Section 1:320 (Prevailing wages) and Chapter 23 (Living Wage) of the Code of the City of Ann Arbor and that it understands and agrees to comply, to the extent applicable to employees providing services to the City under this Contract, with the wage and reporting requirements stated in the City Code provisions cited. Bidder certifies that the statements contained in the City Prevailing Wage and Living Wage Declaration of Compliance Forms are true and correct. Bidder further agrees that the cited provisions of Chapter 14 and Chapter 23 form a part of this Contract.

The Bidder declares that it has become familiar with the City Conflict of Interest Disclosure Form and certifies that the statement contained therein is true and correct.

The Bidder encloses a certified check or Bid Bond in the amount of 5% of the total of the Bid Price. The Bidder agrees both to contract for the work and to furnish the necessary Bonds and insurance documentation within 10 days after being notified of the acceptance of the Bid.

If this Bid is accepted by the City and the Bidder fails to contract and furnish the required Bonds and insurance documentation within 10 days after being notified of the acceptance of this Bid, then the Bidder shall be considered to have abandoned the Contract and the certified check or Bid Bond accompanying this Bid shall become due and payable to the City.

If the Bidder enters into the Contract in accordance with this Bid, or if this Bid is rejected, then the accompanying check or Bid Bond shall be returned to the Bidder.

In submitting this Bid, it is understood that the right is reserved by the City to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

SIGNED THIS _____ DAY OF _____, 201_.

Bidder's Name

Authorized Signature of Bidder

Official Address

(Print Name of Signer Above)

Telephone Number

Email Address for Award Notice

LEGAL STATUS OF BIDDER

(The Bidder shall fill out the appropriate form and strike out the other three.)

Bidder declares that it is:

* A corporation organized and doing business under the laws of the State of _____, for whom _____, bearing the office title of _____, whose signature is affixed to this Bid, is authorized to execute contracts.

NOTE: If not incorporated in Michigan, please attach the corporation's Certificate of Authority

• A limited liability company doing business under the laws of the State of _____, whom _____ bearing the title of _____ whose signature is affixed to this proposal, is authorized to execute contract on behalf of the LLC.

* A partnership, organized under the laws of the state of _____ and filed in the county of _____, whose members are (list all members and the street and mailing address of each) (attach separate sheet if necessary):

* An individual, whose signature with address, is affixed to this Bid: _____ (initial here)

Authorized Official

_____ **Date** _____, 201__

(Print) Name _____ Title _____

Company: _____

Address: _____

Contact Phone () _____ Fax () _____

Email _____

BID FORM

Section 1 – Schedule of Prices

Company: _____

Project: **Water Treatment Plant Ammonia Feed System Modifications - ITB No. 4571**

Notes:

1. All bidders shall provide a Unit Price and Total Price for all bid items specified.
2. The City, at its sole discretion, may elect to delete any portion of the work delineated below, with no change to the unit prices provided. Work shall be determined based upon the availability of funds.
3. Any item not provided in the following list shall be considered incidental.
4. Contract shall be awarded based on the base bid or any combination of base bid and alternate bid in any manner the City believed to be in its best interest.

Bid Items

The Bidder agrees to complete the Project and all related work, as specified and shown on the drawings, for the following unit prices.

AMMONIA FEED SYSTEM MODIFICATIONS					
BASE BID					
Item No.	Item Description	Qty	Unit	Unit Price	Total Price
1.	General Conditions (Max, 10% of total bid)	1	LS	\$	\$
2.	Ammonia Piping and Tank Modifications	1	LS	\$	\$
3.	Ammonia Feed Equipment (using Hydro Instruments)	1	LS	\$	\$
4.	Start-Up, Commissioning, and Training	1	LS	\$	\$
5.	Final Closeout	1	LS	\$	\$
6.	Temporary Ammonia Feed System Allowance	1	ALW	\$30,000	\$30,000
7.	Permit Allowance	1	ALW	\$ 5,000	\$ 5,000
8.	Miscellaneous Allowance	1	ALW	\$10,000	\$10,000
9.	Certified Payroll Compliance and Reporting	1	LS		
TOTAL BASE BID (ITEMS 1 THROUGH 9)					\$

Total Base Bid: _____ Dollars
 (\$ _____)

(Amount shall be shown in both words and figures. In case of a discrepancy, the amount shown in words shall govern.)

Alternates

Bidder shall list alternate bid item prices below.

Alternate No. 1 – Ammonia Feed Equipment (Alternate Manufacturer)

In lieu of the Base Bid manufacturer, provide an alternate manufacturer for Ammonia Feed Equipment and any necessary changes to the Work or means and methods associated with this submission. Contractor shall include the cost of all changes needed for a complete and functional system, including electrical, controls, panel sizing and arrangement, piping, and all other related work. Contractor shall submit revised drawings of all changes to Engineer and Owner for review and approval.

Equipment Manufacturer Name: _____

Add/Subtract (Circle One): _____ **Dollars**

(\$ _____)

(Amount shall be shown in both words and figures. In case of discrepancy, the amount shown in words shall govern.)

BID FORM

Section 2 – Material, Equipment and Environmental Alternates

The Base Bid proposal price shall include materials and equipment selected from the designated items and manufacturers listed in the bidding documents. This is done to establish uniformity in bidding and to establish standards of quality for the items named.

If the Contractor wishes to quote alternate items for consideration by the City, it may do so under this Section. A complete description of the item and the proposed price differential must be provided. Unless approved at the time of award, substitutions where items are specifically named will be considered only as a negotiated change in Contract Sum.

<u>Item Number</u>	<u>Description</u>	<u>Add/Deduct Amount</u>
	Alternate Ammonia Feed Equipment Manufacturer	\$ _____

If the Bidder does not suggest any material or equipment alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any material or equipment alternate under the Contract.

Signature of Authorized Representative of Bidder _____ Date _____

BID FORM

Section 3 - Time Alternate

If the Bidder takes exception to the time stipulated in Article III of the Contract, Time of Completion, page C-1, it is requested to stipulate below its proposed time for performance of the work. Consideration will be given to time in evaluating bids.

If the Bidder does not suggest any time alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any time alternate under the Contract.

Signature of Authorized Representative of Bidder _____ Date _____

BID FORM

Section 4 - Major Subcontractors/Suppliers

For purposes of this Contract, a Subcontractor or Supplier is anyone (other than the Contractor) who performs work (other than or in addition to the furnishing of materials, plans or equipment) at or about the construction site, directly or indirectly for or on behalf of the Contractor (and whether or not in privity of Contract with the Contractor), but shall not include any individual who furnishes merely the individual's own personal labor or services.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision to Section 4 of the General Conditions covering subcontractor's employees who perform work on this contract.

For the work outlined in these documents the Bidder expects to engage the following major subcontractors to perform the work identified:

<u>Subcontractor/Supplier (Name and Address)</u>	<u>Work</u>	<u>Amount</u>
	Mechanical	
	Electrical	
Hydro Instruments	Ammonia Feed Equipment Manufacturer	
Metro Welding Corp	Temporary Feed System Supplier	
	Painter	

If the Bidder does not expect to engage any major subcontractor, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT expect to engage any major subcontractor to perform work under the Contract.

Signature of Authorized Representative of Bidder _____ Date _____

**CITY OF ANN ARBOR
DOCUMENTS AND FORMS**

**CITY OF ANN ARBOR
PREVAILING WAGE DECLARATION OF COMPLIANCE**

The “wage and employment requirements” of Section 1:320 of Chapter 14 of Title I of the Ann Arbor City Code mandates that the city not enter any contract, understanding or other arrangement for a public improvement for or on behalf of the city unless the contract provides that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. Where the contract and the Ann Arbor City Code are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used. Further, to the extent that any employees of the contractor providing services under this contract are not part of the class of craftsmen, mechanics and laborers who receive a prevailing wage in conformance with section 1:320 of Chapter 14 of Title I of the Code of the City of Ann Arbor, employees shall be paid a prescribed minimum level of compensation (i.e. Living Wage) for the time those employees perform work on the contract in conformance with section 1:815 of Chapter 23 of Title I of the Code of the City of Ann Arbor.

At the request of the city, any contractor or subcontractor shall provide satisfactory proof of compliance with this provision.

The Contractor agrees:

- (a) To pay each of its employees whose wage level is required to comply with federal, state or local prevailing wage law, for work covered or funded by this contract with the City,
- (b) To require each subcontractor performing work covered or funded by this contract with the City to pay each of its employees the applicable prescribed wage level under the conditions stated in subsection (a) or (b) above.
- (c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.
- (d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the wage and employment provisions of the Chapter 14 of the Ann Arbor City Code. The undersigned certifies that he/she has read and is familiar with the terms of Section 1:320 of Chapter 14 of the Ann Arbor City Code and by executing this Declaration of Compliance obligates his/her employer and any subcontractor employed by it to perform work on the contract to the wage and employment requirements stated herein. The undersigned further acknowledges and agrees that if it is found to be in violation of the wage and employment requirements of Section 1:320 of the Chapter 14 of the Ann Arbor City Code it shall has be deemed a material breach of the terms of the contract and grounds for termination of same by the City.

_____ Company Name

_____ Signature of Authorized Representative Date

_____ Print Name and Title

_____ Address, City, State, Zip

_____ Phone/Email address

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500

CITY OF ANN ARBOR
LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that an employer who is (a) a contractor providing services to or for the City for a value greater than \$10,000 for any twelve-month contract term, or (b) a recipient of federal, state, or local grant funding administered by the City for a value greater than \$10,000, or (c) a recipient of financial assistance awarded by the City for a value greater than \$10,000, shall pay its employees a prescribed minimum level of compensation (i.e., Living Wage) for the time those employees perform work on the contract or in connection with the grant or financial assistance. The Living Wage must be paid to these employees for the length of the contract/program.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from compliance with the Living Wage Ordinance. If this exemption applies to your company/non-profit agency please check here No. of employees__

The Contractor or Grantee agrees:

- (a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as \$13.22/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than \$14.75/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance with Section 1:815(3).

Check the applicable box below which applies to your workforce

Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits

Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits

- (a) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.
- (b) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.
- (c) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.
- (d) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services or agrees to accept financial assistance in accordance with the terms of the Living Wage Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Living Wage Ordinance, obligates the Employer/Grantee to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract or grant of financial assistance.

Company Name

Street Address

Signature of Authorized Representative

Date

City, State, Zip

Print Name and Title

Phone/Email address

**CITY OF ANN ARBOR
LIVING WAGE ORDINANCE**

RATE EFFECTIVE APRIL 30, 2018 - ENDING APRIL 29, 2019

\$13.22 per hour

If the employer provides health
care benefits*

\$14.75 per hour

If the employer does **NOT**
provide health care benefits*

Employers providing services to or for the City of Ann Arbor or recipients of grants or financial assistance from the City of Ann Arbor for a value of more than \$10,000 in a twelve-month period of time must pay those employees performing work on a City of Ann Arbor contract or grant, the above living wage.

ENFORCEMENT

The City of Ann Arbor may recover back wages either administratively or through court action for the employees that have been underpaid in violation of the law. Persons denied payment of the living wage have the right to bring a civil action for damages in addition to any action taken by the City.

Violation of this Ordinance is punishable by fines of not more than \$500/violation plus costs, with each day being considered a separate violation. Additionally, the City of Ann Arbor has the right to modify, terminate, cancel or suspend a contract in the event of a violation of the Ordinance.

* Health Care benefits include those paid for by the employer or making an employer contribution toward the purchase of health care. The employee contribution must not exceed \$.50 an hour for an average work week; and the employer cost or contribution must equal no less than \$1/hr for the average work week.

The Law Requires Employers to Display This Poster Where Employees Can Readily See It.

**For Additional Information or to File a Complaint Contact:
Colin Spencer at 734/794-6500 or cspencer@a2gov.org**

Revised 2/1/2018



Vendor Conflict of Interest Disclosure Form

All vendors interested in conducting business with the City of Ann Arbor must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the City of Ann Arbor's conflict of interest policies as stated within the certification section below.

If a vendor has a relationship with a City of Ann Arbor official or employee, an immediate family member of a City of Ann Arbor official or employee, the vendor shall disclose the information required below.

1. No City official or employee or City employee's immediate family member has an ownership interest in vendor's company or is deriving personal financial gain from this contract.
2. No retired or separated City official or employee who has been retired or separated from the City for less than one (1) year has an ownership interest in vendor's Company.
3. No City employee is contemporaneously employed or prospectively to be employed with the vendor.
4. Vendor hereby declares it has not and will not provide gifts or hospitality of any dollar value or any other gratuities to any City employee or elected official to obtain or maintain a contract.
5. Please note any exceptions below:

Conflict of Interest Disclosure*	
Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest.	<input type="checkbox"/> Relationship to employee <hr/> <input type="checkbox"/> Interest in vendor's company <input type="checkbox"/> Other (please describe in box below)

*Disclosing a potential conflict of interest does not disqualify vendors. In the event vendors do not disclose potential conflicts of interest and they are detected by the City, vendor will be exempt from doing business with the City.

I certify that this Conflict of Interest Disclosure has been examined by me and that its contents are true and correct to my knowledge and belief and I have the authority to so certify on behalf of the Vendor by my signature below:		
Vendor Name	Vendor Phone Number	
Signature of Vendor Authorized Representative	Date	Printed Name of Vendor Authorized Representative

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500, procurement@a2gov.org

**CITY OF ANN ARBOR
DECLARATION OF COMPLIANCE**

Non-Discrimination Ordinance

The "non discrimination by city contractors" provision of the City of Ann Arbor Non-Discrimination Ordinance (Ann Arbor City Code Chapter 112, Section 9:158) requires all contractors proposing to do business with the City to treat employees in a manner which provides equal employment opportunity and does not discriminate against any of their employees, any City employee working with them, or any applicant for employment on the basis of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight. It also requires that the contractors include a similar provision in all subcontracts that they execute for City work or programs.

In addition the City Non-Discrimination Ordinance requires that all contractors proposing to do business with the City of Ann Arbor must satisfy the contract compliance administrative policy adopted by the City Administrator. A copy of that policy may be obtained from the Purchasing Manager

The Contractor agrees:

- (a) To comply with the terms of the City of Ann Arbor's Non-Discrimination Ordinance and contract compliance administrative policy, including but not limited to an acceptable affirmative action program if applicable.
- (b) To post the City of Ann Arbor's Non-Discrimination Ordinance Notice in every work place or other location in which employees or other persons are contracted to provide services under a contract with the City.
- (c) To provide documentation within the specified time frame in connection with any workforce verification, compliance review or complaint investigation.
- (d) To permit access to employees and work sites to City representatives for the purposes of monitoring compliance, or investigating complaints of non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the Ann Arbor Non-Discrimination Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Non-Discrimination Ordinance, obligates the Contractor to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract.

Company Name

Signature of Authorized Representative Date

Print Name and Title

Address, City, State, Zip

Phone/Email Address

Questions about the Notice or the City Administrative Policy, Please contact:
Procurement Office of the City of Ann Arbor
(734) 794-6500

CITY OF ANN ARBOR NON-DISCRIMINATION ORDINANCE

Relevant provisions of Chapter 112, Nondiscrimination, of the Ann Arbor City Code are included below.
You can review the entire ordinance at www.a2gov.org/humanrights.

Intent: It is the intent of the city that no individual be denied equal protection of the laws; nor shall any individual be denied the enjoyment of his or her civil or political rights or be discriminated against because of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight.

Discriminatory Employment Practices: No person shall discriminate in the hire, employment, compensation, work classifications, conditions or terms, promotion or demotion, or termination of employment of any individual. No person shall discriminate in limiting membership, conditions of membership or termination of membership in any labor union or apprenticeship program.

Discriminatory Effects: No person shall adopt, enforce or employ any policy or requirement which has the effect of creating unequal opportunities according to actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight for an individual to obtain housing, employment or public accommodation, except for a bona fide business necessity. Such a necessity does not arise due to a mere inconvenience or because of suspected objection to such a person by neighbors, customers or other persons.

Nondiscrimination by City Contractors: All contractors proposing to do business with the City of Ann Arbor shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All city contractors shall ensure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon any classification protected by this chapter. All contractors shall agree not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of any applicable protected classification. All contractors shall be required to post a copy of Ann Arbor's Non-Discrimination Ordinance at all work locations where its employees provide services under a contract with the city.

Complaint Procedure: If any individual believes there has been a violation of this chapter, he/she may file a complaint with the City's Human Rights Commission. The complaint must be filed within 180 calendar days from the date of the individual's knowledge of the allegedly discriminatory action or 180 calendar days from the date when the individual should have known of the allegedly discriminatory action. A complaint that is not filed within this timeframe cannot be considered by the Human Rights Commission. To file a complaint, first complete the complaint form, which is available at www.a2gov.org/humanrights. Then submit it to the Human Rights Commission by e-mail (hrc@a2gov.org), by mail (Ann Arbor Human Rights Commission, PO Box 8647, Ann Arbor, MI 48107), or in person (City Clerk's Office). For further information, please call the commission at 734-794-6141 or e-mail the commission at hrc@a2gov.org.

Private Actions For Damages or Injunctive Relief: To the extent allowed by law, an individual who is the victim of discriminatory action in violation of this chapter may bring a civil action for appropriate injunctive relief or damages or both against the person(s) who acted in violation of this chapter.

THIS IS AN OFFICIAL GOVERNMENT NOTICE AND
MUST BE DISPLAYED WHERE EMPLOYEES CAN READILY SEE IT.

MICHIGAN DEPARTMENT OF TRANSPORTATION CERTIFIED PAYROLL

COMPLETION OF CERTIFIED PAYROLL FORM FULFILLS THE MINIMUM MDOT PREVAILING WAGE REQUIREMENTS

(1) NAME OF CONTRACTOR / SUBCONTRACTOR (CIRCLE ONE) (2) ADDRESS

(3) PAYROLL NO. (4) FOR WEEK ENDING (5) PROJECT AND LOCATION (6) CONTRACT ID

(a) EMPLOYEE INFORMATION	(b) WORK CLASSIFICATION	(c) Hour Type	(d) DAY AND DATE							(e) TOTAL HOURS ON PROJECT	(f) PROJECT RATE OF PAY	(g) PROJECT RATE OF FRINGE PAY	(h) GROSS PROJECT EARNED / GROSS WEEKLY EARNED	(i) TOTAL WEEKLY HOURS WORKED ALL JOBS	(j) DEDUCTIONS					(k) TOTAL WEEKLY WAGES PAID FOR ALL JOBS	
															FICA	FEDERAL	STATE	OTHER	TOTAL DEDUCT		
NAME:									0				\$0.00							\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S							0				\$0.00							\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S							0				\$0.00							\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S							0				\$0.00							\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S							0				\$0.00							\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S							0				\$0.00							\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S							0				\$0.00							\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00

Date _____

I, _____ (Name of Signatory Party) _____ (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the _____ (Contractor or Subcontractor); that during the payroll period commencing on the _____ (Building or Work) _____ day of _____, _____, and ending the _____ day of _____, _____, all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full _____ (Contractor or Subcontractor) weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

SAMPLE STANDARD CONTRACT

If a contract is awarded, the selected contractor will be required to adhere to a set of general contract provisions which will become a part of any formal agreement. These provisions are general principles which apply to all contractors of service to the City of Ann Arbor such as the following:

CONTRACT

THIS AGREEMENT is made on the _____ day of _____, 201_, between the CITY OF ANN ARBOR, a Michigan Municipal Corporation, 301 East Huron Street, Ann Arbor, Michigan 48104 ("City") and _____ ("Contractor")

(An individual/partnership/corporation, include state of incorporation)

(Address)

Based upon the mutual promises below, the Contractor and the City agree as follows:

ARTICLE I - Scope of Work

The Contractor agrees to furnish all of the materials, equipment and labor necessary; and to abide by all the duties and responsibilities applicable to it for the project titled [Insert Title of Bid and Bid Number] in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, which are incorporated as part of this Contract:

Non-discrimination and Living Wage
Declaration of Compliance Forms (if
applicable)
Vendor Conflict of Interest Form
Prevailing Wage Declaration of
Compliance Form (if applicable)
Bid Forms

Contracts and Exhibits
Bonds
General Conditions
Standard Specifications
Detailed Specifications
Plans
Addenda

ARTICLE II - Definitions

Administering Service Area/Unit means **Public Services Area/Water Treatment Services Unit**

Project means **Water Treatment Plant Ammonia Feed System Modifications – ITB No. 4571**

ARTICLE III - Time of Completion

- (A) The work to be completed under this Contract shall begin immediately on the date specified in the Notice to Proceed issued by the City.
- (B) The entire work for this Contract shall be substantially completed within sixteen (16) consecutive weeks from Notice to Proceed, with Final Completion twenty (20) consecutive weeks from Notice to Proceed.
- (C) The anticipated Notice to Proceed date is approximately August 1, 2019. The Substantial Completion date shall be no later than November 21, 2019.
- (D) Failure to complete all the work within the time specified above, including any extension granted in writing by the Supervising Professional, shall obligate the Contractor to pay the City, as liquidated damages and not as a penalty, an amount equal to \$500 for each calendar day of delay in the completion of all the work. If

any liquidated damages are unpaid by the Contractor, the City shall be entitled to deduct these unpaid liquidated damages from the monies due the Contractor.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

See Table 1 in Section 01 31 00, Project Coordination, for additional liquidated damages and interim milestones.

ARTICLE IV - The Contract Sum

- (A) The City shall pay to the Contractor for the performance of the Contract, the lump sum price as given in the Bid Form in the amount of:

_____ Dollars (\$_____)

ARTICLE V - Assignment

This Contract may not be assigned or subcontracted any portion of any right or obligation under this contract without the written consent of the City. Notwithstanding any consent by the City to any assignment, Contractor shall at all times remain bound to all warranties, certifications, indemnifications, promises and performances, however described, as are required of it under this contract unless specifically released from the requirement, in writing, by the City.

ARTICLE VI - Choice of Law

This Contract shall be construed, governed, and enforced in accordance with the laws of the State of Michigan. By executing this agreement, the Contractor and the City agree to venue in a court of appropriate jurisdiction sitting within Washtenaw County for purposes of any action arising under this Contract. The parties stipulate that the venue referenced in this Contract is for convenience and waive any claim of non-convenience.

Whenever possible, each provision of the Contract will be interpreted in a manner as to be effective and valid under applicable law. The prohibition or invalidity, under applicable law, of any provision will not invalidate the remainder of the Contract.

ARTICLE VII - Relationship of the Parties

The parties of the Contract agree that it is not a Contract of employment but is a Contract to accomplish a specific result. Contractor is an independent Contractor performing services for the City. Nothing contained in this Contract shall be deemed to constitute any other relationship between the City and the Contractor.

Contractor certifies that it has no personal or financial interest in the project other than the compensation it is to receive under the Contract. Contractor certifies that it is not, and shall not become, overdue or in default to the City for any Contract, debt, or any other obligation to the City including real or personal property taxes. City shall have the right to set off any such debt against compensation awarded for services under this agreement.

ARTICLE VIII - Notice

All notices given under this Contract shall be in writing, and shall be by personal delivery or by certified mail with return receipt requested to the parties at their respective addresses as specified in the Contract Documents or other address the Contractor may specify in writing. Notice will be deemed given on the date when one of the following first occur: (1) the date of actual receipt; or (2) three days after mailing certified U.S. mail.

ARTICLE IX - Indemnification

To the fullest extent permitted by law, Contractor shall indemnify, defend and hold harmless the City, its officers, employees and agents harmless from all suits, claims, judgments and expenses including attorney's fees resulting or alleged to result, in whole or in part, from any act or omission, which is in any way connected or associated with this Contract, by the Contractor or anyone acting on the Contractor's behalf under this Contract. Contractor shall not be responsible to indemnify the City for losses or damages caused by or resulting from the City's sole negligence. The provisions of this Article shall survive the expiration or earlier termination of this contract for any reason.

ARTICLE X - Entire Agreement

This Contract represents the entire understanding between the City and the Contractor and it supersedes all prior representations, negotiations, agreements, or understandings whether written or oral. Neither party has relied on any prior representations in entering into this Contract. No terms or conditions of either party's invoice, purchase order or other administrative document shall modify the terms and conditions of this Contract, regardless of the other party's failure to object to such form. This Contract shall be binding on and shall inure to the benefit of the parties to this Contract and their permitted successors and permitted assigns and nothing in this Contract, express or implied, is intended to or shall confer on any other person or entity any legal or equitable right, benefit, or remedy of any nature whatsoever under or by reason of this Contract. This Contract may be altered, amended or modified only by written amendment signed by the City and the Contractor.

ARTICLE XI – Electronic Transaction

The parties agree that signatures on this Agreement may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this Agreement. This Agreement may be executed and delivered by facsimile and upon such delivery the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

This Contract

FOR CONTRACTOR

By _____

Its: _____

FOR THE CITY OF ANN ARBOR

By _____
Christopher Taylor, Mayor

By _____
Jacqueline Beaudry, City Clerk

Approved as to substance

By _____
Howard S. Lazarus,
City Administrator

By _____
Craig Hupy,
Public Services Area Administrator

Approved as to form and content

Stephen K. Postema, City Attorney

PERFORMANCE BOND

- (1) _____(referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for \$ _____, the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.
- (2) The Principal has entered a written Contract with the City dated _____, 201_, for: _____ and _____ this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq.
- (3) Whenever the Principal is declared by the City to be in default under the Contract, the Surety may promptly remedy the default or shall promptly:
- (a) complete the Contract in accordance with its terms and conditions; or
 - (b) obtain a bid or bids for submission to the City for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, arrange for a Contract between such bidder and the City, and make available, as work progresses, sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in paragraph 1.
- (4) Surety shall have no obligation to the City if the Principal fully and promptly performs under the Contract.
- (5) Surety agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, or the specifications accompanying it shall in any way affect its obligations on this bond, and waives notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work, or to the specifications.

SIGNED AND SEALED this _____ day of _____, 201_.

(Name of Surety Company)

By _____
(Signature)

Its _____
(Title of Office)

Approved as to form:

Stephen K. Postema, City Attorney

(Name of Principal)

By _____
(Signature)

Its _____
(Title of Office)

Name and address of agent:

LABOR AND MATERIAL BOND

- (1) _____
of _____(referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan, (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for the use and benefit of claimants as defined in Act 213 of Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq., in the amount of \$ _____, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.
- (2) The Principal has entered a written Contract with the City, dated _____, 201_, for _____; and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963 as amended;
- (3) If the Principal fails to promptly and fully repay claimants for labor and material reasonably required under the Contract, the Surety shall pay those claimants.
- (4) Surety's obligations shall not exceed the amount stated in paragraph 1, and Surety shall have no obligation if the Principal promptly and fully pays the claimants.

SIGNED AND SEALED this _____ day of _____, 201_

(Name of Surety Company)
By _____
(Signature)
Its _____
(Title of Office)

(Name of Principal)
By _____
(Signature)
Its _____
(Title of Office)

Approved as to form:

Name and address of agent:

Stephen K. Postema, City Attorney

GENERAL CONDITIONS

Section 1 - Execution, Correlation and Intent of Documents

The contract documents shall be signed in 2 copies by the City and the Contractor.

The contract documents are complementary and what is called for by any one shall be binding. The intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper execution of the work. Materials or work described in words which so applied have a well-known technical or trade meaning have the meaning of those recognized standards.

In case of a conflict among the contract documents listed below in any requirement(s), the requirement(s) of the document listed first shall prevail over any conflicting requirement(s) of a document listed later.

(1) Addenda in reverse chronological order; (2) Detailed Specifications; (3) Standard Specifications; (4) Plans; (5) General Conditions; (6) Contract; (7) Bid Forms; (8) Bond Forms; (9) Bid.

Section 2 - Order of Completion

The Contractor shall submit with each invoice, and at other times reasonably requested by the Supervising Professional, schedules showing the order in which the Contractor proposes to carry on the work. They shall include the dates at which the Contractor will start the several parts of the work, the estimated dates of completion of the several parts, and important milestones within the several parts.

Section 3 - Familiarity with Work

The Bidder or its representative shall make personal investigations of the site of the work and of existing structures and shall determine to its own satisfaction the conditions to be encountered, the nature of the ground, the difficulties involved, and all other factors affecting the work proposed under this Contract. The Bidder to whom this Contract is awarded will not be entitled to any additional compensation unless conditions are clearly different from those which could reasonably have been anticipated by a person making diligent and thorough investigation of the site.

The Bidder shall immediately notify the City upon discovery, and in every case prior to submitting its Bid, of every error or omission in the bidding documents that would be identified by a reasonably competent, diligent Bidder. In no case will a Bidder be allowed the benefit of extra compensation or time to complete the work under this Contract for extra expenses or time spent as a result of the error or omission.

Section 4 - Wage Requirements

Under this Contract, the Contractor shall conform to Chapter 14 of Title I of the Code of the City of Ann Arbor as amended; which in part states "...that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen,

mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. At the request of the City, any contractor or subcontractor shall provide satisfactory proof of compliance with the contract provisions required by the Section.

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. A sample Prevailing Wage Form is provided in the Appendix herein for reference as to what will be expected from contractors. Use of the Prevailing Wage Form provided in the Appendix section or a City-approved equivalent will be required along with wage rate interviews.

Where the Contract and the Ann Arbor City Ordinance are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used.

If the Contractor is a "covered employer" as defined in Chapter 23 of the Ann Arbor City Code, the Contractor agrees to comply with the living wage provisions of Chapter 23 of the Ann Arbor City Code. The Contractor agrees to pay those employees providing Services to the City under this Agreement a "living wage," as defined in Section 1:815 of the Ann Arbor City Code, as adjusted in accordance with Section 1:815(3); to post a notice approved by the City of the applicability of Chapter 23 in every location in which regular or contract employees providing services under this Agreement are working; to maintain records of compliance; if requested by the City, to provide documentation to verify compliance; to take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee or person contracted for employment in order to pay the living wage required by Section 1:815; and otherwise to comply with the requirements of Chapter 23.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision covering subcontractor's employees who perform work on this contract.

Section 5 - Non-Discrimination

The Contractor agrees to comply, and to require its subcontractor(s) to comply, with the nondiscrimination provisions of MCL 37.2209. The Contractor further agrees to comply with the provisions of Section 9:158 of Chapter 112 of Title IX of the Ann Arbor City Code, and to assure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity.

Section 6 - Materials, Appliances, Employees

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary or used for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new, and both workmanship and materials shall be of the highest quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor shall at all times enforce strict discipline and good order among its employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned.

Adequate sanitary facilities shall be provided by the Contractor.

Section 7 - Qualifications for Employment

The Contractor shall employ competent laborers and mechanics for the work under this Contract. For work performed under this Contract, employment preference shall be given to qualified local residents.

Section 8 - Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringements of any patent rights and shall hold the City harmless from loss on account of infringement except that the City shall be responsible for all infringement loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the City has notified the Contractor prior to the signing of the Contract that the particular process or product is patented or is believed to be patented.

Section 9 - Permits and Regulations

The Contractor must secure and pay for all permits, permit or plan review fees and licenses necessary for the prosecution of the work. These include but are not limited to City building permits, right-of-way permits, lane closure permits, right-of-way occupancy permits, and the like. The City shall secure and pay for easements shown on the plans 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 observes that the contract documents are at variance with those requirements, it shall promptly notify the Supervising Professional in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

Section 10 - Protection of the Public and of Work and Property

The Contractor is responsible for the means, methods, sequences, techniques and procedures of construction and safety programs associated with the work contemplated by this contract. The Contractor, its agents or sub-contractors, shall comply with the "General Rules and Regulations for the Construction Industry" as published by the Construction Safety Commission of the State of Michigan and to all other local, State and National laws, ordinances, rules and regulations pertaining to safety of persons and property.

The Contractor shall take all necessary and reasonable precautions to protect the safety of the public. It shall continuously maintain adequate protection of all work from damage, and shall take all necessary and reasonable precautions to adequately protect all public and private property from injury or loss arising in connection with this Contract. It shall make good any damage, injury or loss to its work and to public and private property resulting from lack of reasonable protective precautions, except as may be due to errors in the contract documents, or caused by agents or employees of the City. The Contractor shall obtain and maintain sufficient insurance to cover damage to any City property at the site by any cause.

In an emergency affecting the safety of life, or the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Supervising Professional, permitted to act at its discretion to prevent the threatened loss or injury. It shall also so act, without appeal, if authorized or instructed by the Supervising Professional.

Any compensation claimed by the Contractor for emergency work shall be determined by agreement or in accordance with the terms of Claims for Extra Cost - Section 15.

Section 11 - Inspection of Work

The City shall provide sufficient competent personnel for the inspection of the work.

The Supervising Professional shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for access and for inspection.

If the specifications, the Supervising Professional's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Supervising Professional timely notice of its readiness for inspection, and if the inspection is by an authority other than the Supervising Professional, of the date fixed for the inspection. Inspections by the Supervising Professional shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Supervising Professional, it must, if required by the Supervising Professional, be uncovered for examination and properly restored at the Contractor's expense.

Re-examination of any work may be ordered by the Supervising Professional, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to be in accordance with the contract documents, the City shall pay the cost of re-examination and replacement. If the work is not in accordance with the contract documents, the Contractor shall pay the cost.

Section 12 - Superintendence

The Contractor shall keep on the work site, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Supervising Professional. The superintendent will be responsible to perform all on-site project management for the Contractor. The superintendent shall be experienced in the work required for this Contract. The superintendent shall represent the Contractor and all direction given to the superintendent shall be binding as if given to the Contractor. Important directions shall immediately be confirmed in writing to the Contractor. Other directions will be confirmed on written request. The Contractor shall give efficient superintendence to the work, using its best skill and attention.

Section 13 - Changes in the Work

The City may make changes to the quantities of work within the general scope of the Contract at any time by a written order and without notice to the sureties. If the changes add to or deduct from the extent of the work, the Contract Sum shall be adjusted accordingly. All the changes shall be executed under the conditions of the original Contract except that any claim for extension of time caused by the change shall be adjusted at the time of ordering the change.

In giving instructions, the Supervising Professional shall have authority to make minor changes in the work not involving extra cost and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Supervising Professional, and no claim for an addition to the Contract Sum shall be valid unless the additional work was ordered in writing.

The Contractor shall proceed with the work as changed and the value of the work shall be determined as provided in Claims for Extra Cost - Section 15.

Section 14 - Extension of Time

Extension of time stipulated in the Contract for completion of the work will be made if and as the Supervising Professional may deem proper under any of the following circumstances:

- (1) When work under an extra work order is added to the work under this Contract;
- (2) When the work is suspended as provided in Section 20;
- (3) When the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, and which were not the result of its fault or negligence;
- (4) Delays in the progress of the work caused by any act or neglect of the City or of its employees or by other Contractors employed by the City;
- (5) Delay due to an act of Government;
- (6) Delay by the Supervising Professional in the furnishing of plans and necessary information;
- (7) Other cause which in the opinion of the Supervising Professional entitles the Contractor to an extension of time.

The Contractor shall notify the Supervising Professional within 7 days of an occurrence or conditions which, in the Contractor's opinion, entitle it to an extension of time. The notice shall be in writing and submitted in ample time to permit full investigation and evaluation of the Contractor's claim. The Supervising Professional shall acknowledge receipt of the Contractor's notice within 7 days of its receipt. Failure to timely provide the written notice shall constitute a waiver by the Contractor of any claim.

In situations where an extension of time in contract completion is appropriate under this or any other section of the contract, the Contractor understands and agrees that the only available adjustment for events that cause any delays in contract completion shall be extension of the required time for contract completion and that there shall be no adjustments in the money due the Contractor on account of the delay.

Section 15 - Claims for Extra Cost

If the Contractor claims that any instructions by drawings or other media issued after the date of the Contract involved extra cost under this Contract, it shall give the Supervising Professional written notice within 7 days after the receipt of the instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property. The procedure shall then be as provided for Changes in the Work-Section 13. No claim shall be valid unless so made.

If the Supervising Professional orders, in writing, the performance of any work not covered by the contract documents, and for which no item of work is provided in the Contract, and for which no unit price or lump sum basis can be agreed upon, then the extra work shall be done on a Cost-Plus-Percentage basis of payment as follows:

- (1) The Contractor shall be reimbursed for all reasonable costs incurred in doing the work, and shall receive an additional payment of 15% of all the reasonable costs to cover both its indirect overhead costs and profit;

- (2) The term "Cost" shall cover all payroll charges for employees and supervision required under the specific order, together with all worker's compensation, Social Security, pension and retirement allowances and social insurance, or other regular payroll charges on same; the cost of all material and supplies required of either temporary or permanent character; rental of all power-driven equipment at agreed upon rates, together with cost of fuel and supply charges for the equipment; and any costs incurred by the Contractor as a direct result of executing the order, if approved by the Supervising Professional;
- (3) If the extra is performed under subcontract, the subcontractor shall be allowed to compute its charges as described above. The Contractor shall be permitted to add an additional charge of 5% percent to that of the subcontractor for the Contractor's supervision and contractual responsibility;
- (4) The quantities and items of work done each day shall be submitted to the Supervising Professional in a satisfactory form on the succeeding day, and shall be approved by the Supervising Professional and the Contractor or adjusted at once;
- (5) Payments of all charges for work under this Section in any one month shall be made along with normal progress payments. Retainage shall be in accordance with Progress Payments-Section 16.

No additional compensation will be provided for additional equipment, materials, personnel, overtime or special charges required to perform the work within the time requirements of the Contract.

When extra work is required and no suitable price for machinery and equipment can be determined in accordance with this Section, the hourly rate paid shall be 1/40 of the basic weekly rate listed in the Rental Rate Blue Book published by Dataquest Incorporated and applicable to the time period the equipment was first used for the extra work. The hourly rate will be deemed to include all costs of operation such as bucket or blade, fuel, maintenance, "regional factors", insurance, taxes, and the like, but not the costs of the operator.

Section 16 - Progress Payments

The Contractor shall submit each month, or at longer intervals, if it so desires, an invoice covering work performed for which it believes payment, under the Contract terms, is due. The submission shall be to the City's Finance Department - Accounting Division. The Supervising Professional will, within 10 days following submission of the invoice, prepare a certificate for payment for the work in an amount to be determined by the Supervising Professional as fairly representing the acceptable work performed during the period covered by the Contractor's invoice. To insure the proper performance of this Contract, the City will retain a percentage of the estimate in accordance with Act 524, Public Acts of 1980. The City will then, following the receipt of the Supervising Professional's Certificate, make payment to the Contractor as soon as feasible, which is anticipated will be within 15 days.

An allowance may be made in progress payments if substantial quantities of permanent material have been delivered to the site but not incorporated in the completed work if the Contractor, in the opinion of the Supervising Professional, is diligently pursuing the work under this Contract. Such materials shall be properly stored and adequately protected. Allowance in the estimate shall be at the invoice price value of the items. Notwithstanding any payment of any allowance, all risk of loss due to vandalism or any damages to the stored materials remains with the Contractor.

In the case of Contracts which include only the Furnishing and Delivering of Equipment, the

payments shall be; 60% of the Contract Sum upon the delivery of all equipment to be furnished, or in the case of delivery of a usable portion of the equipment in advance of the total equipment delivery, 60% of the estimated value of the portion of the equipment may be paid upon its delivery in advance of the time of the remainder of the equipment to be furnished; 30% of the Contract Sum upon completion of erection of all equipment furnished, but not later than 60 days after the date of delivery of all of the equipment to be furnished; and payment of the final 10% on final completion of erection, testing and acceptance of all the equipment to be furnished; but not later than 180 days after the date of delivery of all of the equipment to be furnished, unless testing has been completed and shows the equipment to be unacceptable.

With each invoice for periodic payment, the Contractor shall enclose a Contractor's Declaration - Section 43, and an updated project schedule per Order of Completion - Section 2.

Section 17 - Deductions for Uncorrected Work

If the Supervising Professional decides it is inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made.

Section 18 - Correction of Work Before Final Payment

The Contractor shall promptly remove from the premises all materials condemned by the Supervising Professional as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute the work in accordance with the Contract and without expense to the City and shall bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement.

If the Contractor does not remove the condemned work and materials within 10 days after written notice, the City may remove them and, if the removed material has value, may store the material at the expense of the Contractor. If the Contractor does not pay the expense of the removal within 10 days thereafter, the City may, upon 10 days written notice, sell the removed materials at auction or private sale and shall pay to the Contractor the net proceeds, after deducting all costs and expenses that should have been borne by the Contractor. If the removed material has no value, the Contractor must pay the City the expenses for disposal within 10 days of invoice for the disposal costs.

The inspection or lack of inspection of any material or work pertaining to this Contract shall not relieve the Contractor of its obligation to fulfill this Contract and defective work shall be made good. Unsuitable materials may be rejected by the Supervising Professional notwithstanding that the work and materials have been previously overlooked by the Supervising Professional and accepted or estimated for payment or paid for. If the work or any part shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good the defect in a manner satisfactory to the Supervising Professional. The judgment and the decision of the Supervising Professional as to whether the materials supplied and the work done under this Contract comply with the requirements of the Contract shall be conclusive and final.

Section 19 - Acceptance and Final Payment

Upon receipt of written notice that the work is ready for final inspection and acceptance, the Supervising Professional will promptly make the inspection. When the Supervising Professional finds the work acceptable under the Contract and the Contract fully performed, the Supervising Professional will promptly sign and issue a final certificate stating that the work required by this Contract has been completed and is accepted by the City under the terms and conditions of the Contract. The entire balance found to be due the Contractor, including the retained percentage, shall be paid to the Contractor by the City within 30 days after the date of the final certificate.

Before issuance of final certificates, the Contractor shall file with the City:

- (1) The consent of the surety to payment of the final estimate;
- (2) The Contractor's Affidavit in the form required by Section 44.

In case the Affidavit or consent is not furnished, the City may retain out of any amount due the Contractor, sums sufficient to cover all lienable claims.

The making and acceptance of the final payment shall constitute a waiver of all claims by the City except those arising from:

- (1) unsettled liens;
- (2) faulty work appearing within 12 months after final payment;
- (3) hidden defects in meeting the requirements of the plans and specifications;
- (4) manufacturer's guarantees.

It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.

Section 20 - Suspension of Work

The City may at any time suspend the work, or any part by giving 5 days notice to the Contractor in writing. The work shall be resumed by the Contractor within 10 days after the date fixed in the written notice from the City to the Contractor to do so. The City shall reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of the suspension.

If the work, or any part, shall be stopped by the notice in writing, and if the City does not give notice in writing to the Contractor to resume work at a date within 90 days of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work suspended and will be entitled to the estimates and payments for all work done on the portions abandoned, if any, plus 10% of the value of the work abandoned, to compensate for loss of overhead, plant expense, and anticipated profit.

Section 21 - Delays and the City's Right to Terminate Contract

If the Contractor refuses or fails to prosecute the work, or any separate part of it, with the diligence required to insure completion, ready for operation, within the allowable number of consecutive calendar days specified plus extensions, or fails to complete the work within the

required time, the City may, by written notice to the Contractor, terminate its right to proceed with the work or any part of the work as to which there has been delay. After providing the notice the City may take over the work and prosecute it to completion, by contract or otherwise, and the Contractor and its sureties shall be liable to the City for any excess cost to the City. If the Contractor's right to proceed is terminated, the City may take possession of and utilize in completing the work, any materials, appliances and plant as may be on the site of the work and useful for completing the work. The right of the Contractor to proceed shall not be terminated or the Contractor charged with liquidated damages where an extension of time is granted under Extension of Time - Section 14.

If the Contractor is adjudged a bankrupt, or if it makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of its insolvency, or if it persistently or repeatedly refuses or fails except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if it fails to make prompt payments to subcontractors or for material or labor, or persistently disregards laws, ordinances or the instructions of the Supervising Professional, or otherwise is guilty of a substantial violation of any provision of the Contract, then the City, upon the certificate of the Supervising Professional that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor 3 days written notice, terminate this Contract. The City may then take possession of the premises and of all materials, tools and appliances thereon and without prejudice to any other remedy it may have, make good the deficiencies or finish the work by whatever method it may deem expedient, and deduct the cost from the payment due the Contractor. The Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of finishing the work, including compensation for additional managerial and administrative services exceeds the unpaid balance of the Contract Sum, the Contractor and its surety are liable to the City for any excess cost incurred. The expense incurred by the City, and the damage incurred through the Contractor's default, shall be certified by the Supervising Professional.

Section 22 - Contractor's Right to Terminate Contract

If the work should be stopped under an order of any court, or other public authority, for a period of 3 months, through no act or fault of the Contractor or of anyone employed by it, then the Contractor may, upon 7 days written notice to the City, terminate this Contract and recover from the City payment for all acceptable work executed plus reasonable profit.

Section 23 - City's Right To Do Work

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the City, 3 days after giving written notice to the Contractor and its surety may, without prejudice to any other remedy the City may have, make good the deficiencies and may deduct the cost from the payment due to the Contractor.

Section 24 - Removal of Equipment and Supplies

In case of termination of this Contract before completion, from any or no cause, the Contractor, if notified to do so by the City, shall promptly remove any part or all of its equipment and supplies from the property of the City, failing which the City shall have the right to remove the equipment and supplies at the expense of the Contractor.

The removed equipment and supplies may be stored by the City and, if all costs of removal and storage are not paid by the Contractor within 10 days of invoicing, the City upon 10 days written notice may sell the equipment and supplies at auction or private sale, and shall pay the Contractor the net proceeds after deducting all costs and expenses that should have been borne by the

Contractor and after deducting all amounts claimed due by any lien holder of the equipment or supplies.

Section 25 - Responsibility for Work and Warranties

The Contractor assumes full responsibility for any and all materials and equipment used in the construction of the work and may not make claims against the City for damages to materials and equipment from any cause except negligence or willful act of the City. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the project (except for any part covered by Partial Completion and Acceptance - Section 26). The Contractor shall make good all work damaged or destroyed before acceptance. All risk of loss remains with the Contractor until final acceptance of the work (Section 19) or partial acceptance (Section 26). The Contractor is advised to investigate obtaining its own builders risk insurance.

The Contractor shall guarantee the quality of the work for a period of one year. The Contractor shall also unconditionally guarantee the quality of all equipment and materials that are furnished and installed under the contract for a period of one year. At the end of one year after the Contractor's receipt of final payment, the complete work, including equipment and materials furnished and installed under the contract, shall be inspected by the Contractor and the Supervising Professional. Any defects shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. Any defects that are identified prior to the end of one year shall also be inspected by the Contractor and the Supervising Professional and shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. The Contractor shall assign all manufacturer or material supplier warranties to the City prior to final payment. The assignment shall not relieve the Contractor of its obligations under this paragraph to correct defects.

Section 26 - Partial Completion and Acceptance

If at any time prior to the issuance of the final certificate referred to in Acceptance and Final Payment - Section 19, any portion of the permanent construction has been satisfactorily completed, and if the Supervising Professional determines that portion of the permanent construction is not required for the operations of the Contractor but is needed by the City, the Supervising Professional shall issue to the Contractor a certificate of partial completion, and immediately the City may take over and use the portion of the permanent construction described in the certificate, and exclude the Contractor from that portion.

The issuance of a certificate of partial completion shall not constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if the Contractor has failed to complete it in accordance with the terms of this Contract. The issuance of the certificate shall not release the Contractor or its sureties from any obligations under this Contract including bonds.

If prior use increases the cost of, or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Supervising Professional may determine.

Section 27 - Payments Withheld Prior to Final Acceptance of Work

The City may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any certificate to the extent reasonably appropriate to protect the City from loss on account of:

- (1) Defective work not remedied;
- (2) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor;
- (3) Failure of the Contractor to make payments properly to subcontractors or for material or labor;
- (4) Damage to another Contractor.

When the above grounds are removed or the Contractor provides a Surety Bond satisfactory to the City which will protect the City in the amount withheld, payment shall be made for amounts withheld under this section.

Section 28 - Contractor's Insurance

- (1) The Contractor shall procure and maintain during the life of this Contract, including the guarantee period and during any warranty work, such insurance policies, including those set forth below, as will protect itself and the City from all claims for bodily injuries, death or property damage which may arise under this Contract; whether the act(s) or omission(s) giving rise to the claim were made by the Contractor or by any subcontractor or anyone employed by them directly or indirectly. In the case of all contracts involving on-site work, the Contractor shall provide to the City, before the commencement of any work under this contract, certificates of insurance and other documentation satisfactory to the City demonstrating it has obtained the policies and endorsements required on behalf of itself, and when requested, any subcontractor(s). The certificates of insurance endorsements and/or copies of policy language shall document that the Contractor satisfies the following minimum requirements.
 - (a) Worker's Compensation Insurance in accordance with all applicable state and federal statutes. Further, Employers Liability Coverage shall be obtained in the following minimum amounts:
 - Bodily Injury by Accident - \$500,000 each accident
 - Bodily Injury by Disease - \$500,000 each employee
 - Bodily Injury by Disease - \$500,000 each policy limit
 - (b) Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 07 98 or current equivalent. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements specifically for the following coverages: Products and Completed Operations, Explosion, Collapse and Underground coverage or Pollution. Further there shall be no added exclusions or limiting endorsements which diminish the City's protections as an additional insured under the policy. The following minimum limits of liability are required:
 - \$1,000,000 Each occurrence as respect Bodily Injury Liability or Property Damage Liability, or both combined.
 - \$2,000,000 Per Job General Aggregate
 - \$1,000,000 Personal and Advertising Injury
 - \$2,000,000 Products and Completed Operations Aggregate
 - (c) Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 07 97 or current

equivalent. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements which diminish the City's protections as an additional insured under the policy. Further, the limits of liability shall be \$1,000,000 for each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

- (d) Umbrella/Excess Liability Insurance shall be provided to apply excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of \$1,000,000.
- (2) Insurance required under subsection (1)(b) and (1)(c) above shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute with this insurance. Further, the Contractor agrees to waive any right of recovery by its insurer against the City.
- (3) Insurance companies and policy forms are subject to approval of the City Attorney, which approval shall not be unreasonably withheld. Documentation must provide and demonstrate an unconditional 30 day written notice of cancellation in favor of the City of Ann Arbor. Further, the documentation must explicitly state the following: (a) the policy number; name of insurance company; name and address of the agent or authorized representative; name and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which shall be approved by the City, in its sole discretion; (c) that the policy conforms to the requirements specified Contractor shall furnish the City with satisfactory certificates of insurance and endorsements prior to commencement of any work. Upon request, the Contractor shall provide within 30 days a copy of the policy(ies) to the City. If any of the above coverages expire by their terms during the term of this Contract, the Contractor shall deliver proof of renewal and/or new policies and endorsements to the Administering Service Area/Unit at least ten days prior to the expiration date.
- (4) Any Insurance provider of Contractor shall be admitted and authorized to do business in the State of Michigan and shall carry and maintain a minimum rating assigned by A.M. Best & Company's Key Rating Guide of "A-" Overall and a minimum Financial Size Category of "V". Insurance policies and certificates issued by non-admitted insurance companies are not acceptable unless approved in writing by the City.
- (5) City reserves the right to require additional coverage and/or coverage amounts as may be included from time to time in the Detailed Specifications for the Project.
- (6) The provisions of General Condition 28 shall survive the expiration or earlier termination of this contract for any reason.

Section 29 - Surety Bonds

Bonds will be required from the successful bidder as follows:

- (1) A Performance Bond to the City of Ann Arbor for the amount of the bid(s) accepted;
- (2) A Labor and Material Bond to the City of Ann Arbor for the amount of the bid(s) accepted.

Bonds shall be executed on forms supplied by the City in a manner and by a Surety Company authorized to transact business in Michigan and satisfactory to the City Attorney.

Section 30 - Damage Claims

The Contractor shall be held responsible for all damages to property of the City or others, caused by or resulting from the negligence of the Contractor, its employees, or agents during the progress of or connected with the prosecution of the work, whether within the limits of the work or elsewhere. The Contractor must restore all property injured including sidewalks, curbing, sodding, pipes, conduit, sewers or other public or private property to not less than its original condition with new work.

Section 31 - Refusal to Obey Instructions

If the Contractor refuses to obey the instructions of the Supervising Professional, the Supervising Professional shall withdraw inspection from the work, and no payments will be made for work performed thereafter nor may work be performed thereafter until the Supervising Professional shall have again authorized the work to proceed.

Section 32 - Assignment

Neither party to the Contract shall assign the Contract without the written consent of the other. The Contractor may assign any monies due to it to a third party acceptable to the City.

Section 33 - Rights of Various Interests

Whenever work being done by the City's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Supervising Professional, to secure the completion of the various portions of the work in general harmony.

The Contractor is responsible to coordinate all aspects of the work, including coordination of, and with, utility companies and other contractors whose work impacts this project.

Section 34 - Subcontracts

The Contractor shall not award any work to any subcontractor without prior written approval of the City. The approval will not be given until the Contractor submits to the City a written statement concerning the proposed award to the subcontractor. The statement shall contain all information the City may require.

The Contractor shall be as fully responsible to the City 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.

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 General Conditions and all other contract documents applicable to the work of the subcontractors and to give the Contractor the same power to terminate any subcontract that the City may exercise over the Contractor under any provision of the contract documents.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

Section 35 - Supervising Professional's Status

The Supervising Professional has the right to inspect any or all work. The Supervising Professional has authority to stop the work whenever stoppage may be appropriate to insure the proper execution of the Contract. The Supervising Professional has the authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

The Supervising Professional shall make all measurements and determinations of quantities. Those measurements and determinations are final and conclusive between the parties.

Section 36 - Supervising Professional's Decisions

The Supervising Professional shall, within a reasonable time after their presentation to the Supervising Professional, make decisions in writing on all claims of the City or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the contract documents.

Section 37 - Storing Materials and Supplies

Materials and supplies may be stored at the site of the work at locations agreeable to the City unless specific exception is listed elsewhere in these documents. Ample way for foot traffic and drainage must be provided, and gutters must, at all times, be kept free from obstruction. Traffic on streets shall be interfered with as little as possible. The Contractor may not enter or occupy with agents, employees, tools, or material any private property without first obtaining written permission from its owner. A copy of the permission shall be furnished to the Supervising Professional.

Section 38 - Lands for Work

The Contractor shall provide, at its own expense and without liability to the City, any additional land and access that may be required for temporary construction facilities or for storage of materials.

Section 39 - Cleaning Up

The Contractor shall, as directed by the Supervising Professional, remove at its own expense from the City's property and from all public and private property all temporary structures, rubbish and waste materials resulting from its operations unless otherwise specifically approved, in writing, by the Supervising Professional.

Section 40 - Salvage

The Supervising Professional may designate for salvage any materials from existing structures or underground services. Materials so designated remain City property and shall be transported or stored at a location as the Supervising Professional may direct.

Section 41 - Night, Saturday or Sunday Work

No night or Sunday work (without prior written City approval) will be permitted except in the case of an emergency and then only to the extent absolutely necessary. The City may allow night work which, in the opinion of the Supervising Professional, can be satisfactorily performed at night. Night work is any work between 8:00 p.m. and 7:00 a.m. No Saturday work will be permitted unless the Contractor gives the Supervising Professional at least 48 hours but not more than 5 days notice of the Contractor's intention to work the upcoming Saturday.

Section 42 - Sales Taxes

Under State law the City is exempt from the assessment of State Sales Tax on its direct purchases. Contractors who acquire materials, equipment, supplies, etc. for incorporation in City projects are not likewise exempt. State Law shall prevail. The Bidder shall familiarize itself with the State Law and prepare its Bid accordingly. No extra payment will be allowed under this Contract for failure of the Contractor to make proper allowance in this bid for taxes it must pay.

Section 43

CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period _____, 20____, to _____, 20____, performed any work, furnished any materials, sustained any loss, damage or delay, or otherwise done anything in addition to the regular items (or executed change orders) set forth in the Contract titled _____, for which I shall ask, demand, sue for, or claim compensation or extension of time from the City, except as I hereby make claim for additional compensation or extension of time as set forth on the attached itemized statement. I further declare that I have paid all payroll obligations related to this Contract that have become due during the above period and that all invoices related to this Contract received more than 30 days prior to this declaration have been paid in full except as listed below.

There is/is not (Contractor please circle one and strike one as appropriate) an itemized statement attached regarding a request for additional compensation or extension of time.

Contractor

Date

By _____
(Signature)

Its _____
(Title of Office)

Past due invoices, if any, are listed below.

Section 44

CONTRACTOR'S AFFIDAVIT

The undersigned Contractor, _____, represents that on _____, 20____, it was awarded a contract by the City of Ann Arbor, Michigan to _____ under the terms and conditions of a Contract titled _____. The Contractor represents that all work has now been accomplished and the Contract is complete.

The Contractor warrants and certifies that all of its indebtedness arising by reason of the Contract has been fully paid or satisfactorily secured; and that all claims from subcontractors and others for labor and material used in accomplishing the project, as well as all other claims arising from the performance of the Contract, have been fully paid or satisfactorily settled. The Contractor agrees that, if any claim should hereafter arise, it shall assume responsibility for it immediately upon request to do so by the City of Ann Arbor.

The Contractor, for valuable consideration received, does further waive, release and relinquish any and all claims or right of lien which the Contractor now has or may acquire upon the subject premises for labor and material used in the project owned by the City of Ann Arbor.

This affidavit is freely and voluntarily given with full knowledge of the facts.

Contractor

Date

By _____
(Signature)

Its _____
(Title of Office)

Subscribed and sworn to before me, on this _____ day of _____, 20____
_____, _____ County, Michigan

Notary Public

_____ County, MI

My commission expires on:

SUPPLEMENTAL GENERAL CONDITIONS

General Safety Requirements

The Contractor shall be responsible for ensuring compliance with the most stringent provisions of the applicable statutes and regulations of the Michigan Occupational Safety and Health Act 154 of 1974, the Occupational Safety and Health Act of 1970, and all City of Ann Arbor safety policies. The Contractor shall flow down all these requirements to any subcontractor performing work under the contract. Should charges of violation of any of the above be issued to the Contractor in the course of the work, a copy of each charge shall be immediately forwarded to the City along with a plan to correct the violation.

Upon the failure of the Contractor to comply with any of these requirements, the City's Representative shall have the authority to stop any and all operations of the Contractor affected by such failure until such failure is remedied. No part of the time lost due to any such stop orders shall be made subject to a claim or extension of time or increase in compensation.

All materials, equipment, and supplies provided to the City of Ann Arbor must comply fully with all safety requirements as set forth by the Michigan Occupational Safety and Health Act 154 of 1974 and all applicable OSHA Standards.

STANDARD SPECIFICATIONS

All work under this contract shall be performed in accordance with the Public Services Department Standard Specifications in effect at the date of availability of the contract documents stipulated in the Bid. All work under this Contract which is not included in these Standard Specifications, or which is performed using modifications to these Standard Specifications, shall be performed in accordance with the Detailed Specifications included in these contract documents.

Standard Specifications are available online:

<http://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx>

DETAILED SPECIFICATIONS

SECTION 01 11 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work covered by the Contract Documents comprises replacement of portions of the ammonia feed system located at the City of Ann Arbor Water Treatment Plant, 919 Sunset Road, Ann Arbor, MI 48103 for the **City of Ann Arbor Water Treatment Services Unit**, Owner.
- B. The Work includes the following major items:
 - 1. Replacement of piping and valves between the bulk storage tank and day tank.
 - 2. Replacement of piping between the day tank and ammoniator panels and piping between the bulk tank and ammoniator panels.
 - 3. Furnishing and installation of three ammoniator panels.
 - 4. Connecting new piping from the ammoniator panels to the existing plant ammonia piping.
 - 5. Piping modifications at two educator stations in near Clearwell Nos. 1 and No. 2 to add flow monitoring.
 - 6. Installation of a redundant vaporizer assembly on the bulk storage tank.
 - 7. Permitting.
 - 8. All related Work.

1.3 GENERAL

- A. Imperative Language: These Specifications (Divisions 01 through 46) are written in the imperative and abbreviated form. This imperative language of the technical specifications is directed at Contractor unless specifically noted otherwise. Incomplete sentences shall be completed by inserting "shall", "shall be" and similar mandatory phrases by inference in the same manner as they are applied to notes on Drawings. The words "shall", "shall be" and similar mandatory phrases 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 in the imperative or otherwise.
- B. Related Sections: Some Sections of these Specifications (Divisions 01 through 46) may include a paragraph titled "Related Sections". This paragraph is an aid to the Project Manual user and is not intended to include all Sections which may be related. It is Contractor's obligation to coordinate all Sections whether indicated under "Related Sections" or not.
- C. Reference to the General Conditions: In Divisions 01 through 46, a reference to the General Conditions includes by inference all amendments or supplements in the Supplementary Conditions.
- D. It shall be the responsibility of the Contractor to identify and obtain any and all building, demolition, and trade permits required from the City of Ann Arbor and other jurisdictions, and pay all associated fees.

1.4 CONTRACTOR USE OF PREMISES

- A. Limit use of premises to allow for Owner occupancy.
- B. Areas for Contractor's trailers, equipment, and material storage, and Contractor's employee parking, shall be as agreed by Owner prior to the start of construction.
- C. Coordinate use of premises under direction of the Owner.

- D. Where the Contract Documents identify certain site elements within the construction limits, such as sidewalks, drives, and streets, that must be kept open for the Owner's use during construction, the Contractor shall be responsible for protection and maintenance of such elements as well.

1.5 OCCUPANCY REQUIREMENTS

- A. Owner Occupancy During Construction:
 - 1. The Owner will occupy or utilize premises during the entire period of construction, for conduct of the Owner's normal operations. Cooperate with the Owner to minimize conflict and to facilitate the Owner's operations.
 - 2. Access to Abutting Properties, Facilities and loading docks: Provide at all times.
 - 3. Access for Emergency Vehicles:
 - a. Provide at all times.
 - b. Provide at least one clear lane during nonwork periods.
 - 4. Fire Hydrants: Provide access to at all times.
 - 5. Do not block fire access routes.
 - 6. Limit parking for construction vehicles to an area designated by the Owner.

1.6 SECURITY AND ACCESS

- A. The City of Ann Arbor's Water Treatment Plant is a limited access facility. The Contractor must comply with the City's operational provisions for security including, but not limited to:
 - 1. Provide proper identification of employees.
 - 2. Provide and use photos IDs for all Contractor personnel.
 - 3. Maintain daily sign-in log of personnel and visitors.
 - 4. Provide a list of personnel and vehicles onsite.
 - 5. Maintain a daily log of vehicle license plate numbers onsite.
 - 6. Allow Owner to conduct background checks on Contractor's personnel upon request.
 - 7. Notify the plant in advance of material deliveries to the site, including delivery contents. Owner will NOT accept deliveries on behalf of the Contractor.
- B. These procedures may be revised by the City at any time, as needed.
- C. Use of Owner's security measures does not relieve Contractor of its responsibility to secure its own working spaces and materials.
- D. Access to Site, Roadways, and Parking Areas
 - 1. Contractor's personnel shall park on public surface streets.
 - 2. It shall be the responsibility of the Contractor to obtain any permits required from the City of Ann Arbor and pay all associated fees.
 - 3. The Contractor shall be responsible for removal of snow in areas of the Contractor's work.
 - 4. No excessive noise, radius, lights, or running engines on the public street.

PART 2 - PRODUCTS

2.1 OTHER MATERIALS

- A. General: All other materials which are not specified herein and are not indicated on the Drawings, but are required for proper and complete performance of the Work.
- B. Procedure:
 - 1. Select new, first quality material.
 - 2. Obtain Engineer's review.
 - 3. Provide and install.

PART 3 - EXECUTION

3.1 CONTROL OF WATER POLLUTION

A. General Requirements

1. The Contractor shall conduct his work in such manner as to prevent the entry of fuels, oils, bituminous materials, chemical, sewage, or other harmful materials into the City's water supply or on to the soil.
2. The Contractor shall take all necessary precautions to prevent the entry of these harmful materials including the use of tarps, planks, protective trusses, or scaffolding systems, or other Owner and Engineer approved methods.
3. Any vehicles or equipment with oil, fuel, or other fluid leaks shall not be allowed on the site and shall be immediately removed upon detection.

END OF SECTION 01 11 00

SECTION 01 14 00 – WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The proposed improvements shall be fully constructed, started, tested and put into operation while portions of the existing ammonia feed system remain in service. Demolition of the existing ammonia feed equipment and related piping shall not commence until the new ammonia feed equipment has been accepted by the Owner.
- B. The existing plant will be maintained in continuous operation by the Owner during the entire construction period of this Project. The intent of this section is to outline the minimum requirements necessary to provide continuous treatment and chloramination of required plant capacity throughout the construction period.
- C. Work under this Contract shall be scheduled and conducted by the Contractor so as not to impede any treatment process or chemical injection, reduce the quality of the plant finish water, or cause odor or other nuisance except as explicitly permitted hereinafter. In performing the work shown and specified, the Contractor shall plan and schedule his work to meet the plant and distribution system operating requirements, and the constraints and construction requirements as outlined in this Section. No discharge of inadequately treated water shall be allowed. The Contractor shall pay all civil penalties, costs, assessments, etc., associated with any failure or inability to discharge of water from the WTP that does not meet water quality standards, adequate quantity requirements or maintain residual disinfection requirements; provided the inadequacy was associated with the Contractor's work.
- D. The Contractor shall be responsible for coordinating the general construction and electrical, plumbing, and instrumentation construction schedules and for ensuring that permanent and temporary chemical is available for all existing, proposed, and temporary facilities that are required to be on line at any given time.
- E. The Contractor has the option of providing temporary facilities that can eliminate a constraint, provided it is done without cost to the Owner and provided that all requirements of these Specifications are fulfilled. Work not specifically covered in the following paragraphs may, in general, be done at any time during the contract period, subject to the operating requirements and constraints and construction requirements outlined hereinafter. All references to days in this Section shall be consecutive calendar days.

1.3 GENERAL CONSTRAINTS

- A. The Contractor shall schedule the Work so that the plant is maintained in continuous operation. The ammonia feed process shall be maintained in continuous operation during the construction period except during approved process interruptions. Shutdowns and diversions shall conform to the requirements hereinafter specified and shall be minimized by the Contractor as much as possible. If in the judgment of the Engineer a requested shutdown is not required for the Contractor to perform the Work, the Contractor shall utilize approved alternative methods to accomplish the Work. All shutdowns shall be coordinated with and scheduled at times suitable to the Owner. Shutdowns shall not begin until all required materials are on hand and ready for installation. Each shutdown period shall commence at a time approved by the Owner. If the Contractor completes all required Work before the specified shutdown period has ended, the Owner may immediately place the existing system back into service.
- B. The Contractor shall give Owner advance notice of proposed shutdowns of any pipe, process, equipment, tank, treatment train, or power source, and shall present all desired shutdowns at the progress meetings. Shutdowns shall be fully coordinated with the Owner at least 72 hours before the scheduled shutdown. Contractor shall lockout/tagout equipment and power sources involved in the shutdowns and diversions. The Owner's personnel shall operate Owner's facilities during shutdowns.

- C. The Contractor shall submit a proposed written plan of work, with a request to schedule shutdown work for Owner and Engineer approval. Work plan shall include sequence of events, needs for coordination with plant staff, plans for lock-out/tag-out, contingency plans for how to return equipment and tanks to service early if needed for emergencies, and details of how the duration of the shut-down will be minimized. See suggested sequence in Division 01 Section "Summary of Work."
- D. Short-term shutdowns (1 hour or less) shall require 7 days prior notice to schedule date and time with Owner, unless otherwise noted herein. Once a short-term shutdown starts, Contractor shall work continuously until the work is complete and the disrupted process or system can be returned to service. Long-term shutdowns (longer than 1 hour) are not permitted.
- E. Any temporary work, facilities, walks, protection of existing structures, piping, blind flanges, valves, equipment, etc. that may be required within the Contractor's work limits to maintain continuous and dependable plant operation shall be furnished by the Contractor at the direction of the Owner or Engineer at no extra cost to the Owner.
- F. The Owner shall have the authority to order work stopped or prohibited that would, in his opinion, unreasonably result in interrupting the necessary functions of the plant operations. The Owner reserves the right to cancel a scheduled shutdown, without additional compensation due the Contractor, and will consider a contract extension if the cancellation affects the Contractor's critical path.
- G. Unless specifically required by this specification, the Contractor shall not request more than one shutdown occur simultaneously.
- H. If the Contractor impairs performance or operation of the plant's chloramination process as a result of not complying with specified provisions for maintaining plant operations, then the Contractor shall immediately make all repairs or replacements and do all work necessary to restore the plant to operation to the satisfaction of the Owner and Engineer. Such work shall progress continuously to completion 24 hours per day and seven work days per week.
- I. After any damage to the existing facilities by the Contractor's Work that, in the opinion of the Owner, constitutes an emergency, the Contractor shall be immediately available and provide immediate services for the repair of damage and mitigation of the emergency.
- J. Shutdowns shall be scheduled between Monday and Friday, unless there are extenuating circumstances approved by the Engineer.

1.4 GENERAL REQUIRMENTS

- A. Access to Site, Roadways, and Parking Areas
 1. An unobstructed traffic route through all water plant gates shall be maintained at all times for the Owner's operations personnel and maintenance equipment. The Contractor shall be responsible for providing access to the construction area and for preparing and maintaining temporary access road, fence, and gate. Contractor's personnel shall park on approved City street curbs and shall not park on the water treatment plant site.
 2. An unobstructed traffic route around the plant site shall be maintained at all times for the Owner's operations personnel, maintenance equipment, and delivery vehicles. Vehicular access to the treatment units, buildings, and bulk chemical storage facilities for Owner personnel and for chemical delivery vehicles shall be maintained at all times by the Contractor except as explicitly permitted hereinafter.
 3. The Contractor shall repair any damage to existing paved surfaces that occurs during the construction period. Any areas disturbed along the shoulders of the access road and interior roads and elsewhere inside and outside of the plant shall be repaired, graded, seeded, etc. as necessary to match pre-construction conditions.
 4. The Contractor shall not undertake the restoration of roadway (paved, gravel, or asphalt overlay) until all other work on the plant improvements has been completed.
 5. The Contractor shall be responsible for removal of snow in areas of the Contractor's work.

6. The Contractor shall not disturb the maintenance of plant operations without a written and approved plan. These operations, at a minimum, include chemical deliveries, sludge hauling and general deliveries.
 7. The Contractor shall submit plans for approval for any needed outages or disturbances to operations. These plans will include the area, process or systems that will be impacted and duration of the outage. No plans can be implemented without written authorization from Owner or Engineer.
- B. Personnel Access
1. Owner's personnel shall have access to all areas which remain in operation throughout the construction period. The Contractor shall locate stored material, dispose of construction debris and trash, provide temporary walkways, provide temporary lighting, and other such work as directed by the Engineer to maintain personnel access to areas in operation. Access and adequate parking areas for Owner's personnel must be maintained throughout construction.
- C. Building Heating and Ventilation
1. Building heating and ventilating for the existing plant structures shall be in service for the entire construction period. Additional temporary heating and ventilation shall be provided as required to maintain facilities under construction adequately heated and vented. The Ammonia Building must be maintained at a minimum of 55°F at all times.
- D. Power, Light and Communications Systems (General)
1. Electric power, lighting service and communications systems shall be maintained in uninterrupted operation in all areas which remain in operation. Individual units may be disconnected as required for replacement, but service shall be available at all times including periods when plant elements are out of service. Shutdown of electrical facilities, when allowed, shall be limited to not more than one (1) hour unless otherwise noted or approved by the Owner. The Owner may allow longer outages under conditions determined by the Owner by making use of the existing engine generator at the plant. The Contractor shall coordinate shutdowns required to minimize the duration of shutdowns and the total number of shutdowns required to complete construction.
- E. Draining Process Tanks, Pipes and Conduits (General)
1. The contents of all tanks, pipes and conduits to be removed, replaced or relocated (or emptied for a specific purpose) shall be transferred to a suitable facility in a manner approved by the Owner through hoses or piping, or by using pumps if hydraulic conditions so require them. The Contractor shall provide the pumps, piping, taps, valves and hoses at no additional cost to the Owner. No uncontrolled release of ammonia gas, spillage of a tank, pipe or conduit shall be permitted. Any spillage, other than potable water, shall be immediately washed down and flushed to the appropriate disposal location. The Contractor may use drains if available, appropriate and approved by the Owner.
- 1.5 SPECIFIC OPERATIONAL CONSTRAINTS
- A. The Contractor shall schedule the work for the following based on the constraints given in such a manner as to maintain the water treatment plant operation. Contractor shall submit a proposed construction schedule including all planned system shutdowns and tie-ins for the Owner's and Engineer's review no later than 30 calendar days after issuance of the Notice to Proceed. At a minimum, Construction Schedule shall indicate a proposed start date and duration for each of the items listed in this section. No construction shall begin on any of the items listed in this section until the proposed schedule has been approved.
 - B. The Contractor shall install as much of the new equipment that is to replace the existing equipment, and pre-assemble as much of the new and replacement piping as feasible prior to shutdown of any portion of the system, to minimize the duration of the shutdown.
 - C. Contractor shall coordinate with Owner prior to turning all valves necessary to isolate pipe sections for connection, and to place the new pipe section in service.
 - D. The Contractor shall install the temporary connection from the bulk tank, and/or temporary cylinder system, to the existing ammonia feed equipment prior starting up any piping demolition. See suggested sequence in Division 01 Section "Summary of Work."

- E. Temporary ammonia cylinder for supply to the existing or new feed equipment, shall be completely set up, and training on system and cylinder usage shall be provided to the WTP operators, prior to transferring operation to the temporary cylinder system.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION 01 14 00

SECTION 01 21 00 – ALLOWANCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Allowances.

1.2 DEFINITIONS

- A. Allowance: A monetary sum that includes, as part of the contract price, the associated costs and requirements to complete the specified allowance.

1.3 SUBMITTALS

- A. Submit detailed invoices or delivery slips to indicate the work performed or delivery slips to indicate actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.4 OWNER'S INSTRUCTIONS

- A. At the earliest feasible date after Contract Award, advise Engineer of the date when the final selection and purchase of each product or system described by an Allowance must be completed in order to avoid delay in performance of the Work.
- B. Use Allowances only as directed for Owner's purposes, and only by Change Orders which designate amounts to be charged to the Allowance.
- C. If the actual price for the specified Allowance is more or less than the stated Allowance, the Contract Price shall be adjusted accordingly by Change Order. The adjustment in Contract Price shall be made in accordance with the General Conditions.
- D. Change Orders authorizing use of funds from the Contingency or Provisionary Allowances will include Contractor's related costs and reasonable overhead and profit margins.
- E. At Project closeout, any amounts remaining in Allowances will be credited to Owner by Change Order.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related construction activities.

3.2 TEMPORARY AMMONIA FEED SYSTEM ALLOWANCE

- A. Contractor shall contract with Metro Welding Corp to provide temporary ammonia feed system, utilizing 150-lb cylinder ammonia supply for up to 45 days. An allowance of \$30,000 shall be included in the Contract Price for this work. This allowance includes furnishing and installing temporary feed system including manifold assemblies and connections, two 4-hour training sessions on non-consecutive weeks for water treatment plant staff, delivery of ammonia cylinders for up to 45 days, removal of temporary system upon completion of the project, as well as coordination with the City.

3.3 ALLOWANCE FOR PERMITS

- A. Contractor shall apply for and pay all fees for the City of Ann Arbor building, demolition and trade permits. A cash allowance of \$5,000 shall be included in the Contract Price for the payment of the permit fees. This allowance shall only be used to pay for the documented permit fees. All paperwork and coordination between the Contractor and City shall be considered incidental to the Contract. For further information contact:

Company City of Ann Arbor Building Department
Address 301 E. Huron Street, Ann Arbor, MI 48104
Phone 734-794-6267

3.4 ALLOWANCE FOR MISCELLANEOUS IMPROVEMENTS

- A. A cash allowance of \$10,000 shall be included in the Contract Price for the miscellaneous additional Work that the Owner approves in advance. This allowance shall only be used to pay for the pre-approved work that exceeds the Contract Scope. All paperwork and coordination between the Contractor and Owner shall be considered incidental to the Contract.

END OF SECTION 01 21 00

SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedures for modifying the Contract Documents.

1.3 DEFINITIONS

- A. Abbreviation: Request For Information (RFI).
- B. Terms:
 - 1. Bulletin: A document delineating possible changes to the Contract Documents which is issued by Engineer for Owner and requests add or deduct costs from Contractor.
 - 2. Field Order: As defined in the General Conditions, a written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
 - 3. Work Change Directive: As defined in the General Conditions, a written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies.
 - 4. Change Order: As defined in the General Conditions, a document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 - 5. Request for Information: A written document initiated by Contractor which requests clarifications to items of the Work from Engineer.

1.4 BULLETIN

- A. Procedures: As indicated herein.
- B. Changes in Cost:
 - 1. Indicate add or deduct lump sum for each item.
 - 2. Include:
 - a. Labor.
 - b. Material.
 - c. Overhead and profit.
 - d. All related work.
 - e. All trades and Subcontractors.
 - 3. Provide a complete cost breakdown with supporting documentation.
- C. Notification to Engineer: Notify Engineer in writing if any of the listed items will cause a change in the Work for which a cost item is not provided in this Bulletin.
- D. Submit:
 - 1. One copy.
 - 2. To Engineer.
 - 3. On or before due date noted.
- E. If Bulletin is accepted, Owner may issue one or more Change Orders for some or all items listed.

1.5 FIELD ORDER

- A. Changes in Contract Price or Contract Times not permitted by use of Field Orders.
- B. Format:
 - 1. May take form of any written communication mutually acceptable to Engineer and Contractor, including, but not necessarily limited to:
 - a. Letter.
 - b. Facsimile transmission.
 - c. Hand drawn or computer generated sketch.
- C. Procedures: Refer to the General Conditions.

1.6 WORK CHANGE DIRECTIVE

- A. Procedures: Refer to the General Conditions.

1.7 CHANGE ORDER

- A. Procedures: Refer to the General Conditions and use Owner-provided form.

1.8 REQUEST FOR INFORMATION

- A. Changes in Contract Price or Contract Times not permitted by use of RFIs.
- B. Format:
 - 1. Contractor shall generate form.
 - 2. Minimum required content of Contractor's RFI form:
 - a. Project name.
 - b. Name and address of Contractor.
 - c. RFI number.
 - d. RFI date.
 - e. Name of initiator.
 - f. Complete written request, with sketches as required.
 - g. Signature of initiator.
 - h. Space for written response by Engineer, with signature and date of Engineer's representative.
- C. Procedures:
 - 1. Maintain a log of RFIs, including the RFI date and the date of the response.
 - 2. Allow at least 15 full working days for Engineer's response following Engineer's receipt of RFI.
 - 3. Submit written justification for shorter response time.
 - 4. Do not submit RFIs for information already included in the Contract Documents.
 - 5. Illegitimate RFIs may be cause for deductions in the Contract amount. See the Supplementary Conditions.
 - 6. RFIs submitted directly by subcontractors or vendors will be rejected.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 01 26 00

SECTION 01 29 16 –PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes submittal to the Owner's designee of Applications for Payment and supporting documentation as specified herein.

1.3 OWNER'S INSTRUCTIONS

- A. Schedule of Values:
1. Coordinate preparation of Schedule of Values with preparation of Contractor's Construction Schedule.
 2. Correlate line items on Schedule of Values with other required administrative schedules and forms, including:
 - a. Contractor's Construction Schedule.
 - b. Application for Payment form.
 - c. List of subcontractors.
 - d. Schedule of Alternates.
 - e. List of products.
 - f. List of principal suppliers and fabricators.
 - g. Schedule of Submittals.
 3. Submit Schedule of Values to Engineer at the earliest feasible date, within 14 days after Notice to Proceed.
 4. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for Schedule of Values.
 5. Identification: Include the following project identification on Schedule of Values:
 - a. Project name and location.
 - b. Name of Engineer.
 - c. Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 6. Arrange Schedule of Values in a tabular form with separate rows for each Specification Section and separate columns for each major structure or area of Work.
 7. Provide a breakdown of the Contract Price in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
 8. Round off amounts to the nearest whole dollar; the total shall equal the Contract Price.
 9. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 10. Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually on Applications for Payment. Each item on Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
 11. At Contractor's option, temporary facilities and other major cost items that are not a direct cost of actual work-in-place may be shown as separate line items on Schedule of Values or distributed as general overhead expense.
 12. Update and resubmit Schedule of Values when Change Orders or Work Change Directives result in a change in the Contract Price.

13. A Lump Sum payment equal to 1-1/2% of the total Bid Price (to include all bonds, insurance, etc.) will be allowed for "mobilization" as a progress payment line item. The actual cost of bonds and insurance (up to maximum payment of 1-1/2%) will be considered in the initial payment request provided that cost documentation suitable to the Owner is furnished by the Contractor. Any outstanding balance of the mobilization line item will be payable when the Work is 10% complete as indicated by the approved progress payments (less costs of mobilization and stored equipment).
14. Schedule of Values should reserve no less than 5% of lump sum cost to close out Work.

1.4 APPLICATION FOR PAYMENT

- A. Initial Application for Payment: Administrative actions and submittals that must precede submittal of the first Application for Payment include the following:
 1. List of subcontractors.
 2. List of principal suppliers and fabricators.
 3. Schedule of Values.
 4. Contractor's Construction Schedule (preliminary if not final).
 5. Schedule of principal products.
 6. Submittal Schedule (preliminary if not final).
- B. Applications For Payment:
 1. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.
 2. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
 3. The date for each progress payment will be determined at the Preconstruction Conference. The period of construction Work covered by each Application for Payment is 1 month. Actual start/end dates will be determined at the Preconstruction Conference.
 4. Use the AIA (American Institute of Architects) Application and Certification for Payment form for Applications for Payment.
 5. Complete every entry on the form, including execution by person authorized to sign legal documents on behalf of Contractor. Incomplete applications will be returned without action.
 6. Entries shall match data on Schedule of Values and Contractor's Construction Schedule. Use updated Schedules if revisions have been made.
 7. Include amounts of Change Orders and Work Change Directives issued prior to the last day of the construction period covered by the application.
 8. Submit 3 executed copies of each Application for Payment to Engineer; each copy shall be complete, including waivers of lien and similar attachments, when required.
 9. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application in a manner acceptable to Engineer.
- C. Application for Payment at Substantial Completion:
 1. Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 2. Administrative actions and submittals that shall proceed or coincide with this application include:
 - a. Warranties (guarantees) and maintenance agreements.
 - b. Maintenance instructions.
 - c. Final cleaning.
 - d. Application for reduction of retainage and consent of surety.
 - e. Final progress photographs.
 - f. List of incomplete Work, recognized as exceptions to Engineer's Certificate of Substantial Completion.
- D. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
 1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Transmittal of required Project construction records to Owner.
 4. Proof that taxes, fees, and similar obligations have been paid.

5. Removal of temporary facilities and services.
6. Removal of surplus materials, rubbish, and similar elements.
7. Contractor's waivers of mechanics liens for Project.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 29 16

SECTION 01 31 00 – PROJECT COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
 - 1. Scheduling:
 - a. Coordination of Work under this Contract.
 - b. Administrative and supervisory personnel.
 - 2. Preconstruction conference.
 - 3. Progress meetings.
 - 4. Inspections
 - 5. Day tank isolation.
 - 6. Short duration ammonia shutdowns.
 - 7. Training.
- B. Related Sections Specified Elsewhere:
 - 1. Requirements for Contractor's Construction Schedule are included in Division 01 Section "Construction Progress Schedule."
 - 2. Closeout procedures are included in Division 01 Section "Closeout Procedures."

1.2 SUBMITTALS

- A. Within 15 days of Notice to Proceed, submit a list of Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at Site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.

1.3 SCHEDULING

- A. For general guidance only, the anticipated Notice to Proceed date is August 1, 2019.
- B. The Contractor shall NOT be permitted to begin any work involving partial shutdowns or use of the temporary ammonia supply until WTP flows average 16 MGD or below. This typically occurs in late September/early October. For general guidance assume October 1, 2019, as earliest date for shutdown or partial shutdowns.
- C. Contractor shall be permitted to use temporary ammonia cylinder system for no longer than 45 consecutive days.
- D. Except in connection with the safety or protection of persons or the Work or property at the Site or adjacent thereto, all Work at the site shall be restricted to the following hours:
 - 1. Monday through Friday (except City holidays): 7 a.m. to 5 p.m.
 - 2. Saturdays with written approval of the Owner.
 - 3. Sundays or City holidays not permitted.
- E. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair. Make adequate provisions to accommodate items scheduled for later installation.
- F. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at Site in accordance with Laws or Regulations. Contractor shall train Contractor's employees on use of these sheets and shall keep a master copy on hand at Site.

- G. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of schedules
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project closeout activities.

1.4 WORK SEQUENCE

- A. Contractor shall prepare and submit to Engineer for approval, a complete detailed working schedule in compliance with the Owner's schedule, setting forth the sequence of operations Contractor proposes to follow. No work shall commence until the Owner/Engineer has approved this plan.
- B. To maintain operation of the ammonia feed system during the piping replacement, the replacement shall be done in a staged approach by providing a temporary feed system using ammonia cylinders. Contractor shall sequence work to ensure the system is capable of supplying up to 150 pounds per day of anhydrous ammonia, uninterrupted.
- C. The suggested sequence for staged construction is provided below; it may possible that some stages can be performed concurrently. Contractor shall verify valve IDs prior to submitting proposed sequence of operations to Owner for review and approval. Coordinate closely with Owner for each stage. See Table 1 for a summary of work items, suggested sequence, notices required to Owner, durations, and liquidated damages. Sketches of the suggested sequence is included at the end of this Section.
1. Stage 1 – Install new ammonia feed equipment, feed from day tank to existing equipment:
 - a. Install new ammoniators, including vacuum regulators, drip legs, vent lines, and all associated piping between Valves 7106 and 7107 in building, leaving existing feed equipment in place.
 - b. Owner's personnel to operate day tank and existing feed equipment to draw down as much of the stored quantity of ammonia in day tank as possible.
 2. Stage 2 – Feed from bulk tank to existing equipment, install temporary connections:
 - a. Owner's personnel may transfer contents between the day tank and the bulk tank to draw down as much of the stored quantity of ammonia as possible.
 - b. Close Valves 7002, 7003, 7004, 7005, and 7006; remove cap (at end of pipe extension beyond the vacuum regulators); and install Valve 7138, TEMP Valve, and associated piping and threaded connections to accept new connections from bulk tank or cylinder system (**short duration shutdown required**).
 - c. Use existing hose connection (Valve 7039) at bulk tank (used for ammonia transfer) to run new steel piping (including Valve 7137) to new temporary connection at existing feed equipment (including Valve 7138) and to Valve 7107 to new feed system. Connect pipe, close Valve 7107, and open Valves 7004, 7005, 7006, 7137, 7138, and 7039.
 - d. Close Valves 7007 and 7023 at the bulk tank.
 3. Stage 3 – Feed from bulk tank to new ammoniators or existing equipment:
 - a. **Coordinate with Owner to ensure plant is not operating with Clearwell No. 1.**
 - 1) Replace existing elbow on existing Clearwell No. 1 feed line, just before pipe exits the ammonia building through the wall, with tee and Valve 7123.
 - 2) Install rotameter, gauge, Valve 7126, and associated piping at Clearwell No. 1 eductors inside WTP.
 - b. **Coordinate with Owner to ensure plant is not operating with Clearwell No. 2.**
 - 1) Replace existing elbow on existing Clearwell No. 2 feed line, just before pipe exits the ammonia building through the wall, with tee and Valve 7124.
 - 2) Install rotameter, gauge, Valve 7125, and associated piping at Clearwell No. 2 eductors inside WTP.
 - c. Connect new piping, including Valves 7131 and 7132, from Valves 7123 and 7124 to new ammoniator panels (completed in Stage 1).
 - d. Both ammoniator systems (new and existing) are now functional.
 - e. Testing of new ammoniators can begin.

4. Stage 4 – Connect to temporary ammonia feed system:
 - a. Install temporary ammonia feed system (Temporary Feed) as indicated on the Drawings and specified herein.
 - b. Ensure TEMP Valve and Valve 7003 are closed. Connect Temporary Feed manifold to TEMP Valve connection.
 - c. Coordinate with Owner to use as much volume in bulk tank as possible before switching to temporary feed.
 - d. Feed existing ammonia feed equipment with Temporary Feed: close Valve 7138 and open TEMP Valve, OR
 - e. Feed new ammonia feed equipment with Temporary Feed: close Valves 7004, 7005, and 7006, and open TEMP Valve and Valve 7138.
 - f. Take all necessary precautions to prevent the release of gaseous ammonia into the air.
 5. Stage 5 – Isolate day tank for valve/fitting replacement:
 - a. Close Valves 7008 and 7026 to isolate day tank from bulk tanks.
 - b. Evacuate remaining ammonia from day tank, taking all necessary precautions to prevent the release of gaseous ammonia into the air.
 - c. Replace day tank connections, valves, and tank capacity gauge up to and including Valves 7002 and 7022.
 6. Stage 6 – Isolate bulk tank for valve/fitting replacement:
 - a. Continue feeding ammonia from temporary system.
 - b. Close Valves 7008, 7026, 7021, 7022, 7137, and 7107 to isolate day tank from bulk tanks.
 - c. Open Valves 7106, 7001, and 7002.
 - d. Evacuate remaining ammonia from bulk tank, taking all necessary precautions to prevent the release of gaseous ammonia into the air.
 - e. Replace all tank connections, valves, and fittings at bulk tank as indicated on the Drawings, and reconnect vapor and liquid feed lines.
 - f. Install second vaporizer unit.
 - g. Replace all remaining piping between bulk tank and day tank and make connection to Valve 7106. Remove ammonia transfer pump and associated piping.
 7. Stage 7 – Put new ammoniator system in service, remove old/temporary systems:
 - a. After ammoniators have been installed, tested, and accepted, remove existing ammonia feed equipment, temporary feed system, TEMP Valve and associated piping, and cap Valve 7138.
 - b. Operate valves accordingly to transfer ammonia from bulk or day tank via new vapor feed lines to new ammoniator feed equipment.
- D. Temporary feed system notes:
1. Contractor shall contract with Metro Welding Corp and shall coordinate installation of the temporary feed system, training of WTP staff, and ongoing delivery of the ammonia cylinders with the Owner.
 2. Contractor shall coordinate two separate training sessions, provided by Metro Welding Corp, for the WTP staff on operation and maintenance of the temporary system, and change out of ammonia cylinders prior to placing system in operation (Stage 5).

**Table 1 – Ann Arbor WTP Ammonia Feed System Modifications
 Interim Milestones and Work Constraints Summary^{2, 3}**

Item	Notice to Owner	Maximum Work Duration	Dates and Deadlines	Liquidated Damages
Anticipated Notice to Proceed (NTP)			August 1, 2019	
Shutdown of ammonia feeders to install temporary connection (Stage 2)	14 days	15 minutes	No sooner than October 1, 2019	
Clearwell 1 shutdown for corresponding Ammonia Feed tie-in (Stage 3)	14 days	3 days	No sooner than October 1, 2019	\$1,000/day
Clearwell 2 shutdown for corresponding Ammonia Feed tie-in (Stage 3)	14 days	3 days	No sooner than October 1, 2019	\$1,000/day

**Table 1 – Ann Arbor WTP Ammonia Feed System Modifications
 Interim Milestones and Work Constraints Summary^{2, 3}**

Item	Notice to Owner	Maximum Work Duration	Dates and Deadlines	Liquidated Damages
Operation of Temporary Ammonia Feed System ¹	14 days	45 days	No sooner than October 1, 2019	\$500/day
Substantial Completion			16 weeks from NTP	See Contract
Final Completion			20 weeks from NTP	See Contract

¹In addition to notice to the Owner, start-up services and training provided by Metro Welding Corp shall be provided to WTP staff prior to putting temporary system into service.

²Liquidated damages will be applied independently for each key contract date set forth by this Contract.

³Where the schedule requirements identified in this Section are not met, including repairs not fully complete, final cleaning, equipment reinstallation, and all other work to make the system suitable for Owner operation, non-quantifiable liquidated damages in the corresponding amounts will be applied.

1.5 PRECONSTRUCTION CONFERENCE

- A. Engineer will schedule a Preconstruction Conference and organizational meeting at the Site or other convenient location prior to commencement of construction activities to review responsibilities and personnel assignments.
- B. Attendees: Owner, Engineer, Contractor, and its superintendent, manufacturers, suppliers, and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress including such topics as:
 - 1. Tentative Construction Schedule.
 - 2. Critical Work sequencing.
 - 3. Designation of responsible personnel.
 - 4. Procedures for processing field decisions and Change Orders.
 - 5. Procedures for processing Applications for Payment.
 - 6. Distribution of Contract Documents.
 - 7. Submittal of Shop Drawings, product data, and samples.
 - 8. Preparation of Record Documents.
 - 9. Use of the premises.
 - 10. Office, Work, and storage areas.
 - 11. Equipment deliveries and priorities.
 - 12. Safety procedures.
 - 13. First aid.
 - 14. Security.
 - 15. Housekeeping.
 - 16. Working hours.

1.6 PROGRESS MEETINGS

- A. Attendees: In addition to representatives of Owner and Engineer, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
- B. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.

- C. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
- D. Reporting: Engineer will prepare and distribute copies of minutes of the meeting to each party present and to other parties who should have been present. The minutes will include a brief summary, in narrative form, of progress since the previous meeting and report.
- E. Schedule Updating: Contractor shall revise Construction Schedule after each progress meeting where revisions to Schedule have been made or recognized. Issue revised Schedule no later than 3 days after the progress meeting date to Engineer for distribution concurrently with the progress meeting minutes.

1.7 INSPECTIONS

- A. Contractor shall participate in inspections with Owner and/or Engineer as needed throughout the project.

1.8 AMMONIA TANK ISOLATION/AMMONIA SYSTEM SHUTDOWN

- A. Contractor shall coordinate the shutdown of the bulk tank, day tank, and/or feed equipment with the City.
- B. Contractor shall isolate the system to shut down ammonia feed to only one clearwell at a time. Contractor shall not make connections to both clearwell feed lines (see Stage 3) simultaneously.
- C. The City shall be notified not less than 14 days prior to shutdown.
- D. Owner will operate the ammonia system to transfer ammonia from the day tank to the bulk tank. Owner will close system valves to isolate the day tank after transfer has been completed.

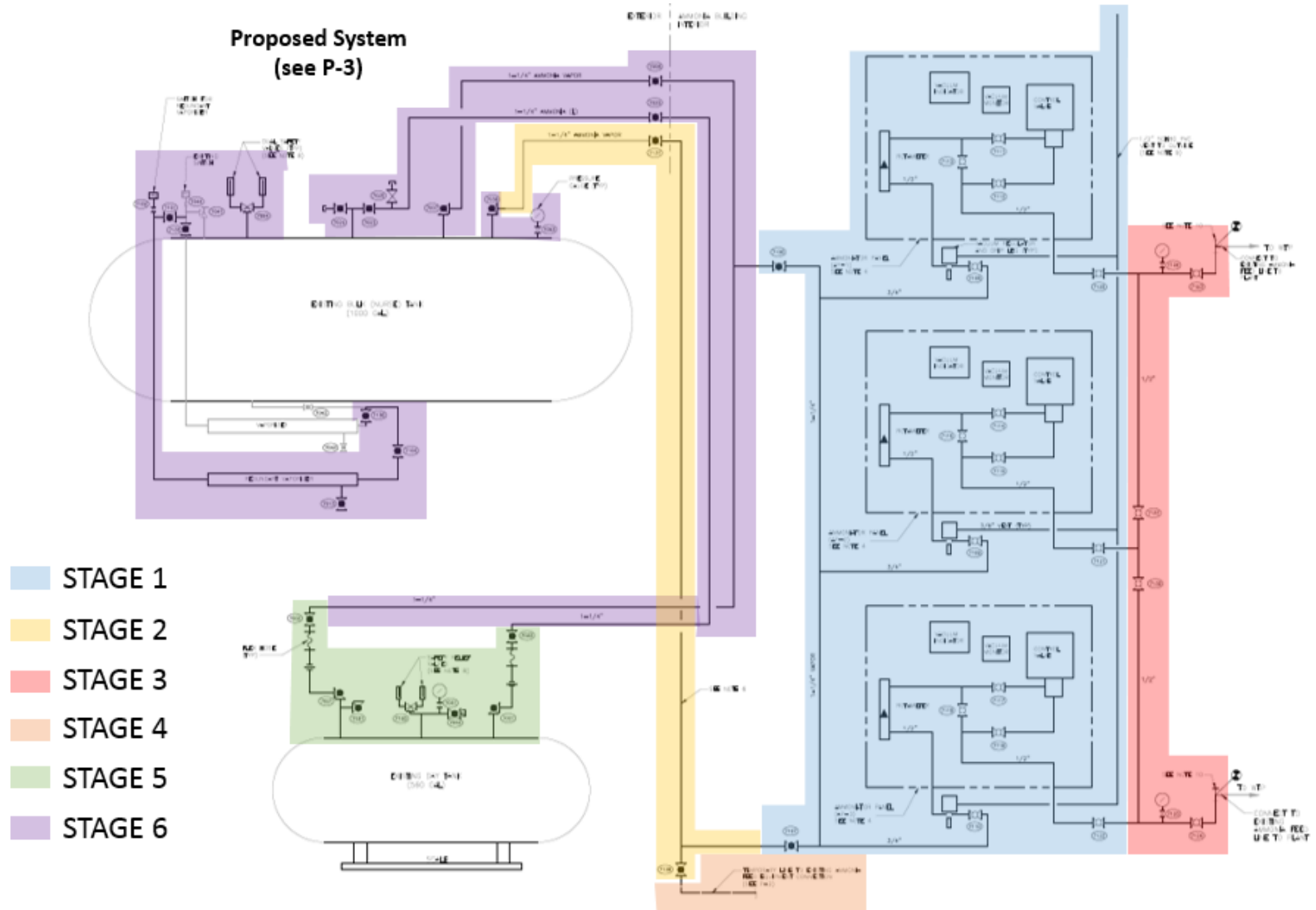
PART 2 - PRODUCTS

Not Used.

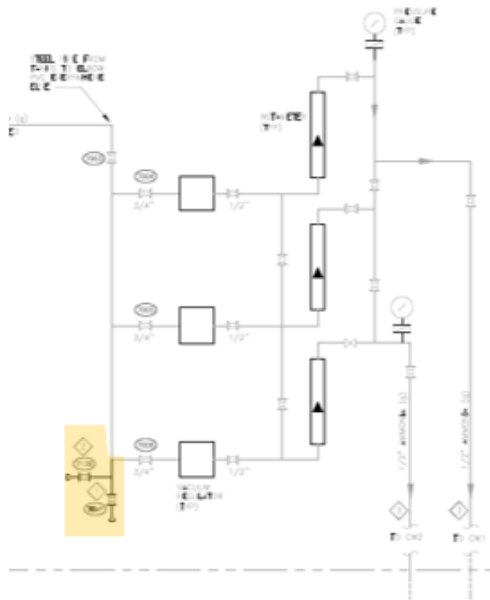
PART 3 - EXECUTION

Not Used.

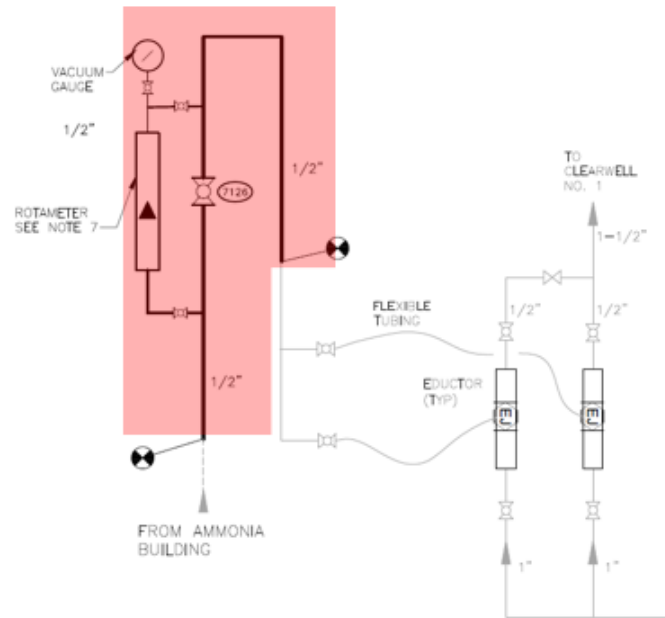
SUGGESTED SEQUENCE SKETCHES



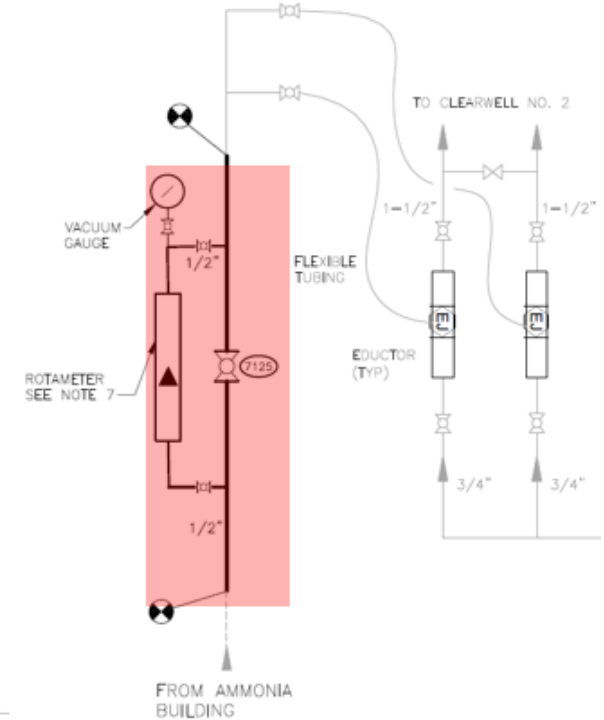
- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4
- STAGE 5
- STAGE 6



Existing System
 (see P-2)



Proposed Work at Eductors
 (see P-3)



Proposed Work at Eductors
 (see P-3)

END OF SECTION 01 31 00

SECTION 01 32 16 – CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the preparation, furnishing, distribution and periodic revision of construction progress schedules.

PART 2 - PRODUCTS

2.1 FORM OF SCHEDULE

- A. Preparation:
 - 1. Prepare in the form of a horizontal bar chart, CPM network, or other form as previously approved by Engineer.
 - 2. Provide a separate horizontal bar column or path for each trade or operation.
 - 3. Prepare the schedule in the chronological order of the beginning of each item of work.
 - 4. Identify each column or path by:
 - a. Major Specification Section number.
 - b. Distinct graphic delineation.
 - 5. Use a horizontal time scale and identify the first work day of each week.
 - 6. Allow space for updating.
- B. Size: The schedule sheets shall be 11 inches x 17 inches unless otherwise approved by Engineer.

2.2 CONTENT OF SCHEDULES

- A. Construction Sequence:
 - 1. Provide a complete sequence of construction by activity.
 - 2. For Shop Drawings, project data and Samples indicate the following:
 - a. Submittal dates.
 - b. Dates review copies will be required.
 - 3. Show decision dates for selection of finishes.
 - 4. Show Product procurement and delivery dates.
 - 5. Show dates for beginning and completion of each element of construction.
- B. Percentage Completion: Show the projected percentage of completion for each item of work as of the first day of each month.
- C. Subschedules:
 - 1. Provide separate subschedules showing submittals, review times, procurement schedules and delivery days.
 - 2. Provide subschedules to define critical portions of the entire schedule.

PART 3 - EXECUTION

3.1 SUBMITTALS

- A. Preliminary Schedule:
 - 1. Submit the preliminary schedule within 10 days after the Effective Date of Agreement.
 - 2. Engineer will review schedules and will return the reviewed copy within 15 days after receipt.

3. If required, resubmit within 7 days after receipt of a returned review copy.
4. Meet with Engineer at least 10 days prior to the submission of the first Application for Payment to review the schedule.

B. Periodic Adjustment: Monthly, submit a revised schedule accurately depicting adjustments and progress to the first day of each month.

C. Number of Copies: Submit the number of copies required by Contractor, plus 4 copies to be retained by Engineer.

3.2 DISTRIBUTION

A. Reviewed Schedules: Distribute copies of the reviewed schedules to the following:

1. Job Site file.
2. Subcontractors.
3. Other concerned parties.

B. Instructions to Recipients: Instruct recipients to report all inability to comply with the schedule, and provide detailed explanations with suggested remedies.

3.3 ADJUSTMENT OF PROGRESS SCHEDULE

A. Changes: Show all changes occurring since previous submission of the schedule.

B. Progress: Indicate progress of each activity and show completion dates.

C. Other Items:

1. Include major changes in scope.
2. Include activities modified since previous updating.
3. Include revised projections due to changes.
4. Include other identifiable changes.

D. Narrative Report: Provide a narrative report including:

1. A discussion of problem areas including current and anticipated delay factors and their impact.
2. Direct action taken, or proposed, and its effect.
3. A description of revisions including:
 - a. Their effect on the schedule due to change of scope.
 - b. Revisions in duration of activities.
 - c. Other changes that may affect the schedule.
4. The status of completion of Milestones.

END OF SECTION 01 32 16

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedures for the submittal of Shop Drawings, Product Data, Schedule of Values, Operation and Maintenance Manuals, Record Photographs, and other information.
- B. Related Sections include pertinent Sections of these Specifications for the individual Submittals required.

1.3 DEFINITIONS

- A. Submittal: Information sent by Contractor to convey information about systems, equipment, materials, products, and administrative matters for the Work.
- B. Resubmittal: Submittal sent for review a second or further time.
- C. Product Data: Illustrations, standard schedules, diagrams, performance charts, instructions, brochures, or manufacturer's literature that describe the physical size, appearance, and other characteristics of materials or equipment for a portion of the Work.
- D. Shop Drawings: Drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
- E. Action Submittals: Submittals that require Engineer's response.
- F. Informational Submittals: Submittals that do not require Engineer's response.
- G. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 SCHEDULE OF VALUES

- A. Within 14 days after issuance of Notice to Proceed, Contractor shall submit two copies of the proposed Schedule of Values for the Engineer's review and approval.
- B. Schedule of Values shall meet requirements of Division 01 Section "Payment Procedures."
- C. Schedule of Values shall be revised as needed based on Engineer's comments.
- D. Schedule of Values shall be organized according to Specification Sections.
- E. Schedule of Values shall include sections for tracking all costs associated with each stage of the project.

1.5 SUBMITTALS

- A. Bonds and insurance certificates shall be submitted to and approved by Owner prior to executing the Contract and prior to the initiation of any construction onsite.

- B. Permits, licenses, and certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents; correspondence and records established in conjunction with compliance with standards; and regulations bearing upon performance of the Work.

1.6 SUBMITTAL PROCEDURES

A. Submittal Schedule:

1. Prepare and submit a Submittal schedule that identifies the following for each Submittal:
 - a. Submittal number
 - b. Submittal description
 - c. Projected date Submittal will be submitted.
 - d. Submit Schedule within 10 days of the date required for establishment of Construction Schedule.
2. An electronic copy (MS Excel file) of a blank Submittal schedule, in the preferred format, will be furnished by Engineer at the preconstruction meeting.
3. Submittal Numbers:
 - a. Number each submittal consecutively beginning with the Specification Section. Resubmittals should have the same number as the original, plus a letter designation for each resubmittal (i.e., 01 33 00-1-A, 01 33 00-1-B, etc.). Where a Submittal is required via a Drawing (instead of a Specification Section), use the applicable Drawing Number followed by a letter designation for each resubmittal (i.e., P101-1-A, P101-1-B, etc.).
 - b. Submittals that are not numbered correctly may be rejected.

B. Delivery Method:

1. Submittals may be delivered as paper copies or electronic files at Contractor's option.
2. Advise Engineer of delivery method to be used at the preconstruction meeting.
3. Where Submittals include information that is intended to be printed on sheets larger than 11 inches x 17 inches, or where scale or drawing size are critical for proper review, submit 3 paper copies for review.
4. Paper Copies:
 - a. Unless indicated otherwise, submit 3 copies of each Submittal.
 - b. One copy of each Action Submittal will be returned to Contractor.
 - c. Extra copies submitted by Contractor will be discarded.
5. Electronic Files:
 - a. Unless indicated otherwise, submit 1 copy of each Submittal in PDF format.
 - b. Scanned Submittals shall be produced in such a way as to not compromise the graphic quality or accuracy of scale, where applicable; and text shall be searchable.
 - c. One copy of each Action Submittal will be returned to Contractor.
 - d. Submittals may be transmitted via electronic mail (e-mail) or on a CD or DVD. Submittals that are transmitted electronically may be returned electronically at the Engineer's discretion.
6. Transmit Submittals to party and address identified by Engineer at preconstruction meeting.

C. Coordination and Timing: Coordinate preparation and processing of Submittals with performance of construction activities. Contractor is responsible for cost of delays caused by lack of coordination or tardiness of Submittals. Incomplete Submittals will be rejected.

1. Coordinate each Submittal with fabrication, purchasing, testing, delivery, other Submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of Submittals for related parts of the Work so processing will not be delayed because of need to review Submittals concurrently for coordination.
 - a. Engineer reserves the right to withhold action on a Submittal requiring coordination with other Submittals until related Submittals are received.

D. Processing Time: Allow 15 full working days for Engineer to review each Submittal, including Resubmittals. Time for review shall commence on Engineer's receipt of Submittal. No extension of the Contract Time will be authorized because of failure to transmit Submittals enough in advance of the Work to permit processing, including Resubmittals. Engineer will advise Contractor when a Submittal being processed must be delayed for coordination.

- E. Identification: Place a permanent label on each Submittal or generate a separate cover sheet.
 - 1. Indicate name of firm or entity that prepared Submittal.
 - 2. Provide space to record Contractor's review and approval markings and action taken by Engineer.
 - 3. Include the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Engineer.
 - d. Name and address of Contractor.
 - e. Name and address of Subcontractor(s).
 - f. Name and address of Supplier(s).
 - g. Name of Manufacturer.
 - h. Submittal number, including revision identifier.
 - i. Drawing number and detail references, as applicable.
 - j. Location(s) where product is to be installed, as applicable.
 - k. Other necessary identification.
- F. Field Verification: Field verify all dimensions prior to starting work. Field verify the components to which the work will be applied are in acceptable condition to receive Contractor's work. Verify or correct Shop Drawing dimensions with field measurements prior to submission.
- G. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on Submittals. Submittals that include deviations that are not identified may be rejected. Engineer may or may not consider deviations. Deviations are not substitutions. Refer to Division 01 Section "Product Substitution Procedures" for procedures regarding requests for substitutions.
- H. Transmittal: Package each Submittal individually and appropriately for transmittal and handling. Transmit each Submittal using a transmittal form. Engineer will reject Submittal(s) received from sources other than Contractor.
- I. Resubmittals: Make Resubmittals in same form and number of copies as initial Submittal.
 - 1. Note date and content of previous Submittal.
 - 2. Clearly identify additions and revisions.
 - 3. Resubmit Submittals until they are marked, "Reviewed, No Exceptions Noted" or "Reviewed With Corrections Noted."
- J. Distribution: Furnish copies of Submittals with mark indicating, "Reviewed, No Exceptions Noted" or "Reviewed With Corrections Noted," to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.
- K. Use for Construction: Unless otherwise indicated by Engineer, use only Submittals with mark indicating, "Reviewed, No Exceptions Noted" or "Reviewed With Corrections Noted."

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit project specific Action Submittals required by individual Specification Sections. Do not use highlighting that would not be reproducible.
- B. Product Data: Collect information into a single Submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for Submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each Submittal to indicate which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.

- d. Color charts as required by individual Specification Sections.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 4. Submit Product Data before or concurrent with Samples.
 5. Maintain copy of returned Submittal for Project records.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale where appropriate. Scale shall be sufficiently large to indicate pertinent features of the item and its method of connection to the Work.
1. Preparation: Fully illustrate requirements of the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Colors and materials as applicable.
 - e. Roughing-in and setting diagrams.
 - f. Wiring diagrams showing field-installed wiring, including power, signal, control, and communication wiring. Differentiate between Manufacturer-installed and field-installed wiring.
 - g. Manufacturing instructions.
 - h. Templates and patterns.
 - i. Schedules.
 - j. Calculations.
 - k. Compliance with specified standards.
 - l. Notation of coordination requirements.
 - m. Notation of dimensions established by field measurement.
 - n. Relationship to adjoining construction clearly indicated.
 2. Sheet Size: Submit Shop Drawings on sheets at least 8-1/2 inches x 11 inches but no larger than 24 inches x 36 inches.
 3. Maintain copy of returned Submittal for Project records.
- D. Operation and Maintenance Manuals:
1. General:
 - a. Where manuals are required to be submitted covering items included in the Work, prepare such manuals in durable plastic 3-ring binders approximately 8-1/2 inches x 11 inches in size and with at least the following:
 - 1) Identification on, or readable through, the front cover and spine stating general nature of the manual.
 - 2) Neatly typewritten index near the front of the manual.
 - 3) Complete instructions regarding operation and maintenance of equipment involved, including:
 - a) Equipment function, normal operating characteristics, and limiting conditions.
 - b) Assembly, installation, alignment, adjustment, and checking instructions.
 - c) Operating instructions for start-up, routine and normal operating, regulation and control, shutdown, and emergency conditions.
 - d) Maintenance instructions, including lubrication requirements where applicable.
 - e) Guide to "troubleshooting".
 - f) Parts lists and predicted life of parts subject to wear.
 - g) Project specific outline and cross sections, assembly drawings, engineering data, and wiring diagrams. Wiring diagrams shall reflect final, as-installed conditions and include wire numbers.
 - h) Test data and performance curves.
 - 4) Complete nomenclature of all replaceable parts, their part numbers, current costs, and name and address of nearest vendor of parts.

- 5) Copies of guarantees and warranties issued.
 - 6) Copies of the reviewed Submittals.
 - 7) Copies of data concerning changes made during construction.
2. Extraneous Data: Where contents of the manuals include Manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete all Manufacturers' data with which this installation is not concerned. Do not use highlighting that would not be reproducible.
 3. Number of Copies Required: Unless otherwise specifically directed by Engineer, or stipulated in the pertinent Section of these Specifications:
 - a. For review, submit 1 paper and 1 electronic copy.
 - b. For record, deliver 5 paper copies and 1 searchable electronic copy to Engineer.
 4. Schedule delivery of record copies of operation and maintenance manuals at least 14 days prior to startup of respective equipment, unless otherwise specified.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by individual Specification Sections. Do not use highlighting that would not be reproducible.
- B. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- C. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- D. Installer Certificates: Prepare written statements on Manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by Manufacturer for this Project.
- E. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- F. Manufacturer's Instructions: Prepare written or published information that documents Manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of Manufacturer. Include the following, as applicable:
 1. Preparation of substrates.
 2. Required substrate tolerances.
 3. Sequence of installation or erection.
 4. Required installation tolerances.
 5. Required adjustments.
 6. Recommendations for cleaning and protection.
- G. Manufacturer's Field Reports: Prepare written information documenting tests and inspections of factory-authorized service representative. Include the following, as applicable:
 1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement of substrate condition and acceptability of substrate for installation or application of product.
 3. Statement that products at Site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Document settings in writing.
 8. Other required items indicated in individual Specification Sections.

- H. Record Photographs:
1. Contractor shall take a minimum of 36 preconstruction photographs to document the condition of the site prior to beginning work.
 2. After final acceptance of the Work, 36 photographs shall be taken of each structure and major feature of the Project as directed by Engineer. These photographs shall be taken from points and at times directed by Engineer.
 3. Photographs shall include condition of the Ammonia Building, bulk tank, day tank, and pavement within fenced site, both before and after project.
 4. Contractor shall provide digital photos submitted on CD. File names should represent the subject matter of the photo. At the completion of the project, the Contractor shall print the photos on photographic paper (4 inches x 6 inches) and bind in a 3-ring binder, two photos per 8-1/2-inch x 11-inch sheet.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each Submittal and check for coordination with other work of the Contract and for compliance with the Contract Documents. Verify field dimensions and conditions; note corrections as necessary. Mark with approval stamp before submitting to Engineer.
1. Approval Stamp: Stamp each Submittal with an approval stamp. Use the same stamp format for each Submittal. Include Project name and location, Submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that Submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
- B. Submittals that are not approved and stamped by Contractor will be rejected.

3.2 ENGINEER'S REVIEW

- A. Action Submittals: Engineer will review Action Submittals, make marks to indicate corrections or modifications required, and return Submittal. Engineer will stamp each Submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
1. Reviewed, No Exceptions Noted: Submittal appears to conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 2. Reviewed With Corrections Noted: Upon incorporation of review comments, it appears that Submittal will conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 3. Revise and Resubmit: Submittal has one or more specific segments that are incomplete, do not appear to conform to the information given in the Contract Documents, or are incompatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Contractor shall resubmit information for review to demonstrate understanding of comments and portions of Work to be provided. Except as noted, Contractor shall not proceed with work related to Submittal.
 4. Rejected, Resubmit: Submittal as a whole is incomplete, does not appear to conform to the information given in the Contract Documents, or is incompatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Contractor shall resubmit information for review to demonstrate understanding of comments and portions of Work to be provided. Contractor shall not proceed with work related to Submittal.
- B. Informational Submittals: Other Submittals required by the Contract Documents are for information only. Engineer will acknowledge receipt of Informational Submittals. Such Submittals include, but are not limited to:
1. Qualifications Data.
 2. Certificates.
 3. Test Reports.
 4. Manufacturer's Instructions.
 5. Maintenance Data.
 6. Field Reports.

- C. Submittals not required by the Contract Documents will be returned without being reviewed.
- D. Partial Submittals are not acceptable, will be considered non-responsive, and will be rejected.

END OF SECTION 01 33 00

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and installation of construction facilities as follows:
 - 1. Temporary Utilities: Water, electricity, and telephone.
 - 2. Sanitary facilities.
 - 3. Temporary heat.
 - 4. Enclosures such as tarpaulins, barricades and canopies.
 - 5. Storage areas.

1.3 STORAGE AREAS

- A. Locations:
 - 1. The following general areas are available for storage:
 - a. Area around Ammonia Building.
 - 2. Specific storage locations within the general areas:
 - a. Carefully coordinate with Owner.
 - b. Subject to approval of Owner.
 - 3. Contractor shall not block access to the thickeners, treatment basins, or other areas designated by the Owner.
- B. Protection and Restoration:
 - 1. Take reasonable means to prevent spillage of fuel, oil, chemicals and similar materials.
 - 2. Clean up spills and, if necessary, remove soil and replace with uncontaminated soil so as to allow vegetation to be quickly reestablished.
- C. Cleaning: Keep storage areas clean in accordance with Division 01 Section "Cleaning and Waste Management."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General:
 - 1. New or used.
 - 2. Adequate in capacity for the required usage.
 - 3. Provide safe conditions.
 - 4. Comply with requirements of applicable codes and standards.

2.2 UTILITIES

- A. Temporary Utilities:
 - 1. Equipment Testing:
 - a. Owner will Pay utility charges for all power, water, and other utilities.
 - b. Furnish, install, remove and pay for associated temporary equipment, piping, pumps, fuel, power distribution, and connections.

2. Water:
 - a. Owner will pay for water usage charges.
 - b. Furnish, install, remove and pay for all temporary piping, water meters, equipment and connections.
 - c. Obtain water by connection to Owner's existing water system.
3. Electricity:
 - a. Owner will pay for electrical usage charges.
 - b. Furnish, install, remove and pay for all temporary wiring, equipment switches, panels, connections and transformers.
 - c. Furnish, install, remove, and pay for area distribution boxes so located that power and artificial lighting are located at all points where required by the Work.
 - d. Obtain electrical power by connecting to Owner's existing system.

2.3 SANITARY FACILITIES

- A. Furnish and install all required temporary toilet buildings with sanitary toilets for use of all workers; comply with all minimum requirements of the Health Department or other public agency having jurisdiction; maintain in a sanitary condition at all times.

2.4 CONSTRUCTION HEATING

- A. General:
 1. All heating required during the progress of the Work, prior to the installation of the permanent heating system, shall be classified "temporary heat".
 2. Prior to the installation of permanent heating equipment, furnish approved heaters and fuel as required.
 3. Keep equipment and surroundings in clean, safe condition.
 4. Pay all fuel bills for heat.
- B. Temperatures:
 1. Except as otherwise called for, a minimum temperature of 50 degrees F and a maximum temperature of 75 degrees F in the building shall be maintained during working hours and above freezing at all other times.
 2. See requirements of various other Sections of these Specifications for minimum temperature to be maintained for the application of work under the various trades.

2.5 OTHER TEMPORARY CONSTRUCTION FACILITIES

- A. Furnish, install and maintain all other temporary construction facilities necessary for proper completion of the Work.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with applicable requirements specified in:
 1. Local Building Code.
- B. Maintain and operate systems to ensure continuous service.
- C. Modify and extend systems as Work progress requires.

3.2 TEMPORARY CONTROLS

- A. Traffic Control:
 1. Provide adequate barricades and take all necessary precautions for the protection of the Work, and the safety of the WTP staff.
 2. Maintain access for all WTP operations, deliveries, and normal activity for the duration of the Work.

3.3 REMOVAL

- A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit.

END OF SECTION 01 50 00

SECTION 01 73 29 – CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes provisions for cutting and patching work.
- B. Requirements:
 - 1. Execute cutting, including excavating and filling, or patching of work required to:
 - a. Make several parts fit properly.
 - b. Uncover work to provide for installation of ill-timed work.
 - c. Remove and replace defective work.
 - d. Remove and replace work not conforming to the requirements of the Contract Documents.
 - e. Install specified work in existing construction.
- C. Protection of Work:
 - 1. Do not endanger any work by cutting or altering the work or any part of it.
 - 2. Do not cut or alter the work of another trade without written consent of Engineer.

1.3 SUBMITTALS

- A. Written Notice:
 - 1. Prior to cutting which may affect the structural integrity of the Project or the work of another trade, submit written notice to Engineer requesting consent to proceed with cutting.
 - 2. Required Information:
 - a. Identification of Project.
 - b. Description of all related defective work.
 - c. Necessity for cutting.
 - d. Effect on other work or on the structural integrity of the Project.
 - e. Description of the proposed work including:
 - 1) Scope of cutting and patching.
 - 2) Subcontractor and trades to execute work.
 - 3) Products proposed to be used.
 - 4) Extent of refinishing.
- B. Changes of Materials or Methods:
 - 1. Should conditions of the Work, or the schedule, indicate change of materials or methods, submit a written recommendation to Engineer including:
 - a. Conditions indicating the change.
 - b. Recommendations for alternative materials or methods.
 - c. Submittals as required for substitutions.
- C. Uncovered Work: Submit written notice to Engineer designating the time work will be uncovered to provide for observation.

1.4 DIVISION OF WORK

- A. Work:
 - 1. In accordance with the General Conditions, Contractor is responsible for dividing the Work among the Subcontractors and Suppliers and for delineating the work to be performed by specific trades.

2. The following are suggestions as to how the Work may be divided. This is not a complete list of all the Work:
 - a. Each trade shall be financially responsible for all cutting and patching for sleeves, penetrations and installation of isolated components as necessary for its work unless herein specifically stated to the contrary.
 - b. All patching shall be done by the trade whose work is damaged.
 - c. Any cost caused by defective or ill-timed work shall be borne by the party responsible.
 - d. Each trade shall do all fitting of its own work as required to make its several components fit together or to receive the work of other contractors.
 - e. Holes cut in exterior walls or roofs for installation of mechanical or electrical equipment shall be waterproofed. If existing roofing is to remain, obtain and submit to Owner original roofing manufacturer's approval and warranty on new roof penetrations and where removing existing roof penetrations and curbs.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials and workmanship shall conform to the requirements of other Sections of the Specifications. Where no materials are specified in these specifications, use materials of an equivalent type, quality, and size to match those existing in other areas of the facility. If none exist, use materials and workmanship recognized as of the highest quality in the industry. Obtain Engineer's review of all such material and workmanship.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Existing Conditions: Inspect existing conditions of the Work, including elements subject to movement or damage during cutting and patching or excavating and backfilling.
- B. Uncovered Work: After uncovering work, inspect conditions affecting the installation of new Products.

3.2 PREPARATION

- A. Shoring and Bracing: Provide shoring, bracing and support as required to maintain structural integrity of the Project.
- B. Protection: Provide protection for other portions of the Project and provide protection from the elements.

3.3 PERFORMANCE

- A. Adjustments to Products: Execute fitting and adjustments of Products to provide finished installation.
- B. Refinishing:
 1. Prepare existing surfaces for finishes by scraping, sanding, filling, acid etching, and sand blasting to ensure bonding and a smooth finish.
 2. Refinish entire surfaces as necessary to provide an even finish.
 3. Refinish continuous surfaces to the nearest intersection.
 4. Refinish entire assemblies.

3.4 CLEANING

- A. Clean materials installed under this Section in accordance with Division 01 Section "Cleaning and Waste Management."

END OF SECTION 01 73 29

SECTION 01 74 00 – CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes provisions for maintaining structures and the Site in a standard of cleanliness.
- B. Related Sections: In addition to standards described in this Section, comply with requirements for cleaning as described in various other Sections of these Specifications.

1.3 QUALITY ASSURANCE

- A. Inspection:
 - 1. Daily and more often if necessary.
 - 2. Conduct inspections to verify that requirements of cleanliness are being met.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Hazards Control:
 - 1. Volatile Wastes:
 - a. Store in covered metal containers.
 - b. Remove from premises daily.
 - c. Provide secondary containment for storage of hazardous materials, as required by governing authorities or agencies.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.

1.5 PROJECT CONDITIONS

- A. Cleaning and Disposal:
 - 1. Conduct operations to comply with local ordinances and anti-pollution laws.
 - 2. Not Allowed:
 - a. Burning or burying of rubbish or waste materials on Site.
 - b. Disposal of volatile wastes in storm or sanitary sewers: Volatile wastes include, but are not limited to, mineral spirits, oil or paint thinner.
 - c. Disposal of wastes into streams or waterways.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Compatibility:
 - 1. Compatible with the surface being cleaned.
 - 2. Recommended by the Manufacturer of the material being cleaned.
 - 3. As reviewed by Engineer.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

A. General:

1. Store Materials:
 - a. In an orderly arrangement allowing maximum access.
 - b. To allow unimpeded drainage and traffic.
 - c. Provide for the required protection of materials.
2. Do not allow accumulation of scrap, debris, waste material and other items not required for construction of the Work.
 - a. Remove from Site at least each week and more often if necessary.
 - b. Provide adequate storage for materials awaiting removal.
3. Observe requirements for fire protection and protection of the environment.

B. Site:

1. Daily, and more often if necessary:
 - a. Inspect the Site.
 - b. Pick up scrap, debris and waste material; remove such items to the place designated for their storage.
2. Weekly, and more often if necessary:
 - a. Inspect arrangements of materials stored on Site.
 - b. Restack or otherwise service arrangements to meet the requirements of paragraph 3.1.A.1 above.
3. At all times maintain the Site in a neat and orderly condition which meets the approval of Engineer.
4. Paved Surfaces: Keep clean.
5. Dust Control:
 - a. Control dust on or near the Work by the application of water or other approved means.
 - b. If Contractor fails to correct unsatisfactory conditions with 24 hours after due notification:
 - 1) Owner may arrange for such work to be performed by other means.
 - 2) Pay costs.

C. Buildings, Tanks, and Other Structures:

1. Weekly, and more often if necessary:
 - a. Inspect.
 - b. Pick up scrap, debris and waste material; remove such items to the place designated for their storage.
 - c. Sweep interior spaces clean. Clean shall be defined to be free from dust and other material capable of being removed by reasonable diligence using a hand-held broom.
2. Preparation for installation of succeeding material:
 - a. Clean the building, tank or other structure or pertinent portion thereof:
 - 1) To the degree of cleanliness recommended by the Manufacturer of the succeeding material.
 - 2) Using equipment and materials required to achieve the required cleanliness.
3. Schedule cleaning operations so that dust and other contaminants resulting from cleaning operations will not fall on wet, recently painted surfaces.

3.2 FINAL CLEANING

A. Definitions for Clean: The level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.

B. Prior to Completion of the Work:

1. Remove from the Site all tools, surplus materials, equipment, scrap, debris and waste.
2. Conduct final progress cleaning as described in Article 3.1 above.

- C. Site:
 - 1. Unless otherwise specifically directed by Engineer:
 - a. Hose down paved areas on Site and public sidewalks directly adjacent to the Site.
 - b. Rake clean other surfaces of the grounds.
 - 2. Remove resultant debris.

- D. Buildings, Tanks and Other Structures:
 - 1. Exterior:
 - a. Visually inspect exterior surfaces.
 - b. Remove traces of soil, waste material, smudges and other foreign matter.
 - c. Remove traces of splashed materials from adjacent surfaces.
 - d. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior surface.
 - e. In the event of stubborn stains not removable with water, Engineer may require light sandblasting or other cleaning at no additional cost to Owner.
 - 2. Interior:
 - a. Visually inspect interior surfaces.
 - b. Remove traces of soil, waste material, smudges and other foreign matter.
 - c. Remove traces of splashed materials from adjacent surfaces.
 - d. Remove paint droppings, spots, stains and dirt from finished surfaces using only the specified cleaning materials and equipment.
 - 3. Polished Surfaces: To surfaces requiring the routine application of buffed polish, apply the specified polish as recommended by the Manufacturer of the material being polished.

- E. Timing: Schedule final cleaning as approved by Engineer to enable Owner to accept a completely clean Project.

END OF SECTION 01 74 00

SECTION 01 75 00 – STARTING AND ADJUSTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes provisions for facility startup and demonstration of the following systems:
 - 1. Ammonia feed system.

1.3 SUBMITTALS

- A. Preliminary Schedules:
 - 1. Submit 2 weeks prior to earliest proposed date.
 - 2. List time and date for the following for each system:
 - a. Startup.
 - b. Demonstration.
- B. Completion Reports:
 - 1. Submit within 1 week after each system demonstration.
 - 2. List time, date and persons present for the following for each system:
 - a. Start-up.
 - b. Demonstration.
 - 3. Include Manufacturer's representative's report indicating:
 - a. Approval of installation.
 - b. Satisfactory start-up.
 - c. Functioning correctly.
 - 4. Indicate that demonstration and instructions were satisfactorily completed.

1.4 QUALITY CONTROL

- A. Manufacturer's Field Services:
 - 1. Provide when required by individual Section.
 - 2. Provide the following services except where indicated otherwise in individual Sections.
 - a. Inspect, check and approve system installation.
 - b. Supervise system start-up.
 - c. Provide written report indicating that system:
 - 1) Has been properly installed and lubricated.
 - 2) Is in accurate alignment.
 - 3) Is free from undue stress imposed by connecting lines or anchor bolts.
 - 4) Has been satisfactorily operated under full load conditions.
 - d. Demonstrate operation of system to Owner's personnel.
 - e. Instruct Owner's personnel on operation and maintenance of system.

1.5 PROJECT CONDITIONS

- A. Verify that:
 - 1. Excess packing and shipping bolts have been removed.
 - 2. Interdependent systems have been checked and are operational.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 STARTING OF SYSTEMS

- A. Inspection:
 - 1. Verify that Project conditions comply with requirements.
 - 2. Verify that status of Work meets requirements for starting of systems.
- B. Preparation:
 - 1. Coordinate sequence for start-up of ammonia feed system with Owner's existing equipment or other systems (i.e., sodium hypochlorite).
 - 2. Notify Engineer 14 days prior to start-up of new system.
 - 3. Have at hand during entire start-up process:
 - a. Contract Documents.
 - b. Shop Drawings.
 - c. Product data.
 - d. Operation and maintenance data.
 - 4. Verify that each piece of equipment has been checked for:
 - a. Proper installation.
 - b. Control sequence.
 - c. Other conditions which may cause damage.
 - 5. Verify control systems are fully operational in automatic mode.
 - 6. Verify that tests, meter readings and specific electrical characteristics agree with those specified by electrical equipment Manufacturer.
 - 7. Venting and drainage:
 - a. Vent gases trapped in any part of systems.
 - b. Verify that liquids are drained from all parts of gas or air systems.
 - 8. Leaks: Check piping for leaks at every joint and at every screwed, flanged, or welded connection using "Leak-Tek" or other approved compound.
- C. Start-up:
 - 1. Execute start-up under supervision of responsible persons in accordance with Manufacturer's instructions.
 - 2. Place equipment in operation in proper sequence.

3.2 SYSTEMS DEMONSTRATION

- A. Preparation:
 - 1. Verify that system:
 - a. Has been inspected and put in service.
 - b. Is fully operational.
 - 2. Operation and Maintenance Manuals:
 - a. Completed.
 - b. Must be provided to the Owner prior to the Demonstration Period.
 - c. Five hard copies in 3-ring binders and 1 electronic copy in accordance with Division 01 Section "Submittal Procedures" shall be available for use in demonstrations and instructions.
- B. Demonstrations and Instructions:
 - 1. Demonstration of and instruction on operation and maintenance of system:
 - a. To Owner's personnel.
 - b. Two weeks prior to final inspection.
 - 2. Instruction:
 - a. Separate training slides highlighting important items within the Operation and Maintenance Manuals.
 - b. Indicate volume/section/page number to Operation and Maintenance Manual references.
 - c. Review critical contents of manual in detail.
 - d. Explain all aspects of operation and maintenance.

3. Demonstrate:
 - a. Start-up.
 - b. Operation in automatic and manual.
 - c. Control.
 - d. Adjustment.
 - e. Alarms.
 - f. Troubleshooting.
 - g. Servicing.
 - h. Maintenance.
 - i. Shutdown.

3.3 PERFORMANCE TEST

- A. Performance Test:
 1. Test the entire Work, including all of its individual systems for 2 weeks before final payment will be made.
 2. Make final tests in the presence of Owner and Engineer.
 3. If any part of the Work or equipment does not meet Specifications:
 - a. Correct the situation.
 - b. Obtain approval of Engineer before final payment is made.
 4. Provide the personnel and bear all costs for correcting all malfunctions.
 5. Owner will provide operating personnel and utilities.

END OF SECTION 01 75 00

SECTION 01 77 00 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the instructions for and the responsibilities of each party in contract closeout.
- B. Related Section includes Certificate of Substantial Completion.

1.3 SUBSTANTIAL COMPLETION

- A. Contractor: When Contractor considers that the Work or any portion of the Work is ready for its intended use, Contractor shall submit:
 - 1. Written certification to Engineer and Owner that the Work, or designated portion of the Work, is substantially complete.
 - 2. A list of major items to be completed or corrected.
 - 3. Request that Engineer issue a certificate of Substantial Completion.
- B. Engineer's Inspection: Engineer will make an inspection:
 - 1. Within 10 days after receipt of certification.
 - 2. Together with Owner and Contractor.
- C. Engineer's Determination of Substantial Completion:
 - 1. Should Engineer consider the Work or designated portion of the Work substantially complete, the following steps shall be taken:
 - a. Contractor shall prepare and submit to Engineer, a list of items to be completed or corrected as determined by the inspection.
 - b. Engineer will prepare and deliver to Owner:
 - 1) A tentative certificate of Substantial Completion.
 - 2) A tentative list of items to be completed or corrected before final payment.
 - c. Owner shall have 7 days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list.
 - d. Engineer will, within 14 days after delivery of tentative certificate to Owner, decide:
 - 1) Not Substantially Complete: Engineer will issue written notice to Contractor stating reasons.
 - 2) Substantially Complete: Engineer will issue definitive certificate of Substantial Completion and a revised list of items to be corrected or completed.
 - 2. Should Engineer consider that the Work or designated portion of the Work is not substantially complete, the following steps shall be taken:
 - a. Engineer shall notify Contractor in writing stating Engineer's reasons.
 - b. Contractor shall complete the Work and send a second written notice to Engineer certifying that the Project, or designated portion of the Project, is substantially complete.
 - c. Engineer and Owner will reinspect the Work.
- D. Division of Responsibilities:
 - 1. Engineer:
 - a. At the time of delivery of tentative certificate of Substantial Completion.
 - b. Deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment with respect to:
 - 1) Security.
 - 2) Operation.

- 3) Safety.
 - 4) Protection of the Work.
 - 5) Maintenance.
 - 6) Heat.
 - 7) Utilities.
 - 8) Insurance.
 - 9) Warranties.
2. Engineer's written recommendation on division of responsibilities shall be binding on Owner and Contractor until final payment unless Owner and Contractor agree otherwise in writing and so notify Engineer prior to Engineer's issuance of a definitive certificate of Substantial Completion.

1.4 FINAL INSPECTION

- A. Contractor Certification: Prior to final inspection, Contractor shall submit written certification that:
1. The Contract Documents have been reviewed.
 2. The Project has been inspected in compliance with the Contract Documents.
 3. Work has been completed in accordance with the Contract Documents.
 4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 5. The Project is complete and ready for final inspection.
- B. Engineer's Inspection: The Engineer will make final inspection:
1. Within 10 days after receipt of certification.
 2. Together with Owner and Contractor.
- C. Engineer's Determination of Final Completion:
1. Should Engineer consider the Work complete and ready for final payment in accordance with the requirements of the Contract Documents, Engineer shall request Contractor to make Project closeout submittals.
 2. Should Engineer consider the Work not complete and ready for final payment:
 - a. Engineer shall notify Contractor in writing stating the reasons.
 - b. Contractor:
 - 1) Take immediate steps to remedy the stated deficiencies.
 - 2) Send a second written notice to Engineer certifying that the Work is complete.
 - c. Engineer and Owner will reinspect the Work.

1.5 CLOSEOUT SUBMITTALS

- A. Contractor:
1. Provide closeout submittals as required in the Contract Documents.
 2. These submittals shall include, but not necessarily be limited to:
 - a. Project record documents.
 - b. Operation and maintenance manuals.
 - c. Guarantees.
 - d. Spare parts and maintenance materials.
 - e. Instruction in operation of all systems.

1.6 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Affidavits:
1. Submit with final Application for Payment an affidavit of payment of debts and release of claims.
 2. Affidavit shall include:
 - a. Contractor's release or waiver of lien.
 - b. Consent of surety of final payment.
- B. Execution: All submittals shall be duly executed before delivery to Engineer.

1.7 FINAL ADJUSTMENT OF ACCOUNTS

- A. Final Statement: Submit a final statement of accounting, which reflects all adjustments, to Engineer. This statement shall contain the following:
 - 1. Original Contract Price.
 - 2. Additions and deductions.
 - 3. Total Contract Price as adjusted.
 - 4. Previous payments.
 - 5. Sum remaining due.
- B. Final Change Order: Engineer will prepare a final Change Order reflecting approved adjustments to the Contract Price not previously made by Change Orders.

1.8 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit a final Application for Payment in accordance with the requirements of the Contract Documents.
- B. Disposition of Final Application for Payment:
 - 1. If the final Application for Payment and the Work are acceptable in accordance with the Contract Documents:
 - a. Engineer will, within 10 days after receipt of the Application for Payment:
 - 1) Submit to Owner a written recommendation for payment.
 - 2) Submit to Owner and Contractor a written notice that the Work is acceptable subject to the provisions of the General Conditions.
 - b. Owner will, within 30 days after receipt of the Application for Payment and Engineer's recommendation in accordance with the Contract Documents, pay to Contractor the amount recommended.
 - 2. If the Application for Payment, the Work or both are unacceptable:
 - a. Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment.
 - b. Contractor shall make the necessary corrections and resubmit the Application for Payment.
 - 3. Final Completion Delayed:
 - a. Upon receipt of Contractor's final Application for Payment and recommendation by Engineer, Owner shall make payment of the balance due for that portion of the Work fully completed and accepted if Engineer confirms that final completion of the Work is significantly delayed through no fault of Contractor.
 - b. Payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
 - c. Contractor shall submit with the Application for Payment written consent of surety if the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 77 00

SECTION 01 78 39 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedures for the maintenance, recording and submittal of Project record documents.

1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Filing: File record documents in accordance with CSI Masterformat.
- B. Maintenance:
 - 1. Maintain documents in a clean, dry, legible condition and in good order.
 - 2. Do not use record documents for construction purposes.
- C. Availability: Make documents available at all times for inspection by Engineer.

1.4 RECORDING

- A. Labeling: Label each document "PROJECT RECORD" in neat large printed letters.
- B. Recording:
 - 1. Record actual revisions to the Work.
 - 2. Record information concurrently with construction progress.
 - 3. Do not conceal any work until required information is recorded.
- C. Drawings:
 - 1. Legibly mark, with notes or graphic representations, to record actual construction.
 - a. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
 - b. Field changes of dimension and detail.
 - c. Changes made by Field Order, Work Change Directive or Change Order.
 - d. Details not on original Contract Drawings.
 - 2. After Engineer's review of the record drawings, transfer all marks to a set of electronic documents provided by Engineer.

1.5 SUBMITTAL

- A. Delivery: At Contract closeout, deliver record documents to Engineer for Owner.
- B. Transmittal Letter:
 - 1. Accompany submittal with transmittal letter in duplicate, containing:
 - a. Date.
 - b. Project title and number.
 - c. Contractor's name and address.
 - d. Title and number of each Record Document.
 - e. Signature of Contractor or their authorized representative.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 78 39

SECTION 01 80 00 – CERTIFIED PAYROLL COMPLIANCE AND REPORTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This specification covers all administrative requirements, payroll reporting procedures to be followed by Contractors performing work on City-sponsored public improvements projects, and all other miscellaneous and incidental costs associated with complying with the applicable sections of the City of Ann Arbor Code of Ordinances with regard to payment of prevailing wages and its Prevailing Wage Compliance policy.
- B. This specification is not intended to include the actual labor costs associated with the payment of prevailing wages as required. Those costs should be properly incorporated in all other items of work bid.

1.2 GENERAL

- A. The Contractor is expected to comply with all applicable sections of Federal and State prevailing wage laws, duly promulgated regulations, the City of Ann Arbor Code of Ordinances, and its Prevailing Wage Compliance Policy as defined within the contract documents. The Contractor shall provide the required certified payrolls, city-required declarations, and reports requested elsewhere in the contract documents within the timeline(s) stipulated therein.
- B. The Contractor shall also provide corrected copies of any submitted documents that are found to contain errors, omissions, inconsistencies, or other defects that render the report invalid. The corrected copies shall be provided when requested by the Supervising Professional.
- C. The Contractor shall also attend any required meetings as needed to fully discuss and ensure compliance with the contract requirements regarding prevailing wage compliance. The Contractor shall require all employees engaged in on-site work to participate in, provide the requested information to the extent practicable, and cooperate in the interview process. The City of Ann Arbor will provide the needed language interpreters in order to perform wage rate interviews or other field investigations as needed.
- D. Certified Payrolls may be submitted on City-provided forms or forms used by the Contractor, as long as the Contractor's forms contain all required payroll information. If the Contractor elects to provide their own forms, the forms shall be approved by the Supervising Professional prior to the beginning of on-site work.

1.3 UNBALANCED BIDDING

- A. The City of Ann Arbor will examine the submitted cost for this item of work prior to contract award. If the City determines, in its sole discretion, that the costs bid by the Contractor for complying with the contract requirements are not reasonable, accurately reported, or may contain discrepancies, the City reserves the right to request additional documentation that fully supports and justifies the price as bid. Should the submitted information not be determined to be reasonable or justify the costs, the City reserves the right to pursue award of the contract to the second low bidder without penalty or prejudice to any other remedies that it may have or may elect to exercise with respect to the original low-bidder.
- B. The Contract Completion date will not be extended as a result of the City's investigation of the as-bid amount for this item of work, even if the anticipated contract award date must be adjusted. The only exception will be if the Contractor adequately demonstrates that their costs were appropriate and justifiable. If so, the City will adjust the contract completion date by the number of calendar days commensurate with the length of the investigation, if the published Notice to Proceed date of the work cannot be met. The contract unit prices for all other items of work will not be adjusted regardless of an adjustment of the contract completion date being made.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 80 00

SECTION 02 41 19 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the modification, alteration, conversion, and renovation of existing structures:
 - 1. Be aware of the many incidental items which exist which must be demolished, relocated, or replaced in order to accomplish the improvements work of trades.
 - 2. Include the price of such demolition, relocating, and replacement in the base Bid.
 - 3. These incidental items may or may not be indicated in the Contract Documents.
 - 4. Contractor and Subcontractors performing improvements work are expected to be familiar with the unknown nature of existing utilities serving an area to be worked on and shall calculate the base Bid to include the demolition, removal, relocation, and replacement of these utilities.

1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the pertinent provisions of the following:
 - 1. American National Standards Institute: ANSI A10.6 - Safety Requirements for Demolition Operations.
 - 2. EPA: Rule 406(b) of the Toxic Substances Control Act of 1992.
 - 3. NFPA: NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.4 DEFINITIONS

- A. Terms:
 - 1. Abandon:
 - a. Remove an item to the extent that it is not visible and does not interfere with new construction.
 - b. Portions of the abandoned item may be left in place.
 - 2. Demolish:
 - a. Remove existing items from their present location in the Project area and haul to an area outside of the Project area.
 - b. Remove utilities serving these items.
 - 3. Relocate:
 - a. Move existing items from their present location to another location in the Project area.
 - b. Extend utilities serving the present location to the new location.
 - 4. Remove:
 - a. Except for items indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property.
 - b. Remove existing items from their present location in the Project area and haul to an area outside of the Project area.
 - c. Remove utilities serving these items.
 - 5. Replace:
 - a. Remove existing items from their present location in the Project area, haul them to an area outside of the Project area, and furnish and install new items in the same or another location.
 - b. Extend utilities serving the present location to the new location.
 - 6. Reuse: Move existing items from their present location to another location in the Project area. Extend utilities serving the present location to the new location.

1.5 DIVISION OF WORK

- A. Work: In accordance with the General Conditions, Contractor is responsible for dividing the Work among the Subcontractors and Suppliers and for delineating the work to be performed by specific trades.

1.6 SUBMITTALS

- A. Predemolition Photographs:
 1. Submit showing existing conditions of construction to remain that could be misconstrued as damage caused by construction activities.
 2. Including building and Site, as well as interior and exterior finishes.
 3. Submit prior to commencing Work.

1.7 QUALITY ASSURANCE

- A. Qualifications: Engage an experienced firm that has specialized in demolition work similar to material and extent indicated for this Project.
- B. Regulatory Requirements:
 1. Comply with governing EPA notification regulations before beginning selective demolition.
 2. Comply with hauling and disposal regulations of authorities having jurisdiction.
 3. Comply with ANSI A10.6 and NFPA 241.
 4. Comply with 29 CFR 1926.62-(OSHA Paint Standard).

1.8 PROJECT CONDITIONS

- A. Owner Occupancy:
 1. Owner will occupy portions of building immediately adjacent to selective demolition area.
 2. Conduct selective demolition so Owner's operations will not be disrupted.
 3. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Access:
 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 2. Do not close or obstruct driveways, pathways, or other occupied or used facilities without written permission from the Owner.
- C. Conditions:
 1. Owner and Engineer assume no responsibility for condition of areas to be selectively demolished.
 2. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as far as practicable.
- D. Storage or sale of removed items or materials on Site will not be permitted.
- E. Maintenance of Utilities:
 1. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- F. Unknown Hazardous Materials:
 1. It is not expected that hazardous materials will be encountered in the Work.
 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner.
 3. Hazardous materials will be removed by Owner under a separate contract.

1.9 WARRANTIES

- A. Existing Warranties:
 1. Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

2. If possible, retain original installer or fabricator to patch exposed work that is damaged during selective demolition.
3. If it is not possible to engage original installer or fabricator, engage another recognized, experienced, and specialized firm.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General:
 1. Materials and workmanship shall conform to the requirements of other Sections of the Specifications.
 2. Where no materials are specified in these specifications, use materials of an equivalent type, quality, and size to match those existing in other areas of the facility.
 3. If none exist, use materials and workmanship recognized as of the highest quality in the industry.
 4. Obtain Engineer's review of such material and workmanship.
- B. Piping: Existing piping which is removed from its present location shall not be reused where new piping is required unless specifically noted on the Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled, and of items to be removed and salvaged.
- D. Conflicts:
 1. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict.
 2. Promptly submit written report to Engineer.
- E. Survey, or engage a competent person to survey condition of the building, in accordance with requirements of OSHA, to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition operations.
- F. Perform additional surveys as the work progresses to detect hazards resulting from operations to date.

3.2 UTILITY SERVICES

- A. Maintain existing services indicated to remain and protect them against damage during selective demolition operations.
- B. Interruptions:
 1. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and other authorities having jurisdiction.
 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
 3. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.
- C. Utility Requirements:
 1. Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 2. Owner will arrange to shut off indicated utilities when requested by Contractor.

3. Arrange to shut off indicated utilities with utility companies.
4. If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition, provide temporary utilities that bypass areas of selective demolition and that maintain continuity of service to other parts of building.
5. Cut off pipe or conduit in walls or partitions to be removed.
6. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

A. Site Access and Temporary Controls:

1. Conduct selective demolition and debris removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
2. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and other authorities having jurisdiction.
3. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
4. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
5. Protect existing Site improvements, appurtenances, and landscape features to remain.
6. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line or groups of trees to remain.

B. Temporary Facilities:

1. Protection:
 - a. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - b. Provide protection to ensure safe passage of people around selective demolition area, and to and from occupied portion of building.
 - c. Weather Protection:
 - 1) Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 2) Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures.
 - 3) Coordinate enclosures with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - d. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - e. Cover and protect furniture, furnishings, and equipment that have not been removed.
2. Shoring and Bracing:
 - a. Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - b. Strengthen or add new supports when required during progress of selected demolition.

3.4 POLLUTION CONTROLS

A. Dust Control:

1. Use water mist, temporary closures, and other suitable methods to limit spread of dust and dirt.
2. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
3. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure.
4. Vacuum carpeted areas.
5. Comply with governing environmental protection regulations.

B. Disposal:

1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
2. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

3.5 GENERAL

- A. Demolish and remove existing construction only to the extent required by new construction and as indicated.
- B. Methods:
 - 1. Use methods required to complete the work within limitations of governing regulations.
 - 2. Level by Level:
 - a. Proceed with selective demolition systematically, from higher to lower level.
 - b. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 3. Cutting Openings:
 - a. Neatly cut openings and holes plumb, square, and true to dimensions required.
 - b. Use cutting methods least likely to damage construction to remain or to adjoining construction.
 - c. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces.
 - d. Temporarily cover openings to remain.
 - 4. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 5. Flame Cutting:
 - a. Do not use cutting torches until work area is cleared of flammable materials.
 - b. At concealed spaces, such as duct and pipe chases, verify condition and contents of hidden space before starting flame-cutting operations.
 - c. Maintain fire watch and portable fire suppression devices during flame-cutting operations.
 - d. Maintain adequate ventilation when using cutting torches.
 - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials, and promptly and legally dispose of off Site.
 - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 9. Dispose of demolished items and materials promptly.
 - 10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
- C. Existing Facilities: Comply with Owner's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during the selective demolition operations.
- D. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning and identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.
- E. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Paint equipment to match new equipment.
 - 3. Pack or crate items after cleaning and repairing, and identify contents of containers.
 - 4. Protect items from damage during transport and storage.
 - 5. Reinstall items in locations indicated.
 - 6. Comply with requirements for new materials and equipment.
 - 7. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- F. Existing Items to Remain:
 - 1. Protect construction indicated to remain against damage and soiling during selective demolition.
 - 2. When permitted by Engineer, items may be removed to a suitable, protected storage location and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 DEMOLITION

A. Structures:

1. Cut, repair, reuse, excavate, demolish or otherwise remove parts of the existing structures or appurtenances, as indicated on the Drawings, herein specified and necessary to permit completion of the Work.
2. Dispose of demolished materials in an approved manner.
3. Include necessary cutting, bending, and welding of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.
4. When removing materials or portions of existing structures, shore up, underpin, and protect adjacent structures.
5. Concrete:
 - a. Demolish in small sections.
 - b. Cut concrete to a depth of at least 3/4-inch at junctures with construction to remain, using a power driven saw.
 - c. Dislodge concrete from reinforcement to remain at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated.
 - d. Neatly trim openings to dimensions indicated.
6. Engineer's review of cutting: No existing structure, equipment or appurtenance shall be shifted, cut, removed or otherwise altered without obtaining review of Engineer.

B. Equipment:

1. Dismantle, remove, and relocate existing equipment, piping, and other appurtenances required for the completion of the Work.
2. Cut existing pipelines for the purpose of making connections thereto.
3. Cut off anchor bolts for equipment and structural steel indicated to be removed 1-inch below the concrete surface.
4. Patch remaining concrete surface to smooth even finish.
5. Remove air conditioning equipment without releasing refrigerants, if applicable.

C. Piping, Fire Protection, and Electrical Components:

1. When a new connection is made to an existing pipeline, install additional new piping, extending to and including the most convenient new valve.
2. Piping, conduit, and wiring indicated or required to be demolished shall be done so to the nearest reasonable connection outside of the Project area or as directed by Engineer.
3. Where necessary or required for the purpose of making connections, cut existing pipelines in a manner to provide an approved joint.
4. Weld beads, flanges, and provide Dresser couplings on existing and new piping.
5. Remove and reinstall existing fire protection heads to allow for new construction.
6. Comply with applicable fire protection codes.
7. Furnish new heads, piping, and connections as required for completion of the Work.
8. Remove junction boxes and electrical outlets which will no longer be in use.
9. At existing walls which are made thicker, extend piping and wiring to accommodate additional wall thickness.
10. Remove and reinstall fixtures and electrical outlets, switches, etc.

D. Ownership of Salvaged Materials:

1. Materials and equipment removed shall remain the property of Owner at Owner's option.
2. Items not salvageable, as determined by Engineer and Owner, and items Owner elects not to keep shall become the property of Contractor to be properly disposed of off the Site.
3. Salvaged equipment shall be thoroughly cleaned, lubricated, and greased for protection during prolonged storage.

E. Nonshrink Grout: Use nonshrink grout for setting wall castings, sleeves, leveling pump bases, doweling anchors into existing concrete and elsewhere as indicated.

F. Protect Facility from Water Damage: Provide flumes, hoses, piping, suitable plugs, bulkheads, or other means to divert or hold back the flow of wastewater, water, or other liquids, as required for proper performance of the Work.

- G. Blasting: Not permitted.
- H. Sleeves:
 - 1. Subcontractors for mechanical, electrical, and other trades shall furnish sleeves and inserts for pipes, conduits, and similar items in forms, walls, partitions, and floors.
 - 2. Perform work in cooperation with Contractor.
 - 3. Place items in ample time so as not to delay operations.
 - 4. Do not place sleeves so they pass through beams, girders, and similar construction.

3.7 PATCHING AND REFINISHING

- A. Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching:
 - 1. Patch and repair existing surfaces from which items have been removed leaving holes, fasteners, and surface blemishes exposed to view.
 - 2. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
 - 3. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to Manufacturer's written recommendations.
 - 4. Comply with Division 01 Section "Cutting and Patching."
- C. Refinishing:
 - 1. Prepare existing surfaces for finishes by scraping, sanding, filling, acid etching, and sand blasting to ensure bonding and a smooth finish.
 - 2. Refinish entire surfaces as necessary to provide an even finish.
 - 3. Refinish continuous surfaces to the nearest intersection and entirely finish assemblies.
 - 4. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
 - 5. Refinish entire surfaces if necessary to remediate existing lead painted surfaces.
- D. Floors and Walls:
 - 1. Where floors or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the new space.
 - 2. Provide an even surface of uniform finish, color, texture, and appearance.
 - 3. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - 4. Patch with durable seams that are as invisible as possible.
 - 5. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 6. Where patching occurs in a painted surface, apply primer and intermediate coats over the patch and apply final coat over entire unbroken surface containing patch.
 - 7. Provide additional coats until patch blends with adjacent surfaces.
 - 8. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
- E. Ceilings: Patch, repair, or rehang existing materials as necessary to provide even plane surface of uniform appearance.

3.8 CLEANING

- A. Clean materials installed under this Section in accordance with Division 01 Section "Cleaning and Waste Management."
- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations.
- C. Return adjacent areas to conditions existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 09 91 00 – PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and application of coating products, such as paints, stains and sealers, and labeling products.
1. Surfaces to be painted or finished include, but are not necessarily limited to, the following interior and exterior surfaces for items furnished or installed under this Work, except as otherwise indicated on the Drawings or herein specified, and existing surfaces specifically identified herein or on the Drawings:
 - a. Ferrous metals, hangers.
 - b. Exposed carbon steel pipe and fittings including wall and floor sleeves and tank connections (if pipe is insulated, insulation shall be painted).
 - c. West interior wall.
 - d. All other surfaces not specifically excluded in the following paragraph. A completely finished project is required, regardless of whether every individual item is specified herein or indicated on the Drawings to be painted.
 2. Surfaces not to be painted or finished include the following unless otherwise indicated on the Drawings:
 - a. Interior, below grade walls and ceilings.
 - b. Glass.
 - c. Manufacturer's name and identification plates.
 - d. Concealed ducts, pipes and conduits.
 - e. Galvanized, aluminum and fiberglass grating.
 - f. Prefinished electrical and control panels with factory applied final finish.
 - g. Aluminum (unless specifically indicated to be painted).
 - h. Door and window hardware.
 - i. Stainless steel (unless specifically indicated to be painted).
 - j. Prefinished wall, ceiling and floor coverings.
 - k. Items with factory applied final finish, such as cabinets, anodized door and window frames, and the like, but excluding machinery and equipment.
 - l. Brick.
 - m. Structural glazed facing tile.
 - n. Items indicated on the Drawings as not to be painted.
 - o. PVC (unless specifically indicated to be painted).
 - p. PVC insulation jackets for pipe.

1.3 REFERENCES

- A. Except as herein specified or as indicated on Drawings, the work of this Section shall comply with the pertinent provisions of the following:
1. Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers:
 - a. Ten States Standards 2.14 - Recommended Standards for Water Works.
 2. Michigan Administrative Code: R 325.51992 Part 603 - Lead Exposure in Construction.
 3. National Sanitation Foundation (NSF): - Standard No. 61 - Drinking Water System Components - Health Effects.
 4. Steel Structures Painting Council (SSPC):
 - a. AB-1 - Mineral and Slag Abrasives.
 - b. PA-1 - Shop, Field, and Maintenance Painting of Steel.
 - c. PA-3 - A Guide to Safety in Paint Application.
 - d. SP-1 - Solvent Cleaning.
 - e. SP-2 - Hand Tool Cleaning (SSI-St2).
 - f. SP-3 - Power Tool Cleaning (SSI-St3).

- g. SP-5 - White Metal Blasting (SSI-Sa3) (NACE #1).
 - h. SP-6 - Commercial Blast Cleaning (SSI-Sa2) (NACE #3).
 - i. SP-7 - Brush-off Blast (SSI-Sa1) (NACE #4).
 - j. SP-8 - Pickling.
 - k. SP-10 - Near-White Blast Cleaning (SSI-Sa2-1/2) (NACE #2).
 - l. SP-11 - Power Tool Cleaning to Bare Metal.
 - m. VIS-1 - Visual Standard for Abrasive Blast Cleaned Steel.
5. United States Department of Labor, Occupational Safety and Health Administration (OSHA): 29 CFR 1926.62.

1.4 DEFINITIONS

A. Terms:

- 1. Coating: Paint, stain, sealer or other product specified.
- 2. Environment:
 - a. Severe: Highly corrosive industrial atmospheres with sustained exposure to high humidity and condensation, frequent cleaning using strong chemicals, heavy concentrations of strong chemical fumes, and frequent splashing and spilling of harsh chemical products.
 - b. Moderate: Corrosive industrial atmospheres with intermittent exposure to high humidity and condensation, occasional mold and mildew development, regular cleaning with strong chemicals, and occasional splashing and spilling of chemical products.
 - c. Mild: Industrial atmospheres with normal exposure to moderate humidity and condensation, occasional mold and mildew development, infrequent cleaning with strong chemicals, low levels of mild chemical fumes, occasional splashing and spilling of chemical products, and normal outdoor weathering.
- 3. Exposure:
 - a. Environmental conditions to which different surfaces may be exposed as follows:
 - 1) Concealed: Surfaces within the confines of a building or other enclosure not constantly exposed to weather, trapped moisture, high heat or other deteriorating conditions, and normally concealed from view.
 - 2) Immersed:
 - a) Surfaces below a liquid surface or exposed to spray.
 - b) Surfaces exposed to spray include areas to 8 inches above maximum liquid surface in quiescent structures and to 18 inches above maximum liquid surface in mixed or agitated structures.
 - c) Immersed surfaces also include the interior surfaces of the floors, walls, and tops of fully or partially enclosed liquid containing structures, regardless of the liquid level.
 - 3) Interior: Surfaces within the confines of a building or other enclosure not immersed or constantly exposed to weather, trapped moisture, high heat or other deteriorating conditions, and exposed to view.
 - 4) Exterior:
 - a) Above Grade: Surfaces above finished grade and not included in 1), 2), or 3) above.
 - b) Below Grade: Surfaces below finished grade and not included in 1), 2), or 3) above.
- 4. Gloss Range (as determined by ASTM D523):
 - a. High Gloss: A high sheen finish of more than 70 when measured at a 60 degree meter.
 - b. Semi Gloss: A medium sheen finish of 35 - 70 when measured at a 60 degree meter.
 - c. Satin: A low-to-medium sheen finish of 15 - 35 when measured at a 60 degree meter.
 - d. Eggshell: A low sheen finish of 20 - 35 when measured at a 60 degree meter.
 - e. Flat: A lusterless or matte finish of less than 5 when measured at an 60 degree meter.

1.5 SUBMITTALS

- A. Manufacturer's Literature: Specification data sheets and color charts for materials proposed for use on the Work. Provide Safety Data Sheets (SDS) as requested by Engineer.
- B. Schedules:
 - 1. Submit a finish schedule indicating rooms and other structures and systems to be coated, items or areas to be coated, the proposed coating system, including surface preparation, primer, intermediate/finish coats, application methods and color charts.

2. Schedule shall be submitted as a complete package.
 3. No coatings may be applied until Engineer has made a complete review of the entire submittal.
- C. Manufacturer's Certificates: Submit signed affidavit from coatings Manufacturer that submitted coatings are of same or better quality than those specified, and Manufacturer's approval of applicator.
- D. Applicator's Experience: Submit written verification of experience required herein.
- E. Product and Maintenance Schedules:
1. At or before the completion of the Work, submit complete lists, in a finish schedule, of the actual products used. Include item covered, coating Manufacturer's name, type of coating and color.
 2. Provide pipe coding schedules listing pipe name, coating Manufacturer's name, type of coating and color.
 3. Provide maintenance manuals detailing the proper procedures and materials to be used for maintenance and repainting of the various coatings.

1.6 QUALITY ASSURANCE

- A. General:
1. Acceptability of materials and performance shall be determined by Engineer.
 2. Testing or certifications may be required to aid Engineer's determination.
 - a. Expense of testing and certifications when required and, unless noted otherwise in the Contract Documents, shall be borne by Contractor.
 - b. If destructive testing is required, Contractor shall repair damaged area. Expense of repair shall be borne by Contractor.
 - c. If initial testing results are unsatisfactory or yield failing results, additional testing will be required. Cost of additional testing shall be borne by Contractor.
 3. Coating Reviews:
 - a. Request, in writing, a review of each coat by Engineer of first finished surface of each type for color, texture and workmanship.
 - b. First accepted surface of each type and color shall be visibly labeled by Engineer with removable label as Project standard for that type and color of item.
 - c. Labels shall remain in place until painting is finished and accepted.
 - d. For spray application, paint a surface of 100 square feet as a Project standard.
 4. Work may be inspected as to proper surface preparation, pretreatment, priming, dry film thickness, curing, color, and workmanship.
 5. Applicable standards, test methods, and inspection equipment includes, but is not necessarily limited to the following:
 - a. SSPC-VIS-1 photographic blast cleaning standards (latest revision).
 - b. Inspector's wet film and dry film thickness gages.
 - c. Zorelco 369/PHD pin hole detector.
 - d. Mark II Tooke Gage.
- B. Coating Subcontractors:
1. Applicators shall have experience with the coating systems specified.
 2. Experience shall be substantiated by previous project experience, certifications, seminar attendance, Manufacturer validation, or similar means.
- C. Applicator's Project Record:
1. Applicator shall maintain a record for each day work is performed, and shall include a record of application process information. At a minimum, applicator's record shall include:
 - a. Material Manufacturer's batch numbers.
 - b. Surfaces to which material is applied.
 - c. Time of application.
 - d. Ambient temperature.
 - e. Substrate temperature.
 - f. Substrate moisture.
 - g. Relative humidity.
 - h. Dew point temperature.

- i. Wet and/or dry film thickness measurements.
 - j. Use of heating, dehumidification and ventilation equipment.
 - k. Unusual or important conditions, features, or events that occur before, during or after work is performed that day. Such information shall be referred to on previous or subsequent daily reports, when appropriate.
2. Submit for Project record.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original sealed containers of the Manufacturer with labels legible and intact. Include the following on labels on each container:
1. Manufacturer's name.
 2. Type of coating.
 3. Manufacturer's stock number.
 4. Manufacturer's batch identification.
 5. Color name and number.
 6. Instructions for mixing and reducing, where applicable.
 7. Percent total solids by volume.
 8. Identification of toxic substances and special instructions.
 9. VOC content.
- B. Storage:
1. Store materials in tightly covered containers at a minimum ambient temperature of 45 degrees F.
 2. Store materials in a well ventilated area and in such a manner as to comply with safety requirements including applicable federal, state, and local rules and requirements.
 3. Storage shall also be in accordance with instructions of the paint Manufacturer and requirements of insurance underwriters.
 4. Maintain storage containers in a clean condition, free from foreign materials and residue:
 - a. Protect from freezing.
 - b. Keep storage area neat and orderly.
 - c. Remove oily rags and waste daily and dispose of legally.
- C. Handle volatile products carefully and use caution so as not to puncture containers. Keep open flame away from areas while handling containers and be aware of material flash points.

1.8 PROJECT CONDITIONS

- A. Environmental Requirements:
1. Waterborne Paints:
 - a. Apply only when temperature of surface to be painted and surrounding air are between 50 and 90 degrees F.
 - b. Maintain temperature range throughout the minimum cure time recommended by the Manufacturer.
 2. Solvent-Thinned Paints:
 - a. Apply only when temperature of surface to be painted and surrounding air are between 45 and 95 degrees F.
 - b. Maintain temperature range throughout the minimum cure time recommended by the Manufacturer.
 3. Inclement Weather:
 - a. Do not apply paint:
 - 1) In snow, rain, fog, or mist.
 - 2) When relative humidity exceeds 85%.
 - 3) When steel temperature is less than 5 degrees F above the dew point.
 - 4) To damp or wet surfaces.
 - b. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the Manufacturer during application and drying periods. Refer to Article 1.7 for further restrictions.

- B. Existing Painted Surfaces:
 - 1. When painting is specified over existing painted surfaces and existing coating types are not known, analyze samples of existing coatings using a laboratory approved by Engineer to determine generic type of coating present and the presence of lead.
 - 2. Submit written report from the lab to Engineer before coating is applied.
 - 3. Required modifications to painting schedule caused by existing paint shall not be justification for extra payment.
 - 4. Existing Coat Bonding Failure:
 - a. Remove existing coating by abrasive blasting or other means, obtaining surface cleanliness and profile required for coating specified without damaging the substrate to the point of affecting its appearance.
 - b. Paint as new surface.
 - c. Unforeseen failure conditions may be justification for extra payment.
- C. Epoxy Coatings:
 - 1. Do not expose epoxy coatings to sunlight or propane heaters during application and curing.
 - 2. Use caution when applying and curing epoxy coatings to ensure that surrounding areas are not occupied and that adequate ventilation and fresh air are present.
- D. Contractor shall demonstrate acceptability of environmental conditions as required by Engineer.

1.9 EXTRA MATERIALS

- A. Leave with Owner at least 1 gallon of each type and color of paint used for finish coats and 1 gallon of each type of thinner required.
- B. Containers shall be tightly sealed and clearly labeled.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Coatings:
 - a. Tnemec.
 - b. Carboline.
- B. Single Manufacturer:
 - 1. Materials selected for coating systems for each type of surface shall be the product of a single Manufacturer.
 - 2. Provide primers and undercoats produced by the same Manufacturer as the finish coats.

2.2 MATERIALS

- A. Material Types:
 - 1. NSF Certification:
 - a. Generally, coating systems in contact with treated potable water require NSF certification.
 - b. NSF certified coating systems have been included in the painting schedule, where the intended use requires NSF certification.
 - c. Proposed substitutions shall also carry NSF certification for specific applications.
 - d. Verify that coating systems utilized carry NSF certification, where such certification is required.
 - 2. Paint, primer and related materials are included in the painting schedule in this Section.
 - 3. Paint used for repair of galvanizing shall have minimum 95% zinc dust in accordance with ASTM D520.
- B. Colors: Colors of finish coats shall be as selected by Engineer.

- C. Blast Abrasives:
 - 1. Level of ionic contaminants shall be in accordance with SSPC-AB 1.
 - 2. Products and Manufacturers:
 - a. Magnum Blast by Dust Net, Wedron, Illinois.
 - b. Black Magnum by Dust Net, Wedron, Illinois.
 - c. Black Beauty by Reed Minerals, Highland, Indiana.
- D. VOC Compliance:
 - 1. Individual coatings and coating systems shall have VOC levels at or below the EPA recommendations identified in 40 CFR Part 59.
 - 2. VOC content shall be tested in accordance with EPA Method 24.

2.3 MIXES

- A. Mixing:
 - 1. Deliver paints to the Site ready-mixed, when possible.
 - 2. Mix two-component paints at the Site and observe pot life as recommended by Manufacturer.
 - 3. Proceed with mixing until paint becomes smooth, homogeneous, and free of surface swirls or pigment lumps.
 - 4. When mixing multi-component paints, remix each component individually, then blend the components, as recommended by the Manufacturer, until the mixture is completely uniform in color.
- B. Thinning:
 - 1. No thinning will be permitted unless absolutely necessary.
 - 2. Paint shall be spray-applied in as-received condition to demonstrate necessity for thinning.
 - 3. Use only thinners as recommended by paint Manufacturer for specific use.
 - 4. Amount of thinner used shall be reported to Engineer.
 - 5. Measure viscosity to ensure proper thinning ratios have been used.
- C. Tinting:
 - 1. Onsite tinting will be permitted only when accepted in writing by Engineer.
 - 2. Use only tinting colors recommended by the Manufacturer for the specific type of coating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspection:
 - 1. Prior to the commencement of surface preparation or other coating activities, thoroughly inspect the surfaces to determine if the Work is ready to be prepared and painted.
 - 2. Report in writing to Engineer conditions that may potentially affect proper application.
 - 3. Do not commence surface preparation or other coating activities until such defects have been corrected.
- B. Correction of Defects:
 - 1. Correct defects and deficiencies in surfaces which may adversely affect work of this Section.
 - 2. Apply filler resurfacers, patching materials and the like that are required to provide the surface recommended by the coating Manufacturer.
 - 3. Start of painting will be construed as the applicator's acceptance of surfaces and conditions within a particular area.

3.2 TEMPORARY HEATING, VENTILATION AND HUMIDITY CONTROL REQUIREMENTS

- A. General:
 - 1. Ventilation is mandatory.
 - 2. Provide ventilation that exhausts fumes and odors to the exterior at a location where existing HVAC systems will not pick up these fumes and odors.
 - 3. Provide negative air pressure to those spaces receiving coatings without reducing air temperatures in those spaces which may impede the curing process of those coating systems.

4. Ventilation is required during surface preparation, application of coating systems, and the curing period for those systems.
 5. Provide additional equipment and fuel as required to condition the space for surface preparation, application of products, and curing of those products, in accordance with Manufacturer's requirements. This equipment may include, but is not limited to, heaters, dehumidifiers and fans for intake and exhaust air.
- B. Enclosures:
1. Provide temporary enclosures as required to isolate dust, fumes and odors from areas in use, to control temperature and humidity, and to protect surface to be coated from the weather.
 2. In the case of spray application, seal doorways as required to protect the areas surrounding the Ammonia Building.
 3. The enclosure shall be of such quality as to maintain optimal conditions for the work of this Section.
 4. The enclosure shall remain until the work is sufficiently cured.

3.3 PREPARATION

- A. General:
1. Prepare surfaces in accordance with this Article, the paint Manufacturer's recommendations and as specified in the painting schedule of this Section.
 2. Cleanliness of Abrasive Blast-Cleaned Steel:
 - a. Determined by Engineer using Steel Structures Painting Council Manual SSPC-VIS-1.
 - b. Small steel panels which have been abrasive blast-cleaned and approved for a specific cleanliness may be used for comparative purposes to facilitate inspection and approval.
 - c. Securely wrap these panels in clear plastic, seal to protect them from deterioration and mark with appropriate SSPC-SP6 cleaning specification.
 3. Cleanliness of Compressed Air:
 - a. Do not use contaminated air for blast cleaning.
 - b. Periodically check compressed air used for blasting to verify that it is clean, dry and oil-free by directing its flow toward a sheet of clean white paper.
 4. Place oil and water separators in the air line as close as possible to blast-cleaning equipment. Make measurements of surface profile of abrasive blast-cleaned steel with a Keane-Tator Surface Profile Comparator or Testex Press-O-Film and Micrometer.
 5. Abrasive Media:
 - a. Select abrasive media to provide the type of profile required by the Manufacturer of the coating product.
 - b. Abrasive media shall contain less than 5% free silica sand.
 6. Protective Covers:
 - a. Protect motors, bearings, chain drives, and other moving parts by wrapping with plastic and sealing with tape.
 - b. Maintain protective covers in dust tight condition.
 7. Correct steel and fabrication defects revealed by surface preparation, such as weld imperfections, delamination, scabs, and slivers, by appropriate trade before proceeding further with surface preparation.
 8. Clean Up of Blast Cleaned Areas:
 - a. Remove dust and blast products from the abrasive blast-cleaned surfaces by high pressure air or vacuum cleaning.
 - b. Completely clean up residue from blasting operations within the entire space to be painted prior to applying coatings.
 9. Inspect surfaces after surface preparation is complete and prior to application of coatings.
 10. Remove hardware, accessories, plates, machined surfaces, lighting fixtures, and similar items in place that are not to be painted, or provide surface applied protection prior to surface preparation and painting, and then replace items after paint has dried.
 11. When acid etching is the approved means of preparing surfaces for coating systems, protect the surrounding areas. Neutralize dispensed solutions and dispose of properly.

- B. Ferrous Metals:
1. Non-Immersed Ferrous Metals:
 - a. Surface Preparation - Shop:
 - 1) Remove dirt, oil, grease and other foreign matter in accordance with SSPC-SP1.
 - 2) Abrasive blast clean surfaces to specification required for coating to be applied.
 - 3) Perform abrasive blast cleaning only when the relative humidity is no higher than 75% and the surface temperature of the steel is at least 5 degrees F above the dew point.
 - 4) Coat cleaned surfaces before visible rust forms on the surface. Do not leave cleaned surfaces uncoated for more than 24 hours.
 - 5) Apply coating as specified under this Section.
 - b. Surface Preparation - Field:
 - 1) Remove dirt, oil, grease and other foreign matter in accordance with SSPC-SP1.
 - 2) Prepare field welds by grinding to remove sharp edges, undercuts, recesses and pin holes.
 - 3) Completely remove weld slag and spatter.
 - 4) Thoroughly clean damages, scratches and abraded areas of shop primers. Thoroughly clean field welds and areas within 4 inches of field welds before painting using surface preparation methods at least as effective as those specified for the structure itself.
 - 5) Feather out edges to make touch-up patches inconspicuous.
 - 6) Clean surfaces with solvent.
 - 7) Contractor may, at Contractor's option, clean and apply one overall coat of primer for each specified shop coat in place of touch-up or spot priming.
 - 8) Contractor shall meet applicable surface preparation and application specifications.
 2. Immersed Ferrous Metals:
 - a. Surface Preparation - Field:
 - 1) Remove dirt, oil, grease and other foreign matter in accordance with SSPC-SP1.
 - 2) Prepare field welds by grinding to remove sharp edges, undercuts, recesses, and pin holes.
 - 3) Completely remove weld slag and spatter.
 - 4) Abrasive blast clean surfaces to specification required for coating to be applied.
 - 5) Perform abrasive blast cleaning only when the relative humidity is no higher than 75% and the surface temperature of the steel is at least 5 degrees F above the dew point.
 - 6) Coat cleaned surfaces before any visible rust forms on the surface.
 - 7) Do not leave cleaned surfaces uncoated for more than 24 hours.
 - 8) Apply coating as specified under this Section.
- C. Stainless Steel:
1. Prepare welds by grinding to remove sharp edges, undercuts, recesses and pin holes.
 2. Remove dirt, oil, grease, and other foreign matter in accordance with SSPC-SP1.
 3. Use only solvents and cleaning solutions containing less than 200 ppm of halogens to prevent stress corrosion cracking.
- D. Nonferrous Metals and Galvanized Steel:
1. Remove dirt, oil, grease, and other foreign matter in accordance with SSPC-SP1. For Solvent Cleaning, test surface with copper sulfate solution. If galvanizing turns black, then surface is clean and ready for paint application. Otherwise abrade surface or brush blast in accordance with SSPC-SP7.
 2. Remove white rust by hand or power brushing being careful not to damage or remove the galvanizing.
 3. Remove rust in accordance with SSPC-SP2 or SSPC-SP3.
 4. On surfaces potentially exposed to the touch, such as railings, grind runs and drips of galvanizing material smooth and repair using zinc-rich primer.
 5. On galvanized steel, touch-up exposed metal areas using zinc-rich primer.
 6. Repairs and touch up of galvanized coatings shall comply with ASTM A780. Zinc-rich primers shall be compatible with finish coats.
- E. Plaster:
1. Do not coat new plaster for at least 28 days.
 2. Test plaster for moisture content as specified herein.
 3. Fill hairline cracks, small holes, and imperfections on plaster surfaces with patching plaster.
 4. Smooth off to match adjacent surfaces.
 5. Wash and neutralize high alkali surfaces where they occur and allow to thoroughly dry.

- F. Moisture Testing:
1. Securely tape a 12-inch x 12-inch piece of heavy gage plastic film to the surface in various locations.
 2. Carefully seal the film with tape to prevent the escape of moisture and keep in place for a minimum of 16 hours.
 3. If, after this period of time, moisture is present between the plastic and the surface, additional time for the material to dry will be required. Also, it may be appropriate to execute other means of testing for moisture.
 4. Other Means of Testing for Moisture:
 - a. ASTM F1869.
 - b. Qualifying moisture meters capable of reading 2% to 100% moisture content on a surface.

3.4 APPLICATION

- A. General:
1. Take necessary safety precautions in accordance with this Article, SSPC-PA Guide 3, Manufacturer's recommendations, federal, state, and local rules and requirements, and insurance underwriter's guidelines.
 2. Apply coatings in accordance with this Article, SSPC-PA1, and the Manufacturer's recommendations.
 3. Moisture Content:
 - a. Do not apply initial coating until moisture content of surface is within limitations recommended by paint Manufacturer.
 - b. Determine moisture content by one of the following methods:
 - 1) As specified herein.
 - 2) By use of a moisture meter approved by Engineer.
 4. Mil Thickness:
 - a. Apply coats in a uniform manner and of the minimum dry film thickness as indicated in the painting schedule.
 - b. Maximum mil thickness shall be as recommended by coating Manufacturer.
 - c. Where the mil thickness is not indicated in the painting schedule, it shall be as recommended by coating Manufacturer.
 5. Sand and dust between each coat to remove defects visible from a distance of 5 feet.
 6. Additional Coats:
 - a. Apply within recoat recommendation of the Manufacturer based on temperature and humidity variations.
 - b. Schedule inspections so as to not interfere with recoat time.
 7. Each coat shall be smooth, free of brush marks, streaks, laps or pile-up of paint, and skipped or missed areas.
 8. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.
 9. Spray apply coatings on hollow metal units.
 10. Finish door tops, edges, and bottoms the same as exposed surfaces.
 11. Except for contact surfaces, surfaces of fabricated assemblies that are inaccessible after erection shall receive field coats of paint before erection.
 12. Ensure that concrete cracks and defects have been repaired prior to applying coating, then fill remaining depressions and crevices with paint if practical.
 13. Protect wet paint against damage from dust or other detrimental foreign matter as much as is practicable.
 14. Remove grills, covers, and access panels of mechanical and electrical systems and tanks from location and paint separately.
 15. Paint the interior surface of ducts flat black in the immediate area of supply and exhaust grilles.
 16. Omit application of masonry filler on acoustical masonry.
 17. Coat entire west interior wall prior to mounting equipment.
 18. Where equipment, piping, conduit or the like are removed from an existing painted surface, patch and paint the newly exposed surface as required so the newly exposed surface matches surrounding surfaces in coating and appearance.
 19. Where epoxy coatings are scheduled over existing paint:
 - a. Test existing paint and substrate for lifting or alligatoring.
 - b. If existing paint lifts or alligators, remove it down to bare substrate.
 20. Where a portion of a surface is to be coated, carry the coating to the nearest break point in the surface plane beyond the portion specified.

- B. Valves, Fittings, and Supports:
 - 1. Paint valves and fittings the same base color as the pipe they adjoin. Do not paint valve stem.
 - 2. Paint floor stands the same base color as the pipe they adjoin.
 - 3. Wall Brackets and Pipe Hangers:
 - a. Paint the same base color as the wall or ceiling they adjoin.
 - b. Use gray color if wall or ceiling is not painted.

3.5 PIPE AND EQUIPMENT IDENTIFICATION

- A. General:
 - 1. Identify non-buried piping installed as part of the Work in accordance with ASME/ANSI A13.1, this Section, as required in the pipe identification schedule, and as indicated on the Drawings.
 - 2. Painting or banding of concealed piping above suspended ceilings is not required, but labels as specified following are required.
 - 3. Identify pumps, tanks, and equipment.
- B. Color Bands:
 - 1. Where color bands are indicated for piping identification, use colored vinyl tape spaced every 6 feet, before and after each valve and where pipe enters and leaves each wall.
 - 2. Band Widths:
 - a. Pipe up to and including 2-inch diameter: 3/4-inch wide.
 - b. Pipe 2-1/2-inch to 6-inch diameter: 2 inches wide.
 - c. Pipe 8-inch to 12-inch diameter: 4 inches wide.
 - d. Pipe 14-inch diameter and over: 6 inches wide.
- C. Labels and Arrows:
 - 1. Label pipes at intervals not to exceed 10 feet, at each branch, and where pipe enters and leaves each wall or floor, to identify the contents of the pipe as determined by Engineer.
 - 2. Place an arrow adjacent to every pipe label to indicate direction(s) of flow.
 - 3. Pipe Markers:
 - a. Provide marker with lettering describing piping system ("AMMONIA") and flow arrow. Naming and line numbering shall be coordinated with the Owner.
 - b. Pre-printed, color-coded, pre-curved plastic pipe markers of the full-bank semi-rigid, snap-on type, extending 360 degrees around pipe.
 - 4. Supply pipe labels, arrows, and color bands by a single Manufacturer which normally manufactures pipe identification systems.
 - 5. Acceptable manufacturers:
 - a. Seton.
 - b. Brady.
 - c. Marking Services, Inc.
 - 6. Labels and Arrow Heights:
 - a. Pipe or Covering Over 3-inch Diameter: 2-1/4 inches.
 - b. Pipe or Covering 1-inch to 3-inch Diameter: 1-1/8 inches.
 - c. Pipe or Covering Under 1-inch Diameter: 1/2-inch.
 - 7. Materials shall be suitable for the use intended.
 - 8. Label pumps, tanks, and equipment items, including description and tag number, with lettering size coordinated with Engineer depending on equipment size.

3.6 FIELD QUALITY CONTROL

- A. Inspection:
 - 1. To facilitate painting and inspection, each coat of paint shall be of a different color or tint.
 - 2. Finished metal surfaces shall be free of skips, voids or pinholes in each coat when tested with a low voltage detector.
 - 3. Do not apply additional coats until previous coat has been inspected and acknowledged in writing by Engineer.
 - 4. Only coats of paint acknowledged in writing will be considered in determining number of coats applied.

- B. Final Touch-Up:
 1. Surface damage shall be repaired with touch-up paint matching material used for original coating.
 2. Repaired areas shall be rubbed out and polished to match surrounding finish.
 3. Finish repair shall be of the quality typically found within the auto body industry.

3.7 CLEANING

- A. Remove spilled, splashed, or spattered paint from surfaces.
- B. Do not mar surface finish of item being cleaned.
- C. Prior to acceptance of the work of this Section, thoroughly clean painted surfaces and related areas in accordance with Division 01 Section "Cleaning and Waste Management."

3.8 PROTECTION

- A. General:
 1. Adequately protect other surfaces from paint and damage.
 2. Repair damage as a result of inadequate or unsuitable protection.
- B. Protective Materials: Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.
- C. Fire Hazards: Place cotton waste, cloths, and materials which may constitute a fire hazard in closed metal containers and remove daily from Site.
- D. Electrical Plates and Hardware:
 1. Remove electrical plates, surface hardware, fittings and fastenings prior to painting operations.
 2. These items are to be carefully stored, cleaned and replaced upon completion of work in each area.
 3. Do not use solvent to clean hardware that may remove permanent lacquer finish.
- E. Equipment with Factory-Applied Final Finishes:
 1. Certain equipment with factory-applied finishes may be accepted by Engineer at Engineer's discretion.
 2. Protect finishes of equipment with approved factory-applied final finishes from scratches and abrasions by all practical means.
 3. Repair surface damage with touch-up paint furnished by equipment Manufacturer by workmen skilled in this type of work.
 4. Rub out and polish repaired areas to match surrounding finish.
 5. Finish repair shall be of the quality typically found within the auto body industry.
 6. If damage to item is severe in the judgment of Engineer, the equipment will be rejected or a new finish coat shall be applied after proper surface preparation at the discretion of Engineer, at no additional cost to Owner.

3.9 PAINTING SCHEDULE

- A. All mil thicknesses indicated are dry film thicknesses (DFT).
 1. Interior Ferrous Metals – Non-Immersed: Gloss Zinc/Aliphatic Acrylic Polyurethane System:

System Manufacturer	Surface Preparation	First Coat	Second Coat	Third Coat
Tnemec	(Shop): SSPC-SP6 commercial blast cleaning	(Shop) and (Field Touch-up, Prime): 394 PerimePrime 2.5-3.5 Mils	(Field): 114-Tneme-Tufcoat 4.0-6.0 Mils	(Field): 114-Tneme Tufcoat 4.0-6.0 Mils
Carboline	(Shop): SSPC-SP6 commercial blast cleaning	(Shop) and (Field Touch-up, Prime): Carbozinc 859 2.5-3.5 Mils	(Field): Sanitile 555 4.0-6.0 Mils	(Field): Sanitile 555 4.0-6.0 Mils

2. Interior Non-Ferrous and Galvanized Metals – Non-Immersed: Gloss Zinc/Aliphatic Acrylic Polyurethane System:

System Manufacturer	Surface Preparation	First Coat	Second Coat
Tnemec	(Field): SSPC-SP1 solvent cleaning and SSPC-SP3 or SSPC-SP7 (abrade to create a 1.0 - 1.5 mil profile)	(Field): 114-Tnemec-Tufcoat 4.0-6.0 Mils	(Field): 114-Tnemec Tufcoat 4.0-6.0 Mils
Carboline	(Field): SSPC-SP1 solvent cleaning and SSPC-SP3 or SSPC-SP7 (abrade to create a 1.0 - 1.5 mil profile)	(Field): Sanitile 555 4.0-6.0 Mils	(Field): Sanitile 555 4.0-6.0 Mils

3. Exterior Ferrous Metals – Non-Immersed: Gloss Zinc/Aliphatic Acrylic Polyurethane System:

System Manufacturer	Surface Preparation	First Coat	Second Coat	Third Coat
Tnemec	(Shop): SSPC-SP6 commercial blast cleaning	(Shop) and (Field Touch-up, Prime): 394 PerimePrime 2.5-3.5 Mils	(Field): 114-Tnemec Tufcoat 4.0-6.0 Mils	(Field): 114-Tnemec Tufcoat 4.0-6.0 Mils
Carboline	(Shop): SSPC-SP6 commercial blast cleaning	(Shop) and (Field Touch-up, Prime): Carbozinc 859 2.5-3.5 Mils	(Field): Sanitile 555 4.0-6.0 Mils	(Field): Sanitile 555 4.0-6.0 Mils

4. Exterior Non-Ferrous and Galvanized Metals – Non-Immersed: Gloss Zinc/Aliphatic Acrylic Polyurethane System:

System Manufacturer	Surface Preparation	First Coat	Second Coat
Tnemec	(Field): SSPC-SP1 solvent cleaning and SSPC-SP3 or SSPC-SP7 (abrade to create a 1.0 - 1.5 mil profile)	(Field): 114-Tnemec-Tufcoat 4.0-6.0 Mils	(Field): 114-Tnemec Tufcoat 4.0-6.0 Mils
Carboline	(Field): SSPC-SP1 solvent cleaning and SSPC-SP3 or SSPC-SP7 (abrade to create a 1.0 - 1.5 mil profile)	(Field): Sanitile 555 4.0-6.0 Mils	(Field): Sanitile 555 4.0-6.0 Mils

5. Interior Gypsum Base/Plaster Walls: Satin Water Base Acrylic Epoxy System:

System Manufacturer	Surface Preparation	First Coat	Second Coat
Tnemec	(Field): See Paragraph 3.3.E and F..	(Field): 114 Hi-Build Tnemec-Tufcoat 4.0-6.0 Mils	(Field): 114 Hi-Build Tnemec-Tufcoat 4.0-6.0 Mils
Carboline	(Field): SSPC-SP13/NACE No. 6 – Surface Preparation of Concrete	(Field): Sanitile 255 4.0-6.0 Mils	(Field): Sanitile 255 4.0-6.0 Mils

3.10 PIPE IDENTIFICATION COLOR SCHEDULE

- A. Identify exposed pipes with the following colors.
 - 1. Colors are from the Tnemec Colorbook color card.
 - 2. Equivalent colors of other Manufacturers indicated in Part 2 of this Section may be used.
- B. Where a facility has an existing identification system already in use, coordinate with the system in use.

- C. In situations where 2 colors do not have sufficient contrast to easily differentiate between them, paint a 6-inch band of contrasting color at 30-inch intervals.

Water Plant Piping	Color Description	Tnemec Colorbook ID
Ammonia	Yellow	Lemonade YB16
Drain Lines, Vent Lines	Gray	Slate Gray 31GR

Ammonia Bldg. Wall	Color Description	Tnemec Colorbook ID
Ammonia	Grey	Grey Day 25 GR (confirm with Owner)

END OF SECTION 09 91 00

SECTION 10 14 24 – SAFETY EQUIPMENT AND SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and installation of safety equipment, signs, and related items.

1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
 1. MIOSHA.
 2. WEF: Water Environment Federation: Manual of Practice No. 1.
 3. State and Local laws and ordinances having jurisdiction.
 4. OSHA: Occupational Safety and Health Administration.

1.4 SYSTEM DESCRIPTION

- A. Signs:
 1. Label all hazardous substances and areas including flammable, toxic, combustible, and corrosive liquids, solids, and gases.
 2. Hazardous substances and areas shall be clearly labeled and identified as dangerous or hazardous with wording DANGER, WARNING or CAUTION, plus a list of precautionary measures and remedies.

1.5 SUBMITTALS

- A. Product Data: For anhydrous ammonia.
- B. Shop Drawings: For signs.
 1. Quantities.
 2. Locations.
 3. Mounting details.
 4. Wording of each sign.
- C. Samples: For signs. Submit 1 representative Sample of each type of material and type.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Pipe Labels: As specified in Division 09 Section "Painting."
- B. Accident Prevention Signs:
 1. Meet the requirements of 29 CFR 1910.
 2. Rounded corners.
 3. Provide, at a minimum, the signs indicated the schedule at the end of this Section.
 4. Fastening:
 - a. Exterior Doors: Stainless steel screws.
 - b. Interior Doors: 3M #4432 foam tape or pressure sensitive tape.
 5. Lettering: Block style, silk-screened.
 6. Manufacturers:
 - a. Lab Safety Supply.
 - b. Or equal.

C. HMIG Signs:

1. Right-To-Know Signs: Meet the requirements of 29 CFR 1910.120(f) (i-iii), (6) and (9).
2. Substrate:
 - a. Aluminum: 0.032-inch aluminum with rounded corners and 1/8-inch mounting holes. Baked enamel background.
 - b. Acrylic: 1/8-inch acrylic with square corners and 1/8-inch mounting holes.
3. Color:
 - a. First and Second Paragraphs: Yellow on black background.
 - b. Remainder of Text: Black letters on yellow background.
4. Lettering: Block style, silk-screened with UV-resistant ink.
5. Provide signs indicated in the schedule at the end of this Section. Wording for each chemical shall be as indicated in the schedule.
6. Manufacturers: Lab Safety Supply; or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment and signs according to with the submittals reviewed by Engineer, and the Manufacturer's recommendations.
- B. Install signs after painting in adjacent areas is complete.
- C. Provide temporary identification signage when applicable chemicals are present onsite until final signage is installed.
- D. Coordinate actual mounting locations with Owner.

3.2 SCHEDULE

A. Accident Prevention Signs:

Recommended Location	Sign Type	Message	Substrate	Size
Outside Ammonia Building	DANGER	Anhydrous Ammonia	Acrylic or fiberglass	7" x 10"
Above anhydrous ammonia fill pipe	NOTICE	Anhydrous Ammonia Fill	Aluminum	7" x 10"

B. Right-To-Know Signs:

Recommended Location	Chemical	Substrate	Size	Fastening
Ammonia Building work area	Anhydrous Ammonia	Polypropylene	7" x 10"	Adhesive
Ammonia Bulk Tank work area	Anhydrous Ammonia	Polypropylene	7" x 10"	Adhesive

C. Sign Copy: For specific chemicals.

1. Ammonia, Anhydrous (gas):
 - a. First Paragraph: Chemical name: Anhydrous Ammonia.
 - b. Second Paragraph: Synonym: Ammonia (gaseous), poison gas.
 - c. Third Paragraph: Signal word: DANGER! and POISON!
 - d. Fourth Paragraph: Statement of immediate hazards: Harmful if inhaled. Causes severe skin burns and serious eye damage. Flammable gas. Contains gas under pressure; may explode if heated. Very toxic to aquatic life. Strong irritant.

- e. Fifth Paragraph: Statement of delayed hazards: Repeated exposure can result in chemical bronchitis followed by pulmonary edema. Long term exposures may cause chronic irritation of the eyes and respiratory tract.
- f. Sixth Paragraph: Precautionary statements: Avoid breathing gas/vapors. Use only outdoors or in a well-ventilated area. Wear protective gloves, protective clothing, eye protection, face protection. Keep away from heat, sparks, open flames, and other ignition sources. No smoking. If responding to a spill or leak, evacuate area and approach only by wearing an approved self-contained breathing apparatus (SCBA).
- g. Seventh Paragraph: FIRST AID PROCEDURES: Inhalation – Immediately remove person from contaminated area to fresh air. In case of severe exposure or if irritation persists, breathing difficulties or respiratory symptoms arise, seek medical attention. If difficulty breathing, administer oxygen if trained to do so. If breathing stops, give artificial respiration. Eye/skin contact: Immediately flush with water for 20 minutes. In all cases, contact a physician immediately.
- h. Eighth Paragraph: Further information. Consult SDS for further health and safety information.
- i. Ninth Paragraph: CAS No.: 7664-41-7.

3.3 CLEANING

- A. Clean materials installed under this Section according to Division 01 Section "Cleaning and Waste Management."

END OF SECTION 10 14 24

SECTION 10 14 25 – PROCESS EQUIPMENT IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and installation of proper identification for process equipment components, and major items requiring identification or labeling as follows:
 - 1. Process equipment.
 - 2. Manufacturer-assembled panels.
 - 3. Instrumentation equipment.
 - 4. Chemical feed equipment.
 - 5. Valves.
 - 6. Enclosures.
 - 7. Chemical injection points and sampling points.
- B. Pipe Labels: As specified in Division 09 Section "Painting."

1.3 REQUIREMENTS

- A. General:
 - 1. Identification shall include equipment name or function (i.e., Ammoniator, Rotameter, etc.), and shall include equipment tag number if one is indicated on the Drawings (i.e., Amm-1, VAFM-1, etc.).
 - a. Submit list for Owner review and approval.
 - b. Coordinate with requirements of related sections to avoid duplication.
 - 2. Lettering:
 - a. Height to width ratio shall be no greater than 2:1.
 - b. Typeface: Sans serif gothic bold, or as approved by Engineer.

1.4 SUBMITTALS

- A. Shop Drawings to include:
 - 1. Text and location for each nameplate, label, and tag.
 - 2. Product data for nameplates and tags.
- B. Samples: Submit 1 sample of each type of identification media to be supplied.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Engraved Nameplate:
 - 1. Plastic laminate with engraved lettering.
 - 2. Minimum 3/8-inch white letters on a black background.
- B. Engraved Tag:
 - 1. Brass round tags.
 - 2. Engraved lettering on one side.
 - 3. Fill letters with high contrast paint.
 - 4. Tag diameter: 2-inch.

- C. Vinyl Label:
 - 1. Vinyl lettering with high tack adhesive backing.
 - 2. Custom manufactured labels. Individual letters not allowed.
 - 3. Label color shall be black typically, but white where mounting location is black.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Locate identification media where highly visible.
 - 2. Location shall not interfere with operation of equipment or create a safety hazard.
 - 3. Firmly attach all media.
 - 4. Nameplates shall be affixed to a flat, smooth surface.
 - 5. Clean mounting location in accordance with Manufacturer's instructions prior to applying adhesives.
- B. Enclosure, Instruments, Sensors, Transmitters, Etc.:
 - 1. Engraved nameplate.
- C. Valves:
 - 1. Engraved tag.
 - 2. Required only for process valves identified with a number on the Drawings.
 - 3. Valves require tag number only. Number on tag shall be the same as indicated on the Drawings.
 - 4. Attach with brass jack chain or nylon tie below or behind operator. Do not attach chain or tie to handwheels, chainwheels, or valve chains. Use adhesive to attach tags where no operator is provided, or where hanging the tag could interfere with valve operation or cause a safety hazard.
- D. Process Equipment: Engraved nameplate.
- E. Sample Taps and Chemical Injection Points:
 - 1. Engraved nameplate or vinyl label mounted near tap in piping.
 - 2. Identify tag number.

END OF SECTION 10 14 25

SECTION 40 05 13 – PROCESS PIPING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and installation of process piping.
- B. Work included under this Section:
 - 1. Non-buried process piping indicated on the Process Drawings.
- C. Related Section includes Division 40 Section "Process Valves."

1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
 - 1. ANSI/ASME B 31.3 – Process Piping Guide.
 - 2. ANSI/ASME B1.20.1 – Pipe Threads, General Purpose
 - 3. ANSI K61.1 - Safety Requirements For The Storage And Handling Of Anhydrous Ammonia.
 - 4. ASTM Standards:
 - a. A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - b. A105 - Standard Specification for Carbon Steel Forgings for Piping Applications
 - c. D1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 - d. D2467 - Socket Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
 - 5. NSF Standards:
 - a. 14 - Plastic Piping Components and Related Materials.
 - b. 61 - Drinking Water System Components.

1.4 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Pipe:
 - 1. Design, fabricate and install according to the references and standards specified herein.
 - 2. The Drawings indicate general pipe layout only. Details of joints, couplings, tie rods, supports and make-up pieces are not necessarily indicated. Submit proposed details for these components for Engineer's review.
 - 3. Provide makeup pipe spools, supports and suitable couplings so that piping may be easily separated for removing valves and inline flanged device.
 - 4. System piping (piping, fittings, flanges, other components) must be made of steel or other material suitable for anhydrous ammonia service, and must be designed for a pressure not less than the maximum pressure to which they may be subjected in service. System piping components made of, or in part of, brass, copper, zinc, galvanized steel, or cast iron may NOT be used for ammonia service.
 - 5. Ammonia system piping must conform to the ANSI B31.3 and K61.1 standards.
- B. Supports and Hangers:
 - 1. The detailed design, layout and spacing of process pipe supports shall be the responsibility of the Contractor. However, required locations of some supports may be indicated on the Drawings.
 - 2. Design to prevent pipe sway and movement.
 - 3. Adequate to prevent sagging of plastic pipe.
 - 4. Design process piping support systems to allow process valves and meters to be removed from the piping system without adding temporary pipe supports to the pipe upstream or downstream of the valve or meter.

1.5 SUBMITTALS

- A. Itemized Listings:
 - 1. Equipment to be provided.
 - 2. Deviations from the requirements of this Section.
- B. Shop Drawings: For equipment assemblies in this Section to include:
 - 1. Details of construction and installation, including taps, weld-on outlets, water collars, specials, and similar features.
 - 2. Pipe diameter, wall thickness, length, centerline elevations, and locations and dimensions of valves fittings, taps, and in-line equipment and instruments, and similar features.
 - 3. Location and centerline elevation of wall sleeves and wall pipes.
 - 4. Type and location of pipe couplings.
 - 5. Schedule of wall sleeves and pipes indicating proposed sizes, lengths, and connection details.
 - 6. Plan indicating preliminary testing schedule showing pipe sections to be tested, bulkheads, and drains.
 - 7. Schedule of coatings.
- C. Product/Catalogue Data: For all products in this Section to include:
 - 1. Manufacturer.
 - 2. Manufacturer's engineering and specification data.
 - 3. Dimensions, thicknesses, cross-sections, materials of construction.
 - 4. Coatings.
- D. Installation Instructions:
 - 1. Submit complete Manufacturer's installation instructions for all products.
 - 2. Submit pipe Manufacturer's recommended span lengths between hangers or supports for each pipe size and type.
- E. Certifications: Submit Manufacturer's certification that products and materials conform to these Specifications.

1.6 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
 - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
 - 2. Knowledgeable of the design and the reviewed Shop Drawings.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, and damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

- A. General:
 - 1. In-Plant Ammonia Piping:
 - a. Carbon steel (upstream of vacuum regulator), PVC (downstream of vacuum regulator), and LDPE tubing for flexible connections on ammoniator wall panels.
 - b. Unless otherwise specified below or indicated on the Drawings.

- B. Carbon Steel Pipe Systems:
1. Use: Upstream of vacuum regulator.
 2. Piping and Seamless Nipples:
 - a. ASTM A53, Grade B, ERW, 60,000 psi tensile strength, Sch. 80, 85% quality.
 - b. ASTM A53, Grade S, Seamless, 70,000 psi tensile strength, Sch. 80, 100% quality.
Note: Threaded joints shall be Sch. 80, Extra Heavy (XH) rated piping, threaded nipples must be seamless Sch. 80, XH rated.
 3. Stainless Steel, Ammonia-Rated Flexible Connectors:
 - a. 250 psi/NH3-rated with a safety factor of four.
 4. Fittings:
 - a. ASTM A105 (Forged Carbon Steel), Class 2000 & greater, threaded and socket weld.
Note: Unions must be steel to steel seated.
 - b. Use MIL Spec P-27730A Teflon seal tape at all threaded connections.
- C. Polyvinyl Chloride (PVC) Pipe Systems:
1. Use: Downstream of vacuum regulator and vent piping.
 2. Materials:
 - a. Manufacture pipe, valves, and fittings from material which meets the requirements of Type 1, Grade 1 polyvinyl chloride as outlined in ASTM D1784.
 - b. PVC shall have a design stress rating of 2,000 psi at 73 degrees F and 440 psi at 140 degrees F.
 - c. Test and approve materials from which pipe, valves and fittings are manufactured for conveying ammonia. Provide documentation from pipe supplier.
 - d. Joint Primer:
 - 1) ASTM F656.
 - 2) IPS P-70 Purple Primer; or equal.
 - e. Solvent Cement:
 - 1) ASTM D2564.
 - 2) IPS Weld-on 724 chemical-resistant cement; or equal.
 3. Pipe: Schedule 80 PVC conforming to ASTM D1785.
 4. Fittings:
 - a. Schedule 80.
 - b. Socket Type Fittings: Conform to ASTM D2467.
 - c. Threaded Type Fittings: Conform to ASTM D2464. Used only where necessary to connect to threaded appurtenances. Use MIL Spec P-27730A Teflon tape when threaded connections are required.
- D. Low Density Polyethylene (LDPE) Pipe Systems:
1. Use: Flexible connections to/from PVC piping on Ammoniator Panel.
 2. Tubing: Natural, semi-rigid and listed for ammonia service.
 3. Chemical Compatibility: Compatible with water treatment plant chemicals.
 4. Size: 1/2-inch O.D. or as indicated on the Drawings, or to match connections.
 5. Fittings:
 - a. Polypropylene compression style fittings.
 - b. Manufacturer: Jaco, John Guest; or equal.

2.2 SUPPORTS AND HANGERS

- A. General:
1. Design Layout and Spacing of the Pipe Supports: Responsibility of Contractor.
 2. Furnish factory fabricated hangers and supports complete with necessary inserts, clamps, bolts, nuts, washers, and accessories.
- B. Manufacturers and Types:
1. Pipe Hangers: Clevis or split ring type with adjustable threaded hanger rods.
 2. Hangers and Supports: Grinnell, Unistrut, Crane; or equal.
- C. Materials (Supports and Hardware):
1. Chemical Feed Rooms In and Above Process Tanks: Type 316L stainless steel.
 2. Isolate dissimilar pipe and support materials with 1/8-inch thick EPDM rubber sheet stock.

2.3 WALL PENETRATIONS

- A. Sleeves:
 - 1. Schedule 40 Type 304 stainless steel pipe of suitable size for installation of casing seal.
 - 2. Annular space shall be filled with expanding foam insulation, vapor tight.
- B. Seals:
 - 1. Modular mechanical type consisting of chemical resistant interlocking synthetic rubber links shaped to continuously fill the annular space between pipe and wall opening.
 - 2. Expanded by tightening stainless steel bolts, with a pressure plate under each bolt head.
 - 3. Providing a water-tight seal between passing pipe and sleeve.
 - 4. Manufacturers and Types:
 - a. Link Seal by Thunderline Corporation.
 - b. Or equal.

2.4 PRESSURE GAGES

- A. Provide pressure gages at locations shown on the Drawings. Provide pressure gages for both the bulk tank and the day tank. Provide vacuum gages at ammoniator discharge lines and at clearwell feed eductor assemblies. All pressure gages shall be installed with isolation valve.
- B. Gages shall be liquid filled and 4-1/2-inch diameter.
- C. Pressure Range:
 - 1. Tanks: -30 in Hg to 300 psig. -40 to 125°F.
 - 2. Pipe Pressure: 0 to 200 psig.
 - 3. Vacuum Pressure: -30 to 30 in Hg.
- D. Manufacturer: Ashcroft, Model 1279; or equal.

2.5 TANK GAUGE

- A. Remove and replace tank capacity gauge on 46-inch diameter day tank.
- B. Range:
 - 1. Tanks: 0% to 100% total tank capacity.
- C. Manufacturer: Rochester Gauge A6283-1-46; or equal.

2.6 FLEXIBLE CONNECTORS

- A. Required on connections to day tanks.
- B. Stainless Steel, Ammonia-Rated Flexible Connectors:
 - 1. 250 psi/NH₃-rated with a safety factor of four.
- C. Manufacturer:
 - 1. Rego Products.
 - 2. Squibb Taylor.
 - 3. Or equal.

2.7 ROTAMETERS

- A. Use: Ammonia vapor.
- B. Material of Construction: PVC-polysulfone; compatible with anhydrous ammonia.

- C. Size:
 - 1. 1/2-inch NPT.
 - 2. 20 to 100 PPD.
- D. Pressure Rating: 100 psig.
- E. Manufacturer: Hydro Instruments; ABB; or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General:
 - 1. Install process piping and accessories in conformance with:
 - a. The Manufacturer's recommendations.
 - b. The Shop Drawings as reviewed by Engineer.
 - 2. Install items to be embedded before concrete is placed.
 - 3. Fasten embedded items securely to prevent movement when concrete is placed.
 - 4. Install items plumb, square, true to lines, grades, elevations, and locations as indicated on the Drawings and herein specified.
 - 5. Do not install chemical piping within finished rooms, regardless of size.
 - 6. Valves, regardless of size and contents, shall be readily accessible. Chemical feed piping valves shall be accessible from operating floor.
 - 7. Do not install chemical feed piping over equipment.
- B. Hangers and Supports:
 - 1. Install hangers and supports at less than maximum spacing as recommended by pipe Manufacturer.
 - 2. Adjust hangers and supports to bring pipe lines to proper elevations.
 - 3. Install inserts in concrete flush with the surface and capable of developing the full strength of the bolt.
- C. PVC Piping: Installation procedures, including support spacing, solvent welding and allowance for expansion and contraction shall be in accordance with the Manufacturer's recommendations. PVC joints shall be allowed to cure for a minimum of 1 week before filling with ammonia.
- D. LDPE Tubing: Bending radius of tube shall be no smaller than 10 times the diameter.

3.2 PAINTING

- A. Paint pipe, fittings, supports, hangers, sleeves and accessories in accordance with Division 09 Section "Painting."

3.3 TESTING

- A. General:
 - 1. Pressure testing with an inert gas, such as nitrogen, shall be performed after system piping is installed. Test pressures should be 1.5 times the maximum operating pressure. Leak testing with ammonia gas shall also be performed after pressure testing with nitrogen. Once the piping is connected to the gas line, open the valve temporarily and shut once the pressure reaches a sufficient level. Check for leaks around the piping by using either moist phenolphthalein or red litmus paper. If an ammonia gas leak is present the litmus paper and/or the phenolphthalein will change color. Take appropriate measures to fix the leak and retest.
 - 2. Tests shall be witnessed by Engineer.
 - 3. Provide necessary equipment to perform tests including, but not necessarily limited to pumps, plugs, hoses and gages.
- B. Repairs: In case of leakage under test, locate and repair leaks in an approved manner and test section again until a satisfactory test is secured.

3.4 CLEANING

- A. Thoroughly clean installed materials and Products and related areas:
 - 1. Prior to acceptance of the work of this Section.
 - 2. In accordance with Division 01 Section "Cleaning and Waste Management."

END OF SECTION 40 05 13

SECTION 40 05 23 – PROCESS VALVES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and installation of all valves and valve operators in the process piping system as indicated on the process Drawings and defined in Division 40 Section "Process Piping Systems."
- B. Related Section includes Division 40 Section "Process Piping Systems."

1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the valves and operators of this Section shall comply with the following as applicable:
 - 1. ASTM Specification: A536 - Ductile Iron Castings.
 - 2. ANSI/NSF Standards: Standard 61 – Drinking Water System Components.
 - 3. ANSI/ASME Standards: ANSI/ASME standard B1.20.1 – Pipe Threads, General Purpose

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. For equipment assemblies in this Section to include:
 - a. Manufacturer.
 - b. Model.
 - c. Details of construction.
 - d. Dimensions, including actuator dimensions and clearances.
 - e. Materials of construction.
 - f. Listing of components.
 - g. Project specific wiring diagrams.
 - h. Coatings.
 - i. Weight of assemblies.
 - j. Certifications of corrosion resistance to ammonia.
 - k. Certifications of compliance with AWWA/NSF 61.
 - 2. For each type of equipment installed to include:
 - a. Itemized listings.
 - b. Deviations from the requirements of this Section.
- B. Product Data: For equipment in this Section to include:
 - 1. Manufacturer.
 - 2. Model.
 - 3. Materials of construction.
 - 4. Manufacturer's engineering and specification data.
 - 5. Electrical specifications and requirements.
 - 6. Torque specifications for actuators.
- C. Torque calculations for actuators.
- D. Installation instructions for equipment in this Section.

- E. Operation and Maintenance Manuals: For equipment in this Section to include:
 - 1. Copy of reviewed Shop drawings and product/catalog data.
 - 2. Equipment function, normal operating characteristics and limiting conditions.
 - 3. Assembly, installation, alignment, adjustment and checking instructions.
 - 4. Operating instructions for start-up, routine and normal operating, regulation and control, and shutdown and emergency conditions.
 - 5. Lubrication and maintenance instructions.
 - 6. Guide to "troubleshooting."
 - 7. Parts lists and predicted life of parts subject to wear.
 - 8. Outline, cross-sections, assembly drawings, engineering data, and wiring diagrams.

- F. Certifications/Affidavits:
 - 1. Submit Manufacturer's certification that products and materials conform to these specifications.
 - 2. Submit an affidavit from the valve manufacturer which certifies that actuators used were furnished and installed by the valve manufacturer.

1.5 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
 - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
 - 2. Knowledgeable of the design and the reviewed Submittals.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration or damage, contamination with foreign matter, and damage by weather or elements and in accordance with Manufacturer's directions.
- C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND TYPES

- A. Provide valves of the size and type as indicated on the Drawings and these Specifications.
- B. All valves of each type shall be the Product of one Manufacturer.

2.2 MATERIALS AND FABRICATION

- A. "V"-Ring Seal Globe and Angle Valves:
 - 1. Designed specifically for positive shutoff in liquid and vapor service on bulk storage and day tanks and plant piping for ammonia service.
 - 2. UL listed for use with anhydrous ammonia.
 - 3. End Connections:
 - a. F. NPT: ANSI/ASME Standard B1.20.1. Contractor to verify in field prior to submitting shop drawings.
 - 4. Materials of Construction:
 - a. Body: Ductile Iron.
 - b. Bonnet: Ductile Iron.
 - c. Seat Disc: Buna N, Teflon or nylon.
 - d. Valve Stem: Stainless Steel.
 - e. Wiper Ring: Neoprene, EPDM, or Buna N.
 - f. "V"-Ring Packing: Teflon.
 - g. Handwheel: Ductile Iron.
 - h. Spring: Stainless Steel.

5. Coating:
 - a. Exterior Surfaces (non-immersed): Shop prime coat for interior ferrous metals – non-immersed (epoxy system).
 6. Manufacturers:
 - a. Rego Products.
 - b. Squibb Taylor.
- B. Ammonia Multipurpose Valves:
1. Designed specifically for filling, withdrawal, or filling/transfer in liquid and vapor service on bulk storage and day tanks and plant piping for ammonia service.
 2. Stainless steel excess flow valve, ductile iron body, steel bonnet, and hardened stainless steel stem
 3. UL listed for use with anhydrous ammonia.
 4. 1/4-inch plugged opening for attachment of hydrostatic relief valve.
 5. Coating:
 - a. Exterior Surfaces (non-immersed): Shop prime coat for exterior ferrous metals - nonimmersed (epoxy system).
 6. Manufacturers:
 - a. Rego Products.
 - b. Squibb Taylor.
- C. External Hydrostatic Relief Valves:
1. Designed specifically for protection of piping and shutoff valves where there is a possibility of trapping liquid anhydrous ammonia.
 2. Provide in the side boss of all shutoff valves where there is a possibility of trapping liquid ammonia. Note these locations in pipe layout submittal.
 3. Manufacturers:
 - a. Rego Products.
 - b. Squibb Taylor.
- D. Pressure Relief Manifold:
1. Duoport unit designed for installation in NH₃ storage tanks.
 2. Allows one relief valve to be removed and inspected at a time without the need to evacuate the container.
 3. Discharge setting – 250 psi.
 4. Manufacturers:
 - a. Rego Products.
 - b. Squibb Taylor.
- E. PVC Ball Valves:
1. Furnish PVC true union valves fabricated of the same material as the fittings for chemical feed piping systems.
 2. Permanently lubricated teflon ball seats.
 3. Teflon stem and EPDM body seals, vented ball cavity to prevent gas buildup.
 4. True union type with socket or flange connections and a pressure rating of 150 psi C.W.P. at 73 degrees F.
 5. Manufacturer:
 - a. Hayward.
 - b. Nibco.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in conformance with:
1. The Shop Drawings reviewed by Engineer.
 2. The Manufacturer's recommendations.
- B. Check and adjust valves, operators and accessories for smooth operation.

- C. Paint all valves and accessories in accordance with Division 09 Section "Painting."
- D. Labeling: Provide an engraved stainless steel tag securely fastened to each valve with the valve size, and identification number clearly indicated.

3.2 CLEANING

- A. Thoroughly clean all installed materials and products and related areas:
 1. Prior to acceptance of the work of this Section.
 2. In accordance with Division 01 Section "Cleaning and Waste Management."

3.3 PROCESS VALVE SCHEDULE

- A. The valve schedule is provided as an aid to the Contractor. Verify all valve requirements and provide valves for a completely operable system. Provide temporary valves as needed.

Valve ID	Type	Size	Material	Location	Service
7054	3-Way Manifold	2"	Carbon Steel	Bulk Tank	Pressure Relief - Gas
7053	Needle	1/4"	Carbon Steel	Bulk Tank	Gauge Isolation
7039	Angle	1-1/4"	Carbon Steel	Bulk Tank	Vapor
7023	Globe	1-1/4"	Carbon Steel	Bulk Tank	Liquid
7024	Globe	1-1/4"	Carbon Steel	Bulk Tank	Liquid Fill
7025	Globe	1-1/4"	Carbon Steel	Liquid Blowdown	Liquid
7007	Angle	1-1/4"	Carbon Steel	Bulk Tank	Vapor
7041	Angle	1-1/4"	Carbon Steel	Vaporizer - Bulk Tank	Vapor
7042	Angle	1-1/4"	Carbon Steel	Vaporizer - Bulk Tank	Isolation
7043	Angle	1-1/4"	Carbon Steel	Vaporizer - Bulk Tank	Drain
7044	Needle	1/4"	Carbon Steel	Vaporizer - Bulk Tank	Gauge Isolation
7001	Angle	1-1/4"	Carbon Steel	Day Tank	Vapor
7002	Globe	1-1/4"	Carbon Steel	Day Tank	Vapor
7008	Globe	1-1/4"	Carbon Steel	Vapor Isolation at Bldg. Wall	Vapor
7021	Angle	1-1/4"	Carbon Steel	Day Tank	Liquid
7022	Globe	1-1/4"	Carbon Steel	Day Tank	Liquid
7026	Globe	1-1/4"	Carbon Steel	Liquid Isolation at Bldg. Wall	Liquid
7031	Angle	1-1/4"	Carbon Steel	Day Tank	Spare
7051	Needle	1/4"	Carbon Steel	Day Tank	Gauge Isolation
7052	Ball	3/4"	Carbon Steel	Bleed	Vapor
7100	3-Way Manifold	2"	Carbon Steel	Day Tank	Pressure Relief - Gas
7101	Globe	1-1/4"	Carbon Steel	Vaporizer - Bulk Tank	Vapor
7102	Needle	1/4"	Carbon Steel	Vaporizer - Bulk Tank	Gauge Isolation
7103	Angle	1-1/4"	Carbon Steel	Vaporizer - Bulk Tank	Drain
7104	Angle	1-1/4"	Carbon Steel	Vaporizer - Bulk Tank	Vaporizer 2 Isolation
7105	Angle	1-1/4"	Carbon Steel	Vaporizer - Bulk Tank	Vaporizer 1 Isolation
7106	Globe	1-1/4"	Carbon Steel	Ammoniator Inlet Header	Vapor
7107	Globe	1-1/4"	Carbon Steel	Ammoniator Inlet Header	Vapor
7108	Ball	3/4"	PVC	Ammoniator Inlet	Vapor

Valve ID	Type	Size	Material	Location	Service
7109	Ball	3/4"	PVC	Ammoniator Inlet	Vapor
7110	Ball	3/4"	PVC	Ammoniator Inlet	Vapor
7111	Ball	3/4"	PVC	Ammoniator Panel	Vapor
7112	Ball	3/4"	PVC	Ammoniator Panel	Vapor
7113	Ball	3/4"	PVC	Ammoniator Panel	Vapor
7114	Ball	3/4"	PVC	Ammoniator Panel	Vapor
7115	Ball	3/4"	PVC	Ammoniator Panel	Vapor
7116	Ball	3/4"	PVC	Ammoniator Panel	Vapor
7117	Ball	3/4"	PVC	Ammoniator Panel	Vapor
7118	Ball	3/4"	PVC	Ammoniator Panel	Vapor
7119	Ball	3/4"	PVC	Ammoniator Panel	Vapor
7120	Ball	1/2"	PVC	Ammoniator Outlet	Vapor
7121	Ball	1/2"	PVC	Ammoniator Outlet	Vapor
7122	Ball	1/2"	PVC	Ammoniator Outlet	Vapor
7123	Ball	1/2"	PVC	Clearwell 2 Isolation - Ammonia Bldg.	Vapor
7124	Ball	1/2"	PVC	Clearwell 1 Isolation - Ammonia Bldg.	Vapor
7125	Ball	1/2"	PVC	Clearwell 2 Isolation - Filter Bldg.	Vapor
7126	Ball	1/2"	PVC	Clearwell 1 Isolation - Filter Bldg.	Vapor
7127	Not Used				
7128	Not Used				
7129	Not Used				
7130	Not Used				
7131	Ball	1/2"	PVC	Ammoniator Outlet Header	Vapor
7132	Ball	1/2"	PVC	Ammoniator Outlet Header	Vapor
7133	Ball	1/2"	PVC	Pressure Gauge Isolation	Vapor
7134	Ball	1/2"	PVC	Pressure Gauge Isolation	Vapor
7135	Angle	1-1/4"	Carbon Steel	Vaporizer - Bulk Tank	Vapor
7136	Angle	1-1/4"	Carbon Steel	Vaporizer - Bulk Tank	Vapor
7137	Globe	1-1/4"	Carbon Steel	Vapor Isolation at Bldg. Wall	Vapor
7138	Globe	1-1/4"	Carbon Steel	Ammoniator Inlet Header	Vapor - Temporary

END OF SECTION 40 05 23

SECTION 46 31 00 – GAS CHEMICAL FEED EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and installation of ammonia feed (ammoniation) equipment.

1.3 SYSTEM DESCRIPTION

- A. The ammoniation system shall consist of 3 (2 duty and 1 standby) pre-assembled ammoniator panels (AP-1, AP-2, and AP-3). Each panel shall have an ammonia gas feed capacity of not less than 250 pounds per day.
- B. The ammoniation panels shall be a vacuum operated, solution feed type for dispensing ammonia gas from an existing anhydrous ammonia bulk or day tank through new ammonia piping and feed equipment to existing ammonia gas piping from the Ammonia Building to the application points in Clearwells No. 1 and No. 2.
- C. Each ammoniator panel shall convey ammonia gas from a new stainless steel ammonia header valve (mounted on the gas piping) to a new electrically heated drip leg and vacuum regulator. The gas shall be transported under vacuum to a wall-mounted panel consisting of 1/2-inch S80 PVC pipe and auto/manual ammonia gas metering system. From the panel assembly, ammonia gas shall be transported from the Ammonia Building via existing PVC pipe on to either of the two existing eductor assemblies where the gas is mixed with carrier water and transported to the application points.
- D. The system design shall permit the entire system to be vacuum checked in the field without the use of special tools.
- E. The system shall be constructed of materials suitable for wet or dry ammonia gas service.
- F. Provide three complete and identical ammoniation pre-assembled panels, each consisting of the following assemblies:
 - 1. One new ammonia header valve, 3/4-inch NPT, stainless steel.
 - 2. One Vacuum Regulator with heated drip leg and yoke connection.
 - 3. One Wall Panel system for Automatic or Manual metering of ammonia feed rate and monitoring system operation.
- G. All ammoniation equipment shall be the product of one manufacturer.

1.4 SUBMITTALS

- A. Shop Drawings: For ammonia equipment.
 - 1. Dimensions.
 - 2. Details of construction and installation.
 - 3. Name of Manufacturer.
 - 4. Model.
- B. Manufacturer's Literature: For ammonia equipment.
 - 1. Descriptive data for all equipment.
 - 2. Installation methods and procedures.
 - 3. Standard drawings of equipment installation.

- C. Operation and Maintenance Manuals: For ammonia equipment.
 - 1. Equipment function, normal operating characteristics and limiting conditions.
 - 2. Assembly, installation, alignment, adjustment and checking instructions.
 - 3. Operating instructions for start-up, routine and normal operating, regulation and control, and shutdown and emergency conditions.
 - 4. Lubrication and maintenance instructions.
 - 5. Guide to "troubleshooting".
 - 6. Parts lists and predicted life of parts subject to wear.
 - 7. Outline, cross-sections, assembly drawings, engineering data and wiring diagrams.
 - 8. Test data and performance curves.

1.5 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
 - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
 - 2. Knowledgeable of the design and the reviewed Shop Drawings.
- B. Manufacturer's Services:
 - 1. Submit Manufacturer's sworn statement that the equipment furnished complies with this Specification.
 - 2. Provide Manufacturer's written test reports.

1.6 SPARE PARTS

- A. Three Preventive Maintenance Kits for 750A-VRB Ammonia Vacuum Regulator (KT7-500-VBC-NH3).
- B. Three Preventive Maintenance Kits for 250 PPD Ammonia 6" Ratemeter/transmitter (KT2-702-RMP-NH3).
- C. Three Preventive Maintenance Kits for OV-110 Omni-Valve Controller (KT1-500-OV-NH3).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Ammonia Equipment – Hydro Instruments (Base Bid):
 - 1. The manufacturer shall be Hydro Instruments, Telford, PA, USA. Local representative: RS Technical Services, Inc. – (800) 800-0836.
 - 2. The automatic control valve shall be Hydro Instruments Model WPOV-110 Omni-Valve.
 - 3. The vacuum regulator shall be Hydro Instruments Model 700A with heated drip leg and yoke connection.
 - 4. The electronic Vacuum Monitor shall be Hydro Instruments Model VM-150.
 - 5. All ammonia feed equipment shall be pre-assembled on custom wall-mount panels by Hydro Instruments.
- B. Ammonia Equipment – Alternate Manufacturer (Alternate No. 1):
 - 1. Approved equal.

2.2 EQUIPMENT

- A. Vacuum Regulator and Header Valve:
 - 1. The vacuum regulator shall mount directly on the gas header valve by means of a corrosion resistant and gasketed yoke assembly complying with the standards of The Chlorine Institute, Inc.
 - 2. The vacuum regulator body parts shall be constructed of solid machined PVC material for maximum cracking resistance.
 - 3. The regulator shall have a spring-opposed diaphragm that controls vacuum and closes tight upon loss of vacuum.
 - 4. Vacuum regulator inlet valve springs shall be Type 316 stainless steel.
 - 5. The regulator shall incorporate a pressure relief (vent) valve with separate ports for ammonia feed and ammonia vent.

6. Connections shall be provided for tubing vented gas away from the pressure relief (vent) port of the vacuum regulator to atmosphere outside the building. The outside end of the vent tubing shall be equipped with an insect screen.
7. The mounting yoke assembly shall include a drip leg with 25-Watt heater to trap and evaporate any liquid ammonia exiting the tank valve.
8. The regulator shall be equipped with an inlet filter to remove particulate matter from the gas before it enters the inlet safety valve.
9. The regulator shall include a mechanism to indicate when the container is empty and requires replacement.
10. The design of the regulator shall not rely on any O-Ring(s) to prevent pressurized ammonia leaks, into the room, from the region upstream of the inlet safety valve.
11. The regulator shall not include a rate meter tube to indicate feed rate.

B. AUTOMATIC CONTROL VALVE WALL PANEL:

1. General:
 - a. The automatic control valve shall be provided to control 0-250 PPD of ammonia gas feed.
 - b. The automatic valve shall be installed onto a 1/2-inch thick polypropylene panel suitable for wall mounting.
 - c. All mounting hardware including bolts, nuts, brackets shall be Type 316 stainless steel.
 - d. The automatic control valve shall be capable of at least 20:1 turn down and accuracy of +/- 2% of full scale.
 - e. The automatic control valve shall be comprised of a PID controller and automatically controlled variable orifice rate valve. These devices shall be incorporated into one compact unit.
 - f. The microprocessor based automatic control valve shall be capable of adjusting the gas feed rate based on up to three 4-20mA analog input signals, Modbus RS-485 Communication, or by means of one to four 12-24VDC inputs.
 - g. The automatic control valve shall allow for the following standard, field selectable control modes:
 - 1) Manual.
 - 2) Proportional control (flow).
 - 3) Set-Point control (residual/ORP).
 - 4) Compound loop control (PID).
 - 5) Step-feed control.
 - 6) Dual input feed forward control.
 - 7) Dual set point control.
2. Enclosure, Motion Control System, Variable Orifice Rate Valve:
 - a. The automatic control valve shall be housed in a corrosion resistant, NEMA 4X (IP66) rated enclosure suitable for installation in corrosive atmospheric environment.
 - b. Materials of construction shall be compatible with ammonia. Acceptable materials of construction for feed equipment include PVC, PTFE, Type 316 stainless steel, and Buna-N. Controller enclosure shall be fiberglass.
 - c. For low maintenance and reliable performance, the linear stepper motor shall be joined to the valve stem by a precision machined Type 316 stainless steel shaft. There shall be two precision machined PTFE shaft seals sealing on this Type 316 stainless steel shaft. The gap between these two PTFE shaft seals shall be open to the outside air. To avoid jamming, no rubber or metal parts or threads shall contact the drive assembly.
 - d. For accurate feed rate control, the length of the variable area orifice portion of the rate valve stem shall be no less than 1.5 inches.
 - e. A suitably sized v-notch stem shall be provided based on the chemical and feed rate range for each control valve.
 - f. Motion of the valve shall be achieved by means of a linear stepper motor. The linear stepper motor shall cover a linear motion range of not less than 1.25 inches (31.75 mm) with not less than 2,000 steps.
 - g. Motion control shall be achieved in software without the use of a feedback potentiometer.
 - h. To ensure accurate feed rates throughout the range of operation, the software shall incorporate a 10-point valve linearization calibration.
3. User Interface – Display and Keypad:
 - a. The automatic control valve shall include a 2-line, 20-character per line, alphanumeric, LCD display.
 - b. User controls shall be through a front panel 4-button keypad.

- c. Menus and variables shall be displayed in plain English words using easy to read, alphanumeric characters for clear understanding.
 - d. Control mode, calibrations, and all control parameters shall be password protected and adjustable through the keypad while displayed on the screen.
 4. Communication Features (Relays, Modbus, Analog Inputs and Outputs):
 - a. The automatic control valve shall include half-duplex, two wire type Modbus RS-485 communication.
 - b. The automatic control valve shall include three analog input channels.
 - c. Each analog input signal shall be independently user selectable as either 4-20mA or 0-10V.
 - d. Two 4-20 mA output signals, proportional to the chemical feed rate, shall be provided.
 - e. The first analog input channel shall be used only for proportional (flow) input signals. The second analog input channel shall be used only for set point (residual or ORP) input signals. The third analog input channel shall be used for one of the following:
 - 1) Remote adjustment of dosage setting.
 - 2) Remote adjustment of set-point setting.
 - 3) Remote valve positioning.
 - 4) Additional input for dual set-point control.
 - f. Four 12-24VDC inputs shall be provided. These inputs can be used for:
 - 1) Step-feed control.
 - 2) External control of AUTO or MANUAL modes.
 - 3) External control of DUTY or STANDBY modes.
 - g. Two relay outputs shall be provided for the following user selectable options:
 - 1) Remote indication of alarm conditions.
 - 2) Indication of whether the valve is in AUTO or MANUAL mode.
 5. Bypass Assembly:
 - a. The automatic control valve shall be provided with a bypass piping and valve arrangement to allow for the selection of automatic feed control or bypass (manual) feed control.
 - b. The selection of manual feed control shall isolate the automatic control valve and allow for the automatic control valve to be disassembled while continuing to feed with manual control.
 - c. The bypass piping arrangement shall be constructed of socket welded schedule 80 PVC pipe and pipe fittings.
 - d. The three true union ball valves shall be constructed with seals of suitable material for the specific chemical application.
 - e. The manual bypass assembly shall be pre-piped and installed onto the 1/2-inch thick polypropylene panel of the automatic control valve wall panel system.
 6. Ammonia Gas Flow Meter:
 - a. Three ammonia gas flow meters (one per panel) shall be provided to indicate the gas flow rate. The gas flow meter shall be factory-installed on automatic control valve wall panel with the automatic control valve.
 - b. The gas flow meter shall be equipped with a control valve for manual feed rate adjustment and be constructed entirely of materials suitable for maximum chemical resistance and maximum service life.
 - c. The glass flow meter tube shall be at least 6 inches (152 mm) long and indicate flow rates up to 250 PPD and down to a minimum of 1/20 of the maximum value.
 - d. The gas flow meter shall provide a 4-wire 4-20 maDC transmitter. A separate 24 VDC power supply in a NEMA4X enclosure is required to power the three flow meters and shall be included.
 7. Vacuum Monitor:
 - a. Each of the three automatic control valve/ammoniator wall panels shall be provided with an electronic vacuum monitor in a NEMA4X enclosure installed.
 - b. The Vacuum Monitor shall include;
 - 1) 3-digit LED digital of 0-30.0 in. Hg vacuum.
 - 2) Three (3) alarm relays; one Low Vacuum, one High Vacuum, and one latch relay, each with a NO and a NC contact, and each with an independently adjustable trip point.
 - 3) 0-100 sec alarm delay.
 - 4) Low Alarm range is 0-15 inches Hg.
 - 5) High Alarm range is 15-30 inches Hg.
 - 6) IP65 External Latch Alarm Reset Switch.

- C. Vaporizer Assembly:
1. A redundant ammonia vaporizer shall be installed on the Ammonia Bulk Tank and shall consist of the following components:
 - a. Shell:
 - 1) The shell shall include angle valves and heating elements rated for 7.5kw/480V.
 - 2) The vaporizer shell be Tanner National Board Registered Vaporizer Shell, or equal.
 - b. Shell Drain:
 - 1) Provide angle valves, hydrostatic relief valves, plugs, and nipples as required.
 - 2) Angle valve and hydrostatic relief valve shall be Squibb Taylor or REGO.
 - 3) Nipples shall be schedule 80 steel.
 - c. Pressure Switch:
 - 1) Provide pressure switch, needle valves, and nipples as required.
 - 2) Needle valves shall be stainless steel.
 - 3) Nipples shall be schedule 80 steel.
 2. Coordinate with Tanner Industries to ensure compatibility with existing tank and vaporizer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in all equipment in conformance with:
1. The Shop Drawings reviewed by Engineer.
 2. The Manufacturer's recommendations.

3.2 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Contractor shall coordinate and pay for Manufacturer's engineer or qualified representative to provide the services indicated below. Schedule the following as soon as practicable after installation and at times approved by Engineer and Owner.
1. Start-up:
 - a. Manufacturer's engineer or qualified representative shall check work, assist in start-up, and demonstrate operation.
 - b. Promptly make all changes and additions required by Manufacturer's engineer.
 - c. Submit Manufacturer's engineer's written approval of installation.
 2. Training:
 - a. Manufacturer's engineer or qualified representative shall demonstrate operation and maintenance and provide training to Owner's personnel.
 - b. Training shall review operation and maintenance manual, covering all items listed in Paragraph 1.4.c above. Submittal and approval of Operation and Maintenance Manuals shall be complete prior to training.
 - c. Trainings shall be provided to Owner's personnel on two separate 4-hour trips, occurring on non-consecutive weeks to accommodate shift changes.
 - d. Contractor shall provide training materials and agenda for review prior to training dates.

3.3 CLEANING

- A. Prior to acceptance of the Work of this Section, thoroughly clean all installed materials, equipment, and related areas in accordance with Division 01 Section "Cleaning and Waste Management."

END OF SECTION 46 31 00