



RE: NEW SLUDGE HOLDING BASIN FOR THE WASTEWATER TREATMENT PLANT
RESOLUTION 2026-34

Background:

As the City of Nixa continues to grow, wastewater flows to the Wastewater Treatment Plant (WWTP) continue to increase. Additional biosolids storage capacity is necessary to accommodate this growth and ensure the City remains in compliance with Missouri Department of Natural Resources (DNR) regulations.

Analysis:

During certain times of the year, weather conditions and land application restrictions prevent the hauling of biosolids. During these periods, the existing sludge holding tanks approach their storage capacity. The current storage capacity is 990,000 gallons. When we reach full capacity, it requires staff to retain additional biosolids in the plant's clarifiers. When this occurs, it reduces our treatment process by the gallons of biosolids being held in the clarifier and reduces operational flexibility and limits the plant's ability to operate at peak efficiency.

Constructing a new 700,000-gallon sludge holding basin would eliminate using the clarifiers for storage and provide the additional storage capacity needed during periods when biosolids cannot be hauled or land applied. The new basin would allow staff to maintain normal treatment operations, improve overall plant efficiency, and reduce operational constraints caused by limited storage.

In addition, the proposed basin would include two truck loading stations, improving the efficiency of biosolid loading and transportation once hauling resumes. The additional storage and loading capacity will also support the City's ability to meet the requirements of the EPA's 40 CFR Part 503 Biosolids Rule and applicable Missouri DNR regulations.

This project has been approved as a capital improvement project in the 2026 budget.

Recommendation:

Staff recommends that City Council authorize the project to be advertised for bid. Construction of a new sludge holding basin will provide the capacity needed to support future growth, improve operational efficiency, and help ensure continued compliance with state and federal biosolids regulations.

MEMO PREPARED BY:

Jason Stutesmun | Water Quality Superintendent

417-725-2353

RESOLUTION NO. 2026-34

A RESOLUTION OF THE COUNCIL OF THE CITY OF NIXA AUTHORIZING THE CITY ADMINISTRATOR TO SOLICIT BIDS FOR THE CONSTRUCTION OF A NEW SLUDGE HOLDING BASIN FOR THE WASTEWATER TREATMENT PLANT

WHEREAS the Nixa City Code (Chapter 2, Article VI) authorizes the City Administrator to purchase supplies, materials, equipment, and services on behalf of the City when a competitive procurement method is utilized; and

WHEREAS said provisions require the City Administrator to obtain an authorizing resolution from the City Council prior to soliciting purchases that will total \$20,000.00 or more; and

WHEREAS City staff are requesting authorization to solicit bids for the construction of a new Sludge Holding Basin for the Wastewater Treatment Plant; and

WHEREAS a new sludge holding basin has become necessary to accommodate the City's growth and additional material the treatment plant is processing. Constructing a new sludge holding basin would provide the additional storage capacity needed during periods when biosolids cannot be hauled or land applied. The new basin would allow staff to maintain normal treatment operations, improve overall plant efficiency, and reduce operational constraints caused by limited storage; and

WHEREAS the additional storage and loading capacity will also support the City's ability to meet the requirements of the EPA's 40 CFR Part 503 Biosolids Rule and applicable Missouri Department of Natural Resources regulations; and

WHEREAS the new sludge holding basin has been approved as a capital improvement project in the 2026 budget; and

WHEREAS the City Council desires to authorize the City Administrator to undertake the purchase described herein in compliance with Chapter 2, Article VI of the Nixa City Code.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF NIXA, AS FOLLOWS:

SECTION 1: The City Administrator, or designee, is hereby authorized, pursuant to the provisions of Chapter 2, Article VI, of the Nixa City Code, to solicit and undertake the purchase described in "Resolution Exhibit A," which said Exhibit is attached hereto and incorporated herein by this reference.

SECTION 2: The City Administrator and the officers of the City are hereby authorized to do all things necessary or convenient to carry out the terms and intent of this Resolution.

RESOLUTION NO. 2026-34

SECTION 3: This Resolution shall be in full force and effect from and after its final passage by the City Council and after its approval by the Mayor, subject to the provisions of section 3.11(g) of the City Charter.

[Remainder of page intentionally left blank. Signatures follow on next page.]

ADOPTED BY THE COUNCIL THIS ____ DAY OF _____, 2026.

ATTEST:

PRESIDING OFFICER

CITY CLERK

APPROVED BY THE MAYOR THIS ____ DAY OF _____ 2026.

ATTEST:

MAYOR

CITY CLERK

APPROVED AS TO FORM:

CITY ATTORNEY



RFB-020-2026/WW

Nixa Sludge Basin

Issue Date: 8/12/2026

Questions Deadline: 8/28/2026 12:00 PM (CT)

Response Deadline: 9/9/2026 10:00 AM (CT)

Contact Information

Contact: Stephanie Ewing

Address: Purchasing

City Hall

715 W. Mt. Vernon Street

PO Box 395

Nixa, MO 65714

Phone: (417) 449-0555

Email: sewing@nixa.com

Event Information

Number: RFB-020-2026/WW
Title: Nixa Sludge Basin
Type: Request for Bid
Issue Date: 8/12/2026
Question Deadline: 8/28/2026 12:00 PM (CT)
Response Deadline: 9/9/2026 10:00 AM (CT)
Notes: The City of Nixa is issuing a Request for Bid for the construction of a sludge basin.

IT IS HIGHLY ENCOURAGED TO SUBMIT YOUR BID ELECTRONICALLY. No emailed bids will be accepted.

The Response Deadline is the date and time public unsealing of bid responses will be held.
Public unsealing of bid responses will take place at:

City of Nixa
Public Works
1111 W. Kathryn St.
Nixa, MO 65714

The City of Nixa reserves the right to accept or refuse any or all bids.

Ship To Information

Contact: Travis Cossey
Address: Wastewater
1111 Kathryn St.
PO Box 395
Nixa, MO 65714
Phone: (417) 725-2353
Email: tcossey@nixa.com

Billing Information

Contact: Accounts Payable
Address: Finance
City Hall
715 W. Mt Vernon St.
PO Box 395
Nixa, MO 65714
Phone: (417) 725-3785
Email: accountspayable@nixa.com

Bid Activities

Pre-Bid Meeting

4/29/2026 1:30:00 PM (CT)

Non-mandatory pre-bid meeting to be held at Public Works facility located at 1111 W Kathryn St., Nixa, MO.

Bid Attachments

Bid Proposal - Sludge Basin 7-26-26a.pdf

Bid Proposal

[View Online](#)

Plans - Sludge Basin (Prelim 7-30-26).pdf

Plans

[View Online](#)

Project Summary - Sludge Basin 2026.pdf

Project Summary

[View Online](#)

Supplemental Specs Nlxa Sludge Basin 073026.pdf	View Online
Supplemental Specs	
Terms and Conditions 2026.pdf	View Online
Terms and Conditions	
Affidavit of Business Entity.pdf	View Online
E-Verify	
anti-demonstration-against-israel.pdf	View Online
Anti-Demonstration Against Israel affidavit	
OSHA 10 AFFIDAVIT.pdf	View Online
OSHA affidavit	
2026 BUSINESS APPLICATION.pdf	View Online
Business License Application	

Requested Attachments

Bid Proposal Form

(Attachment required)

Please upload your bid proposal here.

Bid Bond

(Attachment required)

Please upload your Bid Bond here.

OSHA Affidavit

(Attachment required)

Please download the "OSHA Affidavit", located on the Attachment tab. Complete the document and upload it here.

Anti Demonstration Against Israel Affidavit

(Attachment required)

Please download the "Anti-Israel Affidavit", located on the Attachment tab. Complete the document and upload it here.

E-Verify

(Attachment required)

Please download the "Affidavit of Business Entity", located on the Attachment tab. Complete the document and upload it here.

Other Attachments

If you have additional documentation you wish to provide, please upload it here. File size limitation is 250MB. If your files are larger than the limitation, a zip file containing the documents can also be uploaded.

Business License Application

Please upload the "Business License Application", located on the Attachment tab. Complete the document and upload it here.

Bid Attributes

1	Introduction There are attributes, including this one, associated with this proposal. Some are notes and require no response, but most have a required response. **Please select each page on the right-hand side of the blue bar below (at the bottom of this list of attributes) in order to view the next page of Bid Attributes, if applicable.**
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2 RFB Submission Response

The City of Nixa prefers responses to be submitted online via our electronic system. Submissions may be submitted manually. Manual submissions must be delivered to the Purchasing Department, in a sealed envelope by the date and time stated. No fax or email submissions will be accepted. Only one format is needed. For any questions, please contact the Purchasing Department at 417.449.0555.

3 Bid Opening

Any bid received later than the specified time shall be disqualified.

Questions pertaining to the proposal should be addressed in the Questions Tab or directly to the Purchasing Department at 417.449.0555.

If the City of Nixa office where bids/proposals are to be submitted is closed due to inclement weather, natural disaster, or for any other cause including if the electronic bid system is unavailable on the due date, the deadline for submission shall be extended until the next City calendar business day, unless the bidder is otherwise notified. The time of day for submission shall remain the same.

4 Attachments Required

Be sure to upload all required documents and forms to the "Response Attachments" Tab.

5 Bid Award

The City of Nixa reserves the right to award Bids to the Vendor whose bid response best serves the City's best interest. The City reserves the right to reject any and all Bids or waive any minor irregularity or technicality in Bids received.

☐ I acknowledge.

(Required: Check if applicable)

6 Technical Specs/Plans/Bid Form

Download the Technical Specs, Plans, and Bid Form located on the "Attachments" tab. Thoroughly review the document and understand these are the documents you are to follow for construction of the project. Please indicate below you acknowledge.

☐ I have downloaded, read and agree to comply.

(Required: Check if applicable)

7 Bid Bond/Performance Bond/Insurance Requirements

The City of Nixa has requirements which will need to be completed by the awarded vendor. Please review the information below regarding Bid Bond/Security information as well as information on insurance and special requirements expected from the awarded vendor for this project. Acknowledge your understanding below.

Requirement for Bid Security – Bid security bond is required for all construction when the bid amount is \$20,000.00 or greater or deemed necessary by the City. Bid security shall be a bond provided by a surety company authorized to do business in this state, or the equivalent in cash, or otherwise supplied in a form satisfactory to the City in an amount equal to at least 5% of the amount of the bid. Failure to provide security will result in the bid being rejected. If the bidder fails to honor his bid for any reason, then such bid security may be retained by the City and deposited to the General Fund. The City has the right to hold bidders' bonds until the awarded contract is executed.

Contract Performance and Payment Bonds – When a construction contract is awarded, for an amount exceeding \$20,000.00, a bond shall be delivered to the City and shall become binding on the parties upon the execution of the contract; which bond shall be a performance, labor, and materials bond satisfactory to the City, executed by a surety company authorized to do business in this state or otherwise secured in a manner satisfactory to the City, in an amount equal to 100% of the price specified in the contract.

Insurance - All contracts between the City and a Contractor shall state that Contractor shall include the City as "additional insured" during the term of the contract. Workers Compensation amount and type shall be in full compliance with applicable statutory requirements, and Employer Liability Coverage limits is to be provided consistent with any applicable legal requirements. Commercial General Liability and Comprehensive Automobile Liability coverage are to be in the amount equal to the sovereign immunity limits for Missouri public entities as calculated and published in Section 537.610 RSMo. In addition, for any projects utilizing state or federal transportation funds, Insurance requirements shall meet those necessary to comply with those funding requirements.

Prevailing Wage Requirement (Or Davis Bacon- Whichever is higher)- Subject to prevailing wage requirements, only for those projects required by State law, the vendor must comply with Section 290.250 RSMo by paying to all personnel employed for applicable services actually provided under the contract not less than the prevailing wage hourly rate of wages as determined by the Department of Labor and Industrial Relations, Division of Labor Standards, specified in the current wage order for Christian County. If a project qualifies for prevailing wage, pertinent information will be in the solicitation document.

E-Verify, Federal Work Authorization - Pursuant to RSMo 285.530, if the Vendor meets the definition of RSMo 285.525 of a "Business Entity", the Vendor must affirm its enrollment and participation in the E-Verify federal work authorization program with respect to its employees hired after enrollment in the program who are proposed to work in connection with the services the City is bidding / contracting. The document is required for services when the awarded dollar value is equal or greater than \$5,000.00. OSHA Training Program - Contractors on public works projects shall comply with all requirements of Section 292.675, RSMo., regarding completion of a construction safety program by all employees on the project.

☐ I acknowledge.

(Required: Check if applicable)

8 Anti-Collusion Statement

By offering a submission to this Bid, the bidder certifies the bidder has not divulged, discussed, or compared the Bid with other bidders and has not colluded with any other bidder or parties whatsoever. The bidder also certifies, and in the case of a joint Bid, each party thereto certifies as to their own organization, that in connection with this Bid:

Any prices and/or cost data submitted have been arrived at independently, without consultation, communication, or agreement for the purpose of restricting competition, as to any matter relating to such prices and/or cost data, with any other bidder or with any competitor.

Any prices and/or cost data for this Bid have not knowingly been disclosed by the bidder and will not knowingly be disclosed by the bidder prior to the scheduled opening directly or indirectly to any other bidder or to any competitor.

No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a Bid for the purpose of restricting competition.

The only person or persons interested in this Bid, principal or principals are named therein and that no person other than therein mentioned has any interest in this Bid or in the contract to be entered into.

No person or agency has been employed or retained to solicit or secure the contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee exempting bona fide employees or established commercial agencies maintained by the Purchaser for the purpose of doing business.

I affirm that I am duly authorized to execute this contract; that this company, corporation, firm, partnership or individual has not prepared this bid in collusion with any other Bidder, and that the contents of this bid as to prices, terms or conditions of said bid have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this bid.

☐ I agree.

(Required: Check if applicable)

9 Vendor Verification

The City of Nixa has utilized Payment Works for vendor verification. If awarded the bid, you will receive an email to register with Payment Works and upload your vendor information. By acknowledging this item, you agree to follow thru and register thru Payment Works to be a vendor with the City, as requested.

☐ I acknowledge.

(Required: Check if applicable)

10 Business License

The City of Nixa has a Business License Code which requires all businesses performing a service within the city limits, regardless of their physical location, to obtain a business license. If awarded the bid, as a part of the contract, you and any subcontractors will be required to obtain a business license before any work shall begin.

☐ I understand and agree to comply.

(Required: Check if applicable)

Supplier Information

Company Name:

Contact Name:

Address:

Phone:

Fax:

Email:

Supplier Notes

By signing below, the bidder shall hereby declare understanding, agreement and certification of compliance to provide the items and/or services, at the prices quoted, in accordance with all requirements and specifications contained herein and the Terms and Conditions. The bidder shall further agree that the language of this RFB shall govern in the event of a conflict with his/her bid. In addition, the bidder shall further agree that upon receipt of an authorized purchase order from the City of Nixa or when a Contract Resolution is signed and issued by an authorized official of the City of Nixa, a binding contract shall exist between the bidder and the City of Nixa.

Print Name

Signature

BID PROPOSAL

CITY OF NIXA

SLUDGE STORAGE IMPROVEMENTS

All Bidders are required to thoroughly review the following instructions, accompanying information, the construction plans, specifications and other referenced documents, then shall accurately complete the Bid Form as presented herein:

I. INSTRUCTIONS TO BIDDERS:

1.1 DEFINED TERMS

- A. Terms used in these Instructions to Bidders are defined in the Standard General and Supplementary Conditions of the Construction Contract, Engineers Joint Contract Documents Committee (EJCDC) with the meanings assigned to them therein.
- B. Additional Terms:
 - 1. *Bidder* – One who submits a Bid directly to the City as distinct from a subbidder, who submits a Bid to a Bidder.
 - 2. *Bidding Documents* – The Bidding Requirements and the proposed Contract Documents as listed in the Table of Contents of the Project Manual (including all Addenda issued prior to the opening of Bids).
 - 3. *Bidding Requirements* – The Advertisement to Bid, Instructions to Bidders, Bid security form (if any), the Bid Form with any Bid Form Supplements, and all other documents listed under Bidding Requirements in the Table of Contents of the Project Manual.
 - 4. *Successful Bidder* – The low, responsive, responsible Bidder.
 - 5. The terms *Bid* or *Proposal* as used herein are interchangeable.
 - 6. The terms *Work* and *Project* as used herein are interchangeable.
 - 7. *Responsible Bid* – A Bid that demonstrates the apparent ability of the Bidder to successfully meet all the requirements specified in the Bidding Documents.
 - 8. *Responsible Bidder* – A Bidder submitting a Responsible Bid.
 - 9. *Responsive Bid* – A Bid that complies with all meaningful or material aspects of the Bidding Documents. The Bid must constitute a definite and unqualified offer to meet the material requirements of the Bidding Documents including any terms that affect price, quality, quantity or time of delivery, or are clearly identified in the Bidding Documents to be complied with at the risk of Bid rejection for non-responsiveness.
 - 10. *Responsive Bidder* – A Bidder submitting a Responsive Bid.

1.2 GENERAL REQUIREMENTS

- A. Each bid shall be legibly written or printed in ink on the form provided in the contract documents. No bidder alterations in the provided forms will be acceptable. Qualifications in the Contractor's bid may not be acceptable unless specifically approved. The City may require the bidder to identify any qualifications with legal signature and detailed supportive information for the City's consideration.

Modifications by the bidder of their bid may not be made after the bid has been submitted. All addenda to the contract documents, properly signed by the bidder, shall accompany the bid when submitted.

- B. Each bid shall clearly indicate the Bidder's name and Bidder's contact address, email and phone numbers.
- C. No prime bidder may submit more than one bid on each contract. Multiple bids under different names will not be accepted from one firm or association.

1.3 WITHDRAWAL OF BIDS

No bidder may withdraw his bid for sixty (60) days after the date and hour set for opening. A bidder may withdraw his bid at any time prior to expiration of the period during which bids may be submitted by a written request signed in the same manner and by the same person who signed the Bid Form.

1.4 QUALIFICATION OF BIDDERS

- A. Bidders may be required to submit evidence that they have a practical knowledge of the particular work bid upon and that they have the financial resources to complete the proposed work.
- B. Contract award will be made only to responsible contractors believed to have the ability to perform successfully, which may be determined by considering such matters as contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.
- C. Each bidder may be required to show that he has handled former work so that no just claims are pending against such work. No bid shall be accepted from a bidder who is engaged on any work which would impair his ability to perform or finance this work.

1.5 BID FORM INSTRUCTIONS

- A. The Bid Form shall be complete and shall include all items listed in the Index and all addenda shall be signed and attached.
- B. All blank spaces for Bid prices must be filled in. Proposal Forms must be completed in ink (hand, typed or digital). Only one copy of the complete Proposal is required.
- C. The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which shall be filled in the appropriate place on the Bid Form).
- D. The address to which communications regarding the proposal are to be directed must be shown.
- E. Conditional or qualified Bids may not be accepted.

1.6 SIGNATURE OF BIDDERS

- A. Each bidder shall sign the Bid Form using his usual signature and giving his full business address.
- B. Bids by partnerships shall be signed with the partnership name followed by the signature and designation of one of the partners or other authorized representative.
- C. Bids by corporations shall bear the corporate seal and shall be signed with the name of the corporation followed by the signature and designation of the president, secretary, or other person authorized to bind the corporation.
- D. Bids by joint ventures shall be signed by each participant in the joint venture or by an authorized agent of each participant.

- E. The names of all persons who affix to their signature the word "president", "secretary", "agent", or other designation without disclosing his principal may be held to be the bid of the individual signing. When requested by the City, evidence of the authority of the person signing shall be furnished.

1.7 PROSECUTION OF WORK

Each bidder shall complete the work within the allowable time set forth in the Bid Form. Attention is directed to the contract documents related to extensions of time and liquidated damages.

1.8 BID SUBMITTAL

- A. Bids shall be submitted by the time and per the instructions of the Advertisement for Bids and related instructions and accompanied by the Bid Security and other required documents.
- B. Bids will be opened publicly unless otherwise indicated.
- C. When Bids are opened publicly, they will be read aloud, and a summary of the amounts of the base Bids and major alternates (if any) will be made available after the opening of Bids.

1.9 ACCEPTANCE AND REJECTION OF BIDS

The City reserves the right to accept the bid from a responsible bidder; to reject any or all bids; and to waive irregularities or informalities in any bid. Bids received after the specified time of opening may be rejected.

1.10 BASIS OF AWARD

The City will review the submitted bids from responsive, responsible bidders and may choose to award the base bid and any options or alternates, as applicable, to a bidder or as otherwise described in the bid documents.

1.11 PROJECT DOCUMENTS

- A. Complete sets of the Bidding Documents may be obtained from the Engineer.
- B. Neither the City nor ENGINEER assume any responsibility for errors or misinterpretations resulting from the use of the Bidding Documents.
- C. The City and ENGINEER in providing copies of Bidding Documents on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.
- D. The plans provided are specific to the project and for general reference and guidance. Detailed design of specific equipment, precast structures, retaining walls, or devices is to be by the supplier or others. Additional work and considerations may be applicable. The Contractor shall review and assess project requirements and reflect fully all necessary work and costs in their proposal. The Contractor is solely responsible for all means and methods. Substantial deviations, exceptions or alternatives shall be clearly indicated in the proposal with related pricing.

1.12 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- A. Before submitting a Bid, each Bidder must
 - 1. Examine the Bid Documents thoroughly and other related data.
 - 2. Visit the site to assess local conditions relative to construction hazards and procedures, required labor, and all other conditions and factors, local and otherwise, which may in any manner affect cost, progress, performance, or furnishing of the Work. Such considerations shall include the arrangement and condition of existing structures and facilities, the procedure necessary for maintenance of uninterrupted operation of existing facilities, the availability and cost of labor and facilities for transportation, handling and storage of materials and equipment. All such factors shall be properly investigated and considered in the preparation of the bid. There will be no subsequent financial adjustment for lack of such prior information.
 - 3. Familiarize themselves with and consider federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, progress, performance, or furnishing of the Work.
 - 4. Study and carefully correlate Bidder's observations with the Contract Documents.
- B. The lands upon which the Work is to be performed, rights-of-way for access thereto, and other lands designated for use by Contractor in performing the Work, shall be field verified with the City.
- C. The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with the requirements of this section and that the Bid Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the Work

1.13 INTERPRETATION OF CONTRACT DOCUMENTS

- A. If any person who contemplates submitting a bid as a bidder is in doubt as to the true meaning of any part of the drawings or other documents, he may submit to the City a written request for an interpretation thereof. The submitter of the request shall be responsible for its prompt delivery.
- B. Binding interpretation of the project documents will only be made by addendum which will be provided to known bidders.
- C. The City will not be responsible for any explanations or interpretations of the proposed contract documents not issued by addendum.

1.14 INQUIRIES AND ADDENDA

- A. All questions about the meaning or intent of the Bid Documents shall be submitted to the City in writing. Replies will be issued by addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than ten days prior to the date of opening of bids may not be answered. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications are not binding and are subject to modification or retraction.
- B. Addenda may also be issued to modify the Bidding Documents as deemed advisable by the City or the project Engineer.

1.15 EQUIPMENT

- A. Equipment proposed by the bidder and equipment provided shall meet or exceed the requirements of the specifications, drawings and other contract documents in the opinion of the Owner and the Engineer. The listing of manufactures in the specifications and plans is intended to establish a standard and the words "or equal" if not stated are implied. The naming of a manufacturer in the specifications, plans, addendums, and other contract documents does not constitute a waiver of the specifications or other requirements by that manufacturer.
- B. Where specific material or equipment is referenced in Specifications, Submittals and/or the Drawings, any believed vague or conflicting information shall be reviewed with the Engineer and the higher standard may apply at no additional cost (unless mutually otherwise agreed).
- C. Requests for equivalency determination will be accepted only from prime contractors, and such requests shall be submitted not less than 10 days prior to the date of bid opening. An addendum may be issued prior to the bid date to identify additional manufacturers of the approved equipment.
- D. In order that the Engineer may determine if the proposed equipment is satisfactory, and in addition to any other requirements of these specifications, the bidder shall submit drawings, specifications, test data, references, other full descriptive material and a detailed list of the equipment proposed in accordance with the specifications no less than 10 days prior to the bid date. Submittals should be received from participating bidders.
- E. Should the Bidder propose equipment which does not meet the physical, electrical or other requirements of the specifications, plans and other contract documents, the Bidder shall notify in writing the Engineer of all dimensional, mechanical, electrical and structural changes and/or requirements for the units use and shall reimburse the Owner for any associated redesign and/or construction drawings. He shall include in his bid the additional construction costs of mechanical, architectural, structural, electrical and engineering costs of that unit. If design and drawing revisions are required, they will be prepared by the Engineer and the Contractor shall pay the Owner for such redesign cost. Reimbursement shall be based on the Engineers direct labor costs, plus indirect labor costs, plus any direct non-labor expenses such as travel per diem.
- F. The Owner reserves the right to reject any proposed equipment which does not meet any of the specified requirements.
- G. The Bidder shall include in his/her bid any paid up licenses, patent fees or other costs necessary for the use of the equipment, if required by the manufacturer.

1.16 SUBSTITUTIONS

A Substitution Request Form may be obtained from the engineer and completed by the prime bidder, then submitted, for any desired product or work substitutions by a qualified bidder or awarded contractor. Where substitutions of material or equipment are to be proposed, Bidder shall include in the Base Bid Amount only the products specified or approved by addenda and shall list proposed substitutions on the Substitution Request Form provided and subject to the City's approval.

1.17 SECURITY

Attorneys-in-fact who sign Bid Bonds or Payment Bonds and Performance Bonds must file with each Bond a certified and effective dated copy of their power of attorney.

1.18 CONTRACT TIME

The number of days within which, or the date by which, the Work is to be completed (the Contract Time) is set forth in the contract documents and will be included in the AGREEMENT.

1.19 LIQUIDATED DAMAGES

Provisions for liquidated damages are set forth in the AGREEMENT.

1.20 SUBCONTRACTORS, ETC.

- A. If the project documents require the identity of certain Subcontractors and other persons and organizations to be submitted to the City, the apparent Successful Bidder, and any other Bidder so requested, will within seven days after the day of the Bid opening, submit to the City a list of all Subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) proposed for those portions of the Work as to which such identification is so required. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of qualification for each such Subcontractor, person and organization if requested by the City.
- B. If the City or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, other person or organizations, either may, before giving the Notice of Award, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price. If the apparent Successful Bidder declines to make any such substitution, the Contract shall not be awarded to such Bidder, but his declining to make any such substitution will not constitute grounds for sacrificing his Bid Security.

1.21 WAGE RATES

Missouri State Wage rates shall be utilized and applicable documentation submitted including, but not limited to certified pay roles, affidavits and other documents. Information may be obtained from the Industrial Commission, Missouri Department of Labor and Industrial Relations (DOLIR), Box 449, Jefferson City, Missouri 65102 or by calling (573) 751-3403.

II. BID FORM:

SLUDGE STORAGE IMPROVEMENTS for the CITY OF NIXA

THIS BID IS SUBMITTED BY: _____
(hereinafter called BIDDER),

- ☐ a corporation arranged under the laws of the State of _____
- ☐ a partnership consisting of _____
- ☐ an individual d/b/a _____

TO: The CITY OF NIXA, MISSOURI, hereinafter referred to as CITY.

In response to the Invitation to Bid and after having carefully examined the drawings, specifications, related contract documents, all addenda thereto and the project site and conditions related thereto, the BIDDER hereby proposes to perform all work for **SLUDGE STORAGE IMPROVEMENTS** for the **City of Nixa, Missouri**, in strict accordance with these Contract Documents, Plans and Specifications, within the period of time set out herein, and for the price stated hereinafter.

1. By submission of this Bid, each BIDDER certifies, and in the case of a joint Bid, each party thereto certifies as to his own organization, that this Bid has been arrived at independently without consultation, communication, or agreement, collusion, or understanding with any other Bidder submitting a Bid for this Project.
2. BIDDER hereby agrees that if this Bid is accepted, BIDDER will, within ten (10) consecutive calendar days after the date of Notice of Award, enter into an Agreement of form attached herein, and will, at that time, deliver to the CITY the prescribed documents.
3. BIDDER agrees to provide to the CITY, if a contract is awarded, the certificates of insurance specified in these Documents, and to maintain the scope of insurance throughout the term of the Agreement.
4. **TIME FOR COMPLETION.** If this proposal is accepted, the undersigned hereby agrees that work will begin no later than the authorization date in the Notice to Proceed and will be diligently prosecuted at such rate and in such manner as, in the judgment of the CITY, is necessary for the completion of the work within the time specified in the contract documents.

Work will be considered complete when the contractor has completed the project, all clean-up is complete, and all excess materials and equipment are moved off site.

5. LIQUIDATED DAMAGES. The undersigned agrees that, should they fail to complete the work in the time specified or such additional time as may be allowed by the Engineer under the Contract, the amount of liquidated damages shall be recovered in accordance with the requirements of the *AGREEMENT*. Liquidated damages will be assessed until the work is completed, all cleanup completed and moved offsite.

BIDDER acknowledges understanding of the terms for liquidated damages as provided by the project documents, and agrees to pay liquidated damages in the amount(s) and by the term(s) established in the Agreement, without condition or recourse.

6. SUBLETTING OF CONTRACT. The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the contract or contracts or any portion thereof, or of his right, title, or interest therein, without written consent of the CITY. Requests for permission to sublet, assign, or otherwise dispose of any portion of the contract shall be in writing and accompanied by evidence that the organization which will perform the work is particularly experienced and equipped for such work. In case such consent is given, the Contractor will be permitted to sublet a portion thereof, but shall perform with his own organization, work amounting to not less than thirty percent (30%) of the total contract cost, except that any items designated in the contract as specialty items may be performed by subcontract and the contract value of any such specialty items so performed by subcontract may be deducted from the total contract cost before computing the amount of work required to be performed by the Contractor with his own organization.

No subcontractor is permitted to further subcontract his work; no 2nd tier subcontracting is allowed without written approval of CITY.

7. BIDDER, in submitting this Bid, agrees to commence work under the Agreement as specified by the Notice to Proceed.
8. BIDDER acknowledges receipt of the following ADDENDA:

<u>NO.</u>	<u>DATE</u>

9. Attention of the Bidder is directed to the Instructions to Bidders herein, Measurement and Payment - Section 01 20 00 as attached, the entire Construction Contract, the project specifications, and all other referenced contract documents.

Execution of this Bid Form/Proposal by the Bidder affirms the Bidders acceptance and understanding thereof.

10. **Bid Schedule:**

Each bidder shall fully and accurately complete the attached Bid Schedule.

Before completing and executing the following Bid Schedule, each Bidder shall examine the Bidding Requirements, Contract Documents, Specifications, Drawings, and other proposed Project Documents, and all Addenda thereto; and shall be acquainted with and fully understand:

- (1) the extent and character of the work covered by this Bid Form;
- (2) the location, character and condition of, among other things, existing roads, streets, highways, railroads, pavements, surfacing, walks, driveways, curbs, gutters, trees, sewers, utilities, drainage courses and structures, and other items, both surface and underground, which may affect or be affected by the proposed work;
- (3) the location, arrangement, and specified requirements of the proposed work and any equipment, structures, or facilities;
- (4) the extent, location and constraints of the project site and construction limits;
- (5) the nature and extent of excavations to be made, and the type, character, and general condition of materials to be excavated; along with the necessary handling, dewatering, and rehandling of excavated materials, including construction of fills and embankments;
- (6) the difficulties and hazards of the work including those that might be caused by the nature of the work and/or site, as well as those caused by weather, floods, or other events (natural or otherwise);
- (7) local conditions relative to labor, transportation, hauling, storage and delivery facilities;
- (8) all other factors and conditions affecting or which may be affected by the work.

Each bidder hereby proposes to furnish all materials, equipment, supplies, and appurtenances, to provide all construction equipment and tools; to perform all necessary labor and supervision; and to construct, install, erect, equip, and complete all work stipulated in, required by, and in accordance with the proposed contract documents and the drawings, specification, and other documents referred to therein (as altered, amended or modified by addenda) at the unit or lump sum prices stated on the following pages.

Notice is given that any quantities listed on the attached Based Bid Schedule are provided for bid comparison purposes and actual quantities may vary substantially. All work and quantities shall be field verified with the CITY prior to construction. Materials and construction shall conform to the project and City specifications, as

applicable. Note that the higher standard is to be upheld where any conflict occurs between plans and referenced specifications.

Attention of the Bidder is directed to the accompanying Job Special Provisions, Measurement and Payment Summary, Cleaning and Waste Management Requirements and all other contract documents. Execution of this Bid Form by the Bidder affirms the Bidders acceptance and understanding thereof.

**** REFER TO AND COMPLETE THE FOLLOWING BID SCHEDULE****

BID SCHEDULE

BASE BID:

SECTION 1.00 MISCELLANEOUS

1.01 Mobilization & Bonding (For All Work) 1 LS \$ _____

SECTION 2.00 SITE IMPROVEMENTS

2.01 Demolition 1 LS \$ _____

2.02 Site Grading 1 LS \$ _____

2.03 Site Piping - Fluids (Pipe, Valves, Fittings, Etc.) 1 LS \$ _____

2.04 Site Piping – Air (Pipe, Valves, Fittings, Etc.) 1 LS \$ _____

2.05 Asphalt Paving 1 LS \$ _____

2.06 Conc. Sidewalks & Pedestrian Pavement 1 LS \$ _____

2.07 Sludge Loading Pad w/ Inlet 1 LS \$ _____

2.08 Gravel Surfacing 1 LS \$ _____

2.09 Seeding, Mulching & Erosion Control 1 LS \$ _____

2.10 Misc. Work (Not Otherwise Designated) 1 LS \$ _____

SECTION 3.00 WASTEWATER IMPROVEMENTS

3.01 Sludge Storage Structure 1 LS \$ _____

3.02 Aeration System (Equipment, Controls, Piping) 1 LS \$ _____

3.03 Monitoring Equipment (DO, Level, Flow, Alarm & Wiring) 1 LS \$ _____

3.04 Sludge Pumping System (Structures, Controls, Equip.) 1 LS \$ _____

3.05 Electrical (Site, Lighting, Etc.) 1 LS \$ _____

TOTAL BASE BID:

The total Base Bid price shall be the sum of prices previously provided in the Base Bid Schedule and shall be the basis for the establishment of the apparent lowest base bidder. The following price shall include all costs required for the provision of the previously described items and all work, equipment and labor incidental thereto in order to complete work properly and in accordance with the related construction plans, specifications and other contract documents.

Price in Numeric Dollars and Cents: \$ _____.

Price Written in Words: _____

BID SCHEDULE (Continued)

BID ALTERNATES:

The following bid alternates may be selected and removed (as applicable) from the base bid(s) at the discretion of the City:

Bid Alternate 1 - Deduct Stainless Steel Air Piping and Substitute Galvanized

The following value shall be deducted from the Base Bid value to substitute stainless steel air piping for compatible galvanized piping as recommended by the supplier including all applicable modifications and requirements. (LS) \$ _____

Bid Alternate 2 – Deduct Actuators for Fluid Control

The following value shall be deducted from the Base Bid value to deduct the actuators that are related to fluid control (not air). Electrical shall be stubbed to junction boxes near valve locations for future use: (LS) \$ _____

Bid Alternate 3 - Deduct Monitoring Equipment

The Base Bid Item provided for Monitoring Equipment shall be deducted from the contract value per the amount provided in the Base Bid schedule.

Bid Alternate 4 – Aeration System

The following value shall be deducted from the Base Bid value to deduct the aeration system, including, but not limited to all blowers, piping, valves, diffusers and piping. Electrical shall be provided as needed for lift station power, fluid related valves, and lighting with other power stubbed to junction boxes near the blower pad location for future use: (LS) \$ _____

Bid Alternate 5 – Asphalt Paving

The following value shall be deducted from the Base Bid value to deduct the proposed asphalt paving and provide a 6" aggregate surface: (LS) \$ _____

UNIT PRICING:

The selected contractor after bid award shall provide a schedule of values that may be used for change orders, if needed, consisting of the various project pipe, valves, and fitting items and generally totaling to the bid value.

MATERIALS & EQUIPMENT

Each BIDDER shall fill in the following schedule of select materials and equipment that they intend to provide as a part of their bid. BIDDERS are advised that only the equipment and material specified or approved by Addenda should included in the Bid. Alternate or equal equipment and materials may be submitted to the ENGINEER until ten (10) days prior to the date of the Bid Opening (or per the substitute process after the bid).

<u>Item</u>	<u>Manufacturer</u>
Aeration System:	_____
Diffusers:	_____
Blowers:	_____
Pumps:	_____

ACKNOWLEDGEMENT:

The following signed bidder agrees to enter into a contract after acceptance of this bid in accordance with this bid form and the contract documents, and further agrees to complete all work covered by this bid in accordance with the specified requirements and within the amount of time indicated in the contract effective from the Notice to Proceed or to pay liquidated damages as provided in the General Conditions and Contract Documents.

Bidder understands that the City reserves the right to reject any or all bids and to waive any informalities in the bidding.

The bidder agrees that this bid shall be good and may not be withdrawn for a period of 60 calendar days after the scheduled closing time for receiving bids. Upon receipt of written notice of the acceptance of this bid, Bidder will execute the formal contract attached within 10 days and deliver a Surety Bond or Bonds as required by the General conditions and in conformance with the contract documents. The bid security attached is to be forfeited by the Bidder in the event the contract and bond are not executed within the time set forth as liquidated damages for the delay and additional expense to the City caused thereby.

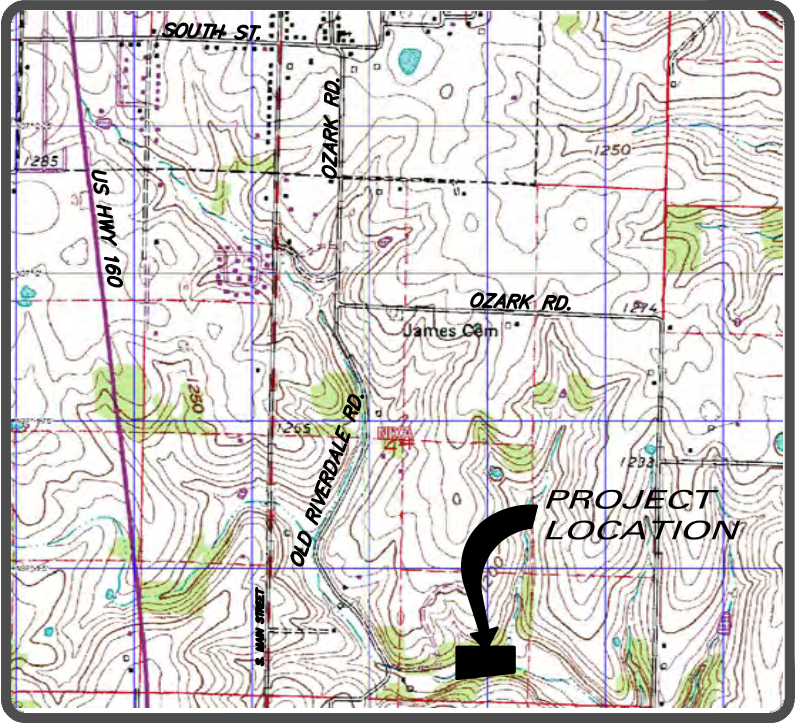
Dated on this _____ day of _____, _____

Signature Of Bidder:

If an Individual: _____, doing
business as _____.
(Print Name)

If a Partnership: _____
By _____, partner.

If a Corporation: _____
By _____
Title _____ (SEAL)



LOCATION MAP

SW 1/4, SW 1/4, SW 1/4, SEC. 24, TWP. 27N, R10E, 22W
CHRISTIAN COUNTY, MISSOURI
UTM COORDINATES: 474491 / -4097463
PHYSICAL ADDRESS: 972 OLD RIVERDALE ROAD
NIXA, MISSOURI 65714

T.B.M.

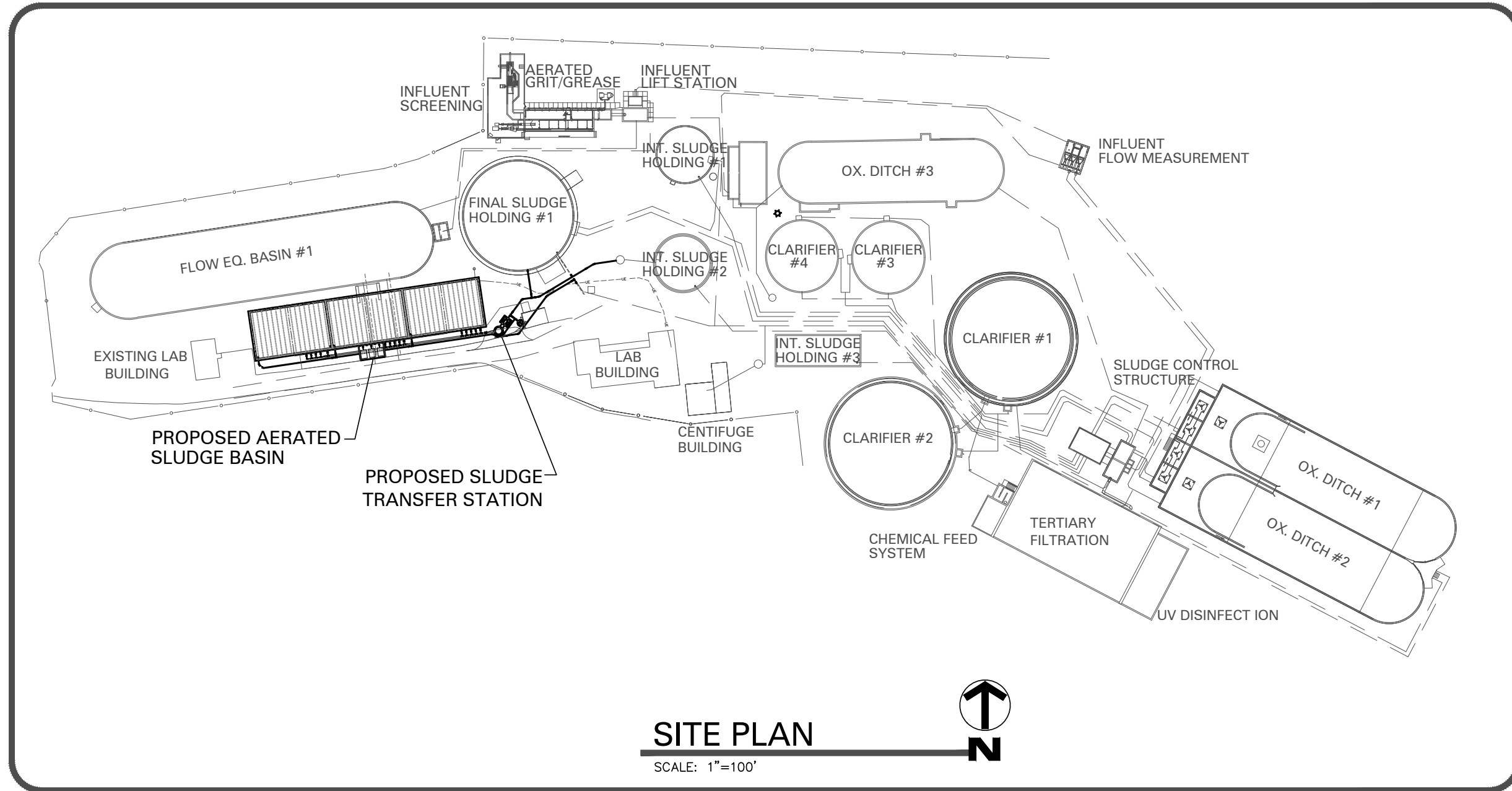
CONTROL POINTS ARE AS SHOWN IN SITE PLAN OR PROVIDED BY THE ENGINEER.

LEGEND

● CP	CONTROL POINT	---	PROPERTY LINE
● P	FOUND IRON PIN	---	SANITARY SEWER
○ P	SET IRON PIN	---	STORM SEWER
△	RIGHT-OF-WAY MARKER	---	TELEPHONE LINE
○ P	POWER POLE W/ GUY	---	UNDERGROUND TELEPHONE
○ MH	MANHOLE	---	GAS LINE
○ SC	SEWER CLEANOUT	---	WATER LINE
○ GM	GAS METER	---	ELECTRIC LINE
○ LP	LIGHT POLE	---	UNDERGROUND ELECTRIC
○	SIGN	---	FENCE LINE
○ WM	WATER METER	---	RETAINING WALL
○ WV	WATER VALVE	---	LINE LABELS
○ GV	GAS VALVE	---	TREELINE
○ FH	FIRE HYDRANT	---	BUSH
○ TR	TELEPHONE RISER	---	ER ELECTRICAL RISER
○	BUMPER POST	---	TS TRAFFIC SIGNAL BOX
■	GRATE INLET	---	MB MAIL BOX

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL ELEVATIONS, GRADES, & LOCATIONS. COORDINATE ANY CONFLICTS BETWEEN THE PROPOSED WORK AND PLANS WITH THE ENGINEER.
2. THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING, AND SAFETY CONCERNS ASSOCIATED WITH THIS PROJECT DURING CONSTRUCTION, UNLESS SPECIFICALLY ADDRESSED OTHERWISE IN THIS PLAN OR ELSEWHERE IN THE CONTRACT.
3. DURING WORK, THE CONTRACTOR SHALL HAVE ON SITE A SET OF APPROVED PLANS FILED AND A COMPETENT SUPERINTENDENT, FOREMAN OR AGENT CAPABLE OF READING AND THOROUGHLY UNDERSTANDING THE PROJECT PLANS AND SPECIFICATIONS, THOROUGHLY EXPERIENCED IN THE TYPE OF WORK BEING PERFORMED, AND WHO MAY RECEIVE INSTRUCTIONS FROM THE ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.
4. CONSTRUCTION METHODS AND MATERIALS SHALL CONFORM TO THE PROJECT DOCUMENTS AND THE LATEST REVISIONS OF THE STANDARD GENERAL CONDITIONS AND TECHNICAL SPECIFICATIONS FOR CONSTRUCTION FOR THE CITY OR UTILITY AND PER STATE OR OTHER APPLICABLE AGENCY GUIDELINES, UNLESS OTHERWISE NOTED.
5. APPLICABLE PERMITS MUST BE OBTAINED BY THE CONTRACTOR & AT THE CONTRACTOR'S EXPENSE FROM THE CITY, STATE AND COUNTY PRIOR TO EXCAVATION WITHIN ANY RIGHT-OF-WAY, AND PRIOR TO ANY CONSTRUCTION.
6. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF ANY UNDERGROUND UTILITIES OR OTHER OBSTRUCTIONS AND TO BE LIABLE FOR DAMAGE AND CONSEQUENT REPAIR TO SUCH IN THE COURSE OF HIS OPERATIONS. UTILITY LOCATIONS SHOWN HEREIN ARE APPROXIMATE AND BASED ON INFORMATION FROM OTHERS THAT MAY BE INACCURATE. CONTRACTOR TO VERIFY ALL UTILITY LOCATIONS AND ARRANGE FOR LOCATES BY APPLICABLE ENTITIES. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND/OR FACILITIES CAUSED DURING THEIR CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES FOR THE LOCATION OF ALL UTILITY SERVICES PRIOR TO BEGINNING ANY EXCAVATION OR CONSTRUCTION, AND SHALL BE RESPONSIBLE FOR THE PRESERVATION OF ALL BURIED UTILITY LINES.
7. THE QUANTITIES AND SITE CONDITIONS DEPICTED IN THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE GENERAL AND SUBJECT TO OMISSIONS. THE CONTRACTOR SHALL SATISFY THEMSELVES AS TO ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THIS PLAN OR PERFORMING WORK.
8. VERTICAL BENDS ARE NOT SHOWN. CONTRACTOR SHALL PROVIDE WITH THRUST BLOCKS WHERE REQUIRED AND COORDINATE COSTS WITH OWNER. THE USE OF RESTRAINED FITTINGS MAY BE PERMITTED AND SHOULD BE APPROVED BY THE ENGINEER.
9. RESTRAINED MEGA-LUG OR SIMILAR END CAPS SHALL BE USED WHERE END CAPS ARE DESIGNATED.
10. ALL CONSTRUCTION AND EXCAVATION ACTIVITIES SHALL BE CONFINED TO EASEMENTS, ROAD RIGHT-OF-WAYS, AND/OR WORK AREA LIMITS WHICH ARE APPROXIMATELY SHOWN ON THESE DRAWINGS & SHALL BE FIELD VERIFIED BY THE CONTRACTOR. IF ANY WORK OR ACCESS TO ANY ADJOINING PROPERTY IS DONE, IT IS THE FULL RESPONSIBILITY OF THE APPLICANT/OWNER TO OBTAIN PROPER RELEASES FROM ADJOINING PROPERTY OWNERS AND ASSUME ALL LIABILITY FOR ACTION TAKEN DURING ALL CONSTRUCTION.
11. ALL AREAS DISTURBED BY CONSTRUCTION, NOT PAVED, SHALL BE TOP SOILED, FINISH GRADED, SEEDED, AND MULCHED IN ACCORDANCE WITH THE CURRENT REQUIREMENTS OF THE CITY AND TYPICAL STANDARDS FOR PUBLIC IMPROVEMENTS.
12. THE CONTRACTOR AND/OR BUILDER WILL KEEP THE WORK AREA NEAT AND ORDERLY AT ALL TIMES WHILE CONSTRUCTION IS TAKING PLACE. ALL CITY STREETS ADJACENT TO THE PROJECT SHALL BE KEPT CLEAR OF MUD, ROCK, DIRT, DEBRIS, PAPER AND WASTE MATERIAL AT ALL TIMES. THE PROPER AMOUNT OF INSPECTION SHALL BE CALLED FOR AT THEIR PROPER TIMES, OR ANY AND ALL WORK MAY BE REJECTED.
13. THE REMOVAL OF ANY TREES OR IMPROVEMENTS SHALL BE APPROVED BY THE OWNER PRIOR TO REMOVAL.
14. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE ANY EXISTING STREET, CURB AND GUTTER, SIDEWALK AND DRIVEWAYS AND PROMPTLY REPAIR ANY DAMAGE THERETO.
15. THE CONTRACTOR, AS PART OF THEIR BID COST, SHALL REMOVE, PRESERVE, AND RESET ALL FENCES, POSTS, CULVERTS, SIGNS, STREET MARKERS, MAILBOXES, AND THE LIKE WITHIN THE LIMITS OF THE PROPOSED IMPROVEMENTS. ALL MAIL BOXES, SIGNS, OR OTHER IMPROVEMENTS DISTURBED/DISPLACED BY CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AND REPLACED WITHIN ANY CHANGES IN POSITION APPROVED BY OWNER/ENGINEER.
16. ALL MANHOLE FRAMES AND COVERS, WATER AND GAS VALVE BOXES AND LIDS, ETC. SHALL BE SET OR ADJUSTED TO MATCH FINISHED GRADE ELEVATION AND SLOPE. CONTRACTOR TO FIELD VERIFY ELEVATIONS & REQUIREMENTS.
17. FINAL GRADES & SLOPES SHALL BE FIELD ADJUSTED SO THAT ALL CULVERTS, PIPES, & GRASS SURFACES DRAIN TO DAYLIGHT. GRASS SLOPES SHALL BE 1% MIN. & NOT MORE THAN 3:1.
18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EROSION CONTROL FOR THE PROJECT PER THE PROJECT SWPPP (WHERE APPLICABLE) OR OTHER RELATED REQUIREMENTS.
19. ALL DISTURBED AREAS TO BE SEEDED SHALL BE HYDRO-SEEDED AND MULCHED.
20. CONTRACTOR TO PROVIDE MIN. 3" TOPSOIL OVER DISTURBED AREAS.
21. ALL TRENCHES, WHICH LIE UNDER PROPOSED PAVEMENT OR LIE WITHIN TWO FEET OF THE BACK OF CURB SHALL BE BACKFILLED TO PAVEMENT SUBGRADE WITH CLEAN COMPACTED GRANULAR MATERIAL.
22. TESTING OF CONTROLLED STRUCTURAL FILL, OBSERVATION OF EXCAVATIONS AND COMPACTION OF SUBGRADE SHALL BE DONE BY A QUALIFIED GEOTECHNICAL CONSULTANT PER PROJECT SPECIFICATIONS AND APPLICABLE REQUIREMENTS SUCH AS CITY OR OTHER).
23. CONTRACTOR SHALL DISPOSE OF ALL MATERIALS PER APPLICABLE REQUIREMENTS AND SHALL OBTAIN ANY REQUIRED PERMITS.
24. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE AND MAINTAIN ALL PROJECT WARNING SIGNS AND MEET ALL THE REQUIREMENTS OF MOTOR OR OTHER APPLICABLE AUTHORITY. BARRIERS & TEMPORARY SIGNAGE SHALL BE PROVIDED AS REQUIRED TO LIMIT ACCESS DURING CONSTRUCTION.
25. ALL TRAFFICWAYS, INCLUDING DRIVEWAYS, ALLEYWAYS, ETC., SHALL REMAIN ACCESSIBLE TO RESIDENTIAL AND EMERGENCY VEHICLES THROUGHOUT PROJECT DURATION. FIELD COORDINATE PRIOR TO BEGINNING CONSTRUCTION.
26. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ORDERING/DELIVERY AND STORAGE OF MATERIALS.
27. STAKING MAY BE REQUESTED FROM THE ENGINEER WITH ONE SET OF STAKES PROVIDED AT OWNERS EXPENSE WHEN APPROVED. RESTAKING WILL BE AN OBLIGATION OF THE CONTRACTOR.



SHAFFER & HINES
CONSULTING ENGINEERS - REGISTERED LAND SURVEYORS

P.O. Box 493, Nixa, Missouri, 65714
Tel: (417) 725-4663 - Fax: (417) 725-5230

SHEET INDEX

SHEET NO.	DESCRIPTION
1.	COVER SHEET
2.	SITE LAYOUT PLAN
3.	DEMOLITION PLAN
4.	SITE GRADING
5.	SPOT ELEVATION PLAN
6.	SPOT ELEVATION PLAN
7.	PAVING PLAN
8.	SLUDGE BASIN LAYOUT
9.	DIMENSION PLAN
10.	AERATION LAYOUT
11.	SLUDGE BASIN FLUID PIPING
12.	DEWATERING DETAILS
13.	SITE PIPING 1
14.	SITE PIPING 2
15.	LIFT STATION
16.	DETAILS
17.	STRUCTURAL PLAN
18.	ELECTRIC PLAN

GENERAL EQUIPMENT NOTE

THE EQUIPMENT AND ELEVATIONS INDICATED ON THE DRAWINGS IS BASED ON SIMILAR EQUIPMENT PROVIDED BY VARIOUS MANUFACTURERS. ANY DEVIATION WHICH WOULD REQUIRE A REVISION TO ANY STRUCTURES OR RESULT IN A SIGNIFICANT CHANGE TO THE HYDRAULIC PROFILE WILL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

CAUTION

EXISTING UNDERGROUND INSTALLATIONS SUCH AS WATER MAINS, GAS MAINS, SEWERS, TELEPHONE LINES, FIBER OPTIC LINES, POWER LINES AND BURIED STRUCTURES ARE INDICATED ON THE DRAWINGS ONLY TO THE EXTENT SUCH INFORMATION HAS BEEN MADE AVAILABLE TO OR DISCOVERED BY THE ENGINEER/SURVEYOR IN PREPARING THESE DRAWINGS. THERE IS NO GUARANTEE AS TO THE ACCURACY OR COMPLETENESS OF SUCH INFORMATION.

SAFETY NOTICE TO CONTRACTOR

1. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
2. THE DUTY OF THE ENGINEER OR OWNER TO CONDUCT CON-STRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE.

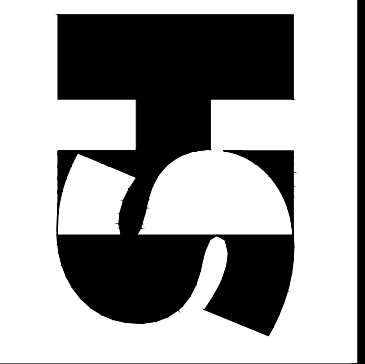
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MISSOURI ONECALL SYSTEM
www.moi1call.com

SLUDGE STORAGE BASIN IMPROVEMENTS
NIXA WASTEWATER TREATMENT PLANT
NIXA MISSOURI
Nixa, Christian County, Missouri

PRELIMINARY
FOR REVIEW
ONLY

SHAFFER & HINES, INC.
CERTIFICATE OF AUTHORITY
LICENSE NO. 001665

SHAFFER & HINES
CONSULTING ENGINEERS - REGISTERED LAND SURVEYORS
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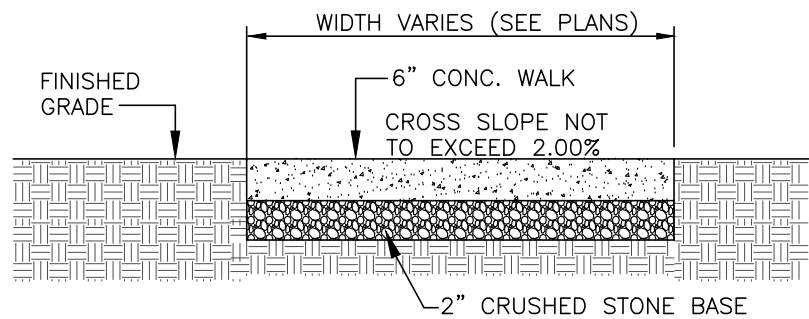
COVER SHEET

DESIGN BY GWS/AN
DRAWN BY GWS/AN
CHKD BY AN/CMH
DATE MARCH 2025
SCALE AS SHOWN

REVISIONS

JOB NO. 242004

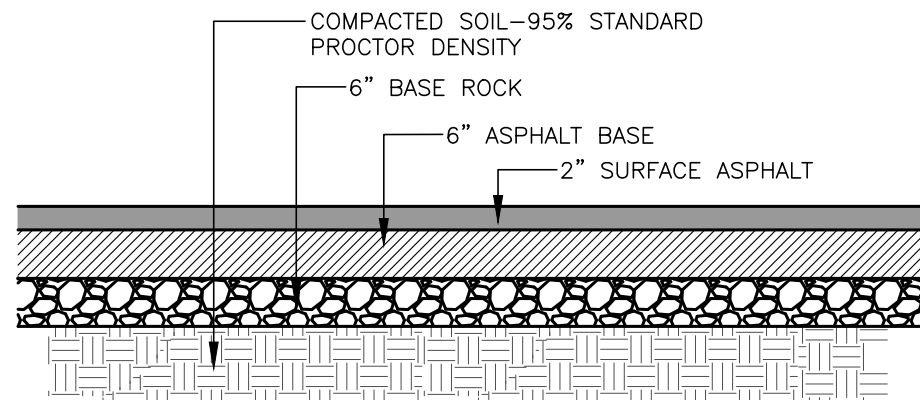
SHEET 1



NOTES:
1. SAWED CONTROL JOINTS SHOULD BE PLACED EVERY 5' AND SHALL BE 1/4" WIDE (MIN.) AND 1" DEEP. REFERENCE ARCHITECT PLAN FOR EXACT LAYOUT.
2. EXPANSION JOINTS ARE TO BE SET EVERY 50' (TYP.) WITH 2" EXPANSION MATERIAL AND BE FLUSH WITH THE TOP OF THE WALK. MATERIAL SHALL BE SAME DEPTH AS SIDEWALK. EXPANSION JOINTS SHALL ALSO BE PLACED WHERE SIDEWALK ABUTS TO OTHER STRUCTURES.

CONCRETE SIDEWALK SECTION:

NOT TO SCALE



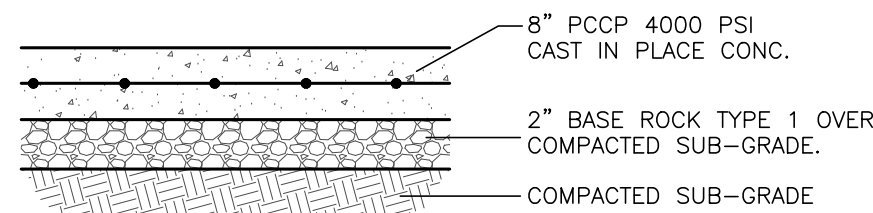
STANDARD ASPHALT PAVEMENT SECTION:

NOT TO SCALE

PAVING NOTES:

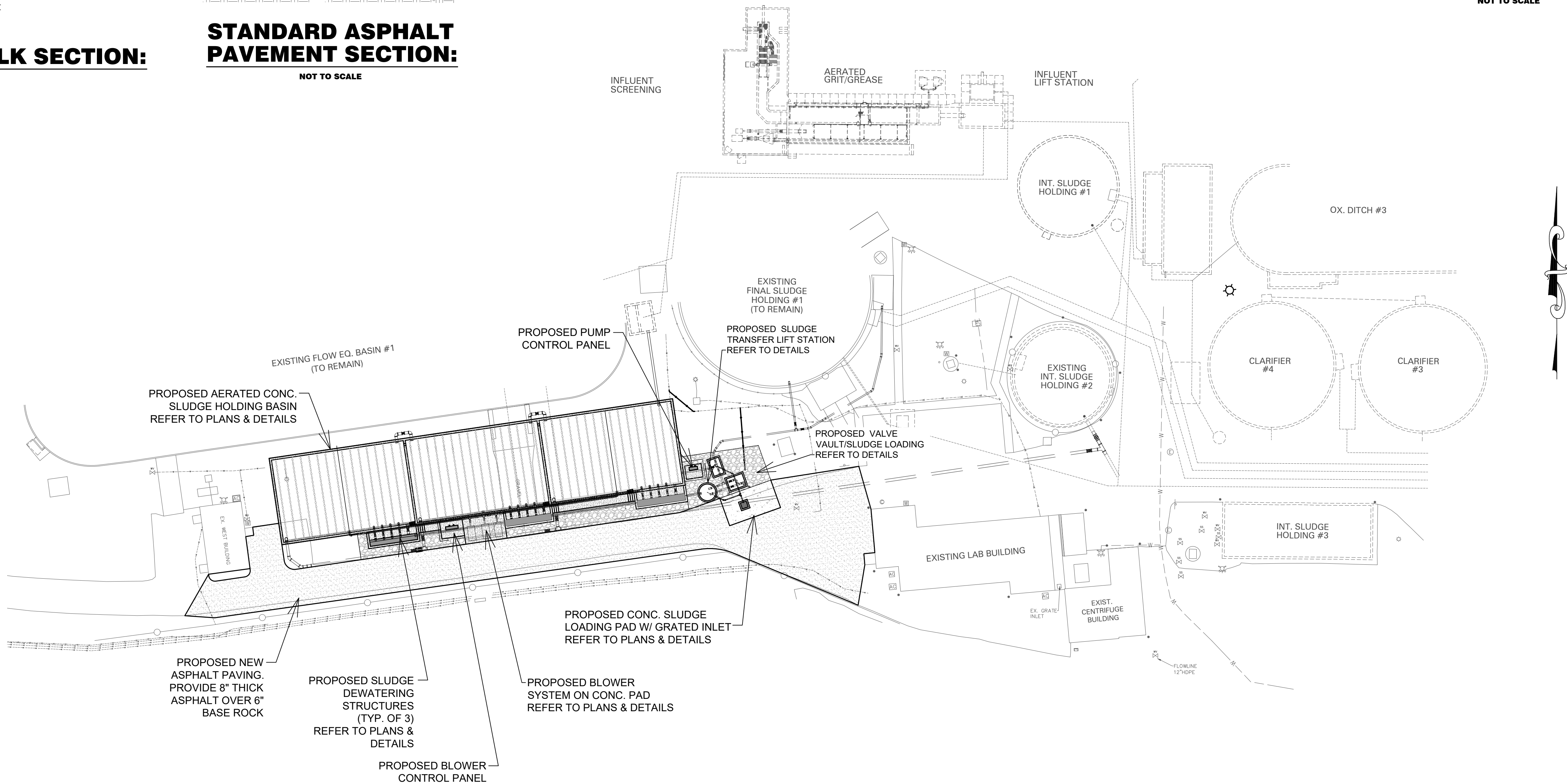
1. ALL ASPHALT PAVEMENT, CONCRETE, AND BASE ROCK SHALL BE PER CITY OF NIXA TECHNICAL SPECIFICATIONS.

NOTE:
PROVIDE CONTROL JOINTS WITH SEALANT AT MAX. OF 12'-0" C.C. AND EXPANSION JOINTS AT MAX. 48'-0" O.C. IN ALL CONC. PAVING LOCATIONS.

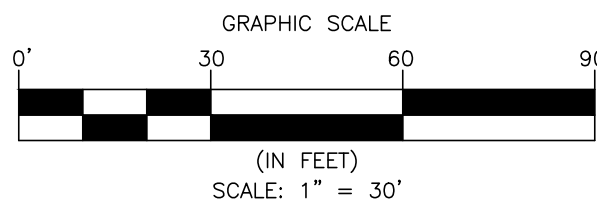


STANDARD CONCRETE SECTION:

NOT TO SCALE



1 GENERAL LAYOUT



HATCH LEGEND:

	AREA OF ASPHALT
	AREA OF CONCRETE
	AREA OF LANDSCAPE GRAVEL

GENERAL LAYOUT NOTES

- REFER TO OTHER SHEETS, DETAILS AND SPECIFICATIONS FOR MORE DETAILED REQUIREMENTS AND INFORMATION.
- THIS SHEET IS GENERAL PROJECT INFORMATION. LOCATIONS SHOWN HEREIN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED. SPECIFIC SHEETS & DETAILS FOR RELATED ITEMS SHALL TAKE PRECEDENCE OVER THE GENERAL INFORMATION INDICATED HEREIN.
- THE LOCATION OF ALL EXISTING AND PROPOSED IMPROVEMENTS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. LOCATIONS INDICATED ON THE PLANS ARE APPROXIMATE AND ARE SUBJECT TO INACCURACIES AND/OR OMISSIONS. UTILITIES SHOWN ARE APPROXIMATE AND NOT ALL MAY BE INDICATED. CONTRACTOR SHALL VERIFY LOCATION WITH CITY AND BY FIELD INVESTIGATION.
- CONNECTIONS TO EXIST. STRUCTURES AND PIPING SHALL BE FIELD ADJUSTED AND COORD. WITH CITY PERSONNEL. INTERRUPTION TO EXIST. PLANT OPERATIONS SHALL BE MINIMIZED AS MUCH AS POSSIBLE.
- ALL DISTURBED AREAS ARE TO BE RESTORED. FINAL SURFACES SHALL BE GRADED TO DRAIN.
- EROSION CONTROL IS NOT FULLY SHOWN, BUT SHALL BE PROVIDED AS NEEDED TO CONTAIN SEDIMENT ON SITE AND PROTECT ADJACENT AREAS. REFER TO GENERAL LAYOUT HEREIN AND RELATED NOTES AND DETAILS.

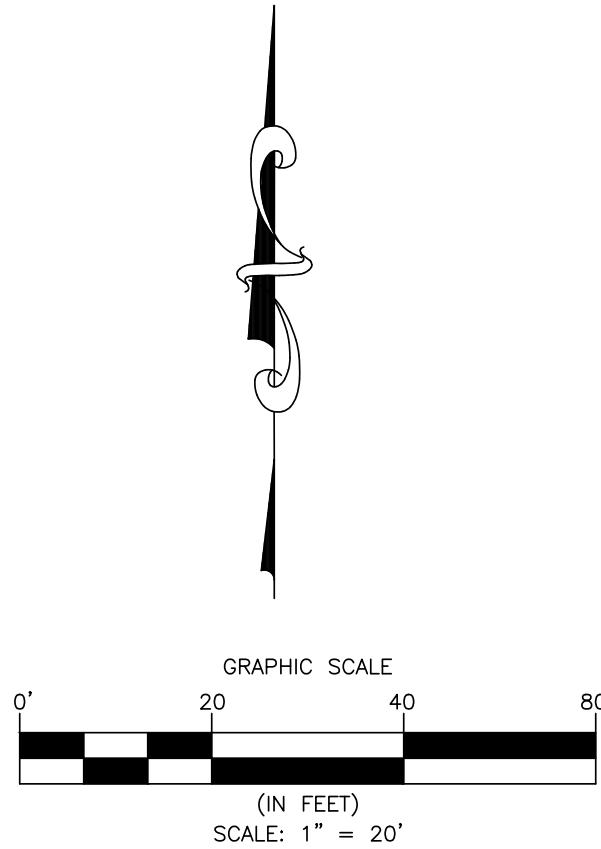
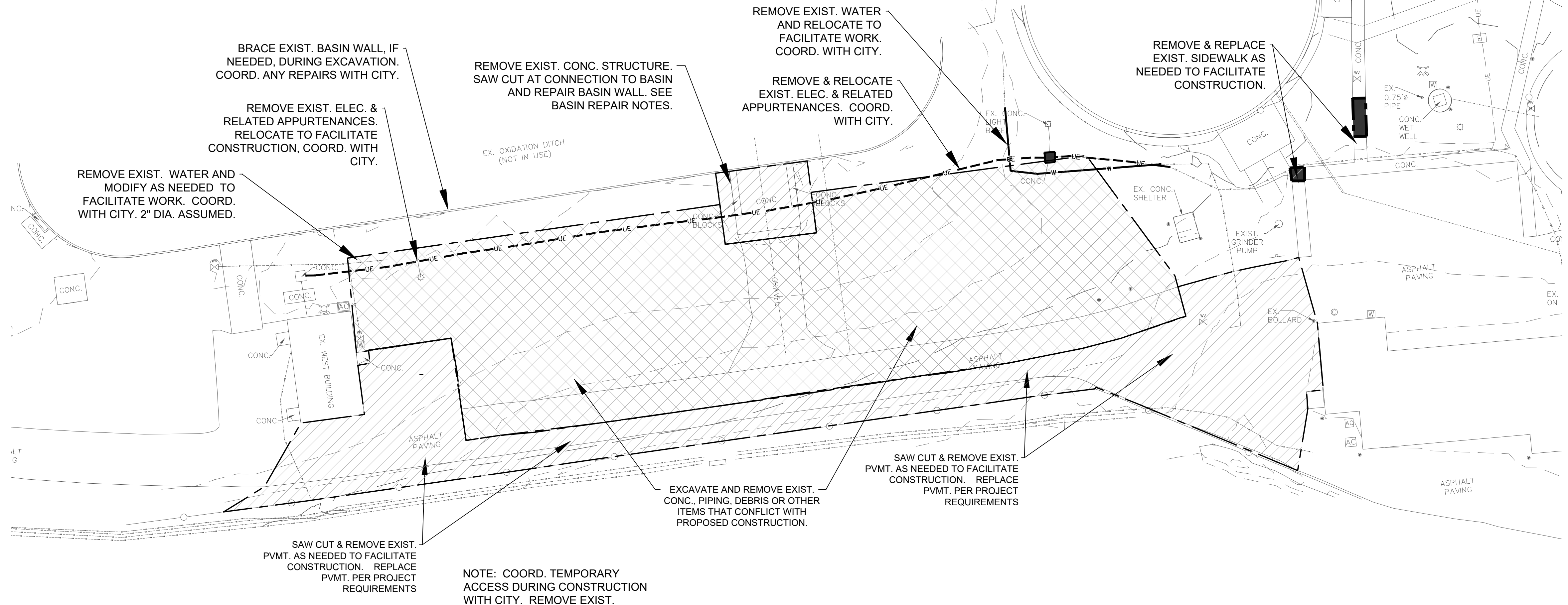
SAFETY NOTES:

- IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
- THE DUTY OF THE ENGINEER OR OWNER TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE.

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NOTE: AREA OF PROPOSED CONSTRUCTION IS IN PART UPON PREVIOUSLY DISTURBED GROUND WITH REMNANTS OF PRIOR BASINS THAT WERE PARTIALLY COLLAPSED AND BURIED TO ABANDON IN PLACE. CONTRACTOR SHALL FIELD VERIFY REQUIREMENTS AND REMOVE MATERIALS AS NEEDED TO FACILITATE WORK. CUT AND CAP/SEAL ANY EXIST. PIPING. SOME DISPOSAL MAY OCCUR ON ADJACENT CITY LAND TO THE NORTH. COORD. ALL WITH CITY.



DEMOLITION NOTES

1. REFER TO OTHER SHEETS, DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION & PROPOSED IMPROVEMENTS. THIS SHEET IS GENERAL IN NATURE. LOCATIONS & CONDITIONS SHOWN HEREIN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED.
2. UTILITIES SHOWN ARE APPROXIMATE IN LOCATION AND NOT ALL MAY BE INDICATED OR REFLECTED ACCURATELY. CONTRACTOR SHALL VERIFY LOCATIONS WITH CITY AND BY FIELD INVESTIGATION.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND PROPER DISPOSAL OF ALL REMOVED MATERIALS AND ITEMS PER APPLICABLE REGULATIONS AND GUIDELINES. NOTE THAT PROJECT DOCUMENTS ARE NOT INTENDED TO COVER ALL APPLICABLE PROCEDURES OR REQUIREMENTS RELATED TO DEMOLITION AND THE CONTRACTOR WILL NEED TO FIELD VERIFY THE ITEMS TO BE REMOVED AND REQUIREMENTS RELATED THERETO. ANY ITEMS BELIEVED TO BE TOXIC OR HAZARDOUS IN NATURE SHALL BE REVIEWED WITH THE CITY AND DISPOSED PER APPLICABLE GUIDELINES.
4. EQUIPMENT AND ALL ITEMS REMOVED SHALL BE OFFERED TO THE CITY AND DELIVERED TO A LOCATION DESIGNATED. ANY MATERIALS NOT ACCEPTED BY THE CITY SHALL BE DISPOSED BY THE DEVELOPER.
5. DISTURBED AREAS SHALL BE REPAIRED AND RESTORED. FINAL SURFACES SHALL BE FIELD ADJUSTED TO DRAIN.
6. PROVIDE NEW PAVEMENT SURFACES PER DETAILS AND PROJECT DOCUMENTS. OTHER SURFACES SHALL BE STABILIZED AND SEEDED AND MULCHED. A MINIMUM OF 2' OF CLEAN EARTHEN MATERIAL SHALL BE PROVIDED IN UNPAVED AREAS WITH TOP SOIL PER SPECIFICATIONS.
7. INTERRUPTION TO EXIST. PLANT OPERATIONS SHALL BE MINIMIZED AS MUCH AS POSSIBLE. EQUIPMENT AND FACILITIES REQUIRED FOR PLANT OPERATION SHALL REMAIN IN SERVICE UNTIL NEW FACILITIES ARE APPROVED AND OPERATIONAL OR AS APPROVED BY CITY.
8. EROSION CONTROL IS NOT FULLY SHOWN, BUT SHALL BE PROVIDED AS NEEDED TO CONTAIN SEDIMENT ON SITE AND PROTECT ADJACENT AREAS.

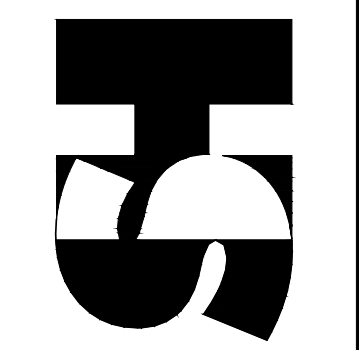
1 GENERAL DEMOLITION LOCATIONS

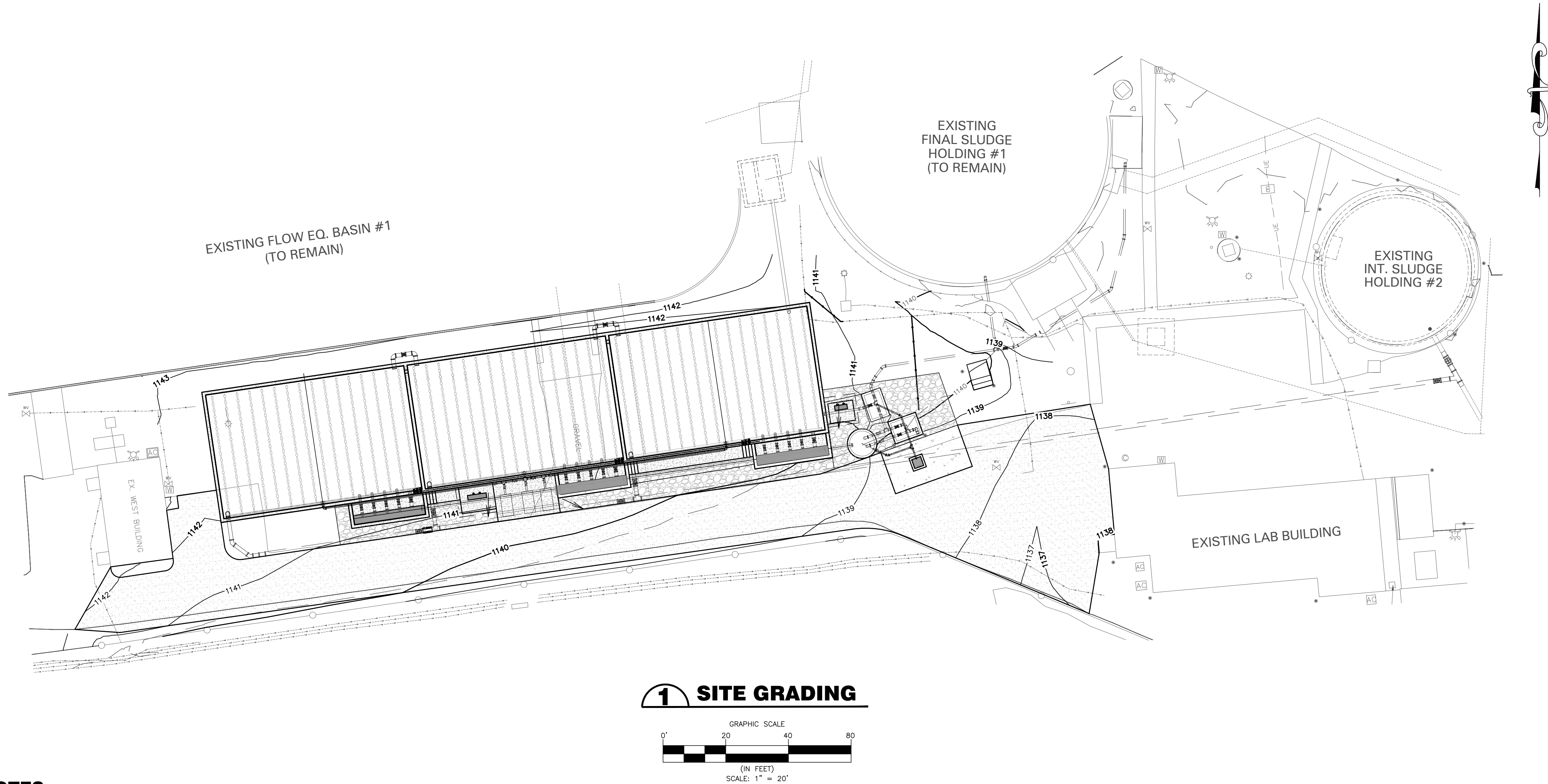
SAFETY NOTES:

1. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
2. THE DUTY OF THE ENGINEER OR OWNER TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE.



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GENERAL SITE GRADING NOTES

1. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL FIELD VERIFY EXIST. CONDITIONS INCLUDING THE LOCATION OF EXISTING IMPROVEMENT AND UTILITIES. ANY ADJUSTMENTS IN WORK SHALL BE COORDINATED WITH THE ENGINEER AND OWNER.
2. TOPOGRAPHIC INFORMATION, CONTOURS, LOCATIONS, AND ELEVATIONS SHOWN HEREIN BASED, IN PART, ON INFORMATION PROVIDED BY OTHERS AND SUBJECT TO ANY INACCURACIES OR OMISSIONS THEREIN. RELATED INFORMATION IS GENERAL AND APPROXIMATE IN NATURE. CONTRACTOR SHALL FIELD VERIFY GRADES.
3. TO REFER TO OTHER SHEETS, DETAILS AND SPECIFICATIONS FOR MORE DETAILED REQUIREMENTS AND INFORMATION.
4. THIS SHEET IS GENERAL PROJECT INFORMATION AND SPECIFIC SHEETS & DETAILS FOR RELATED ITEMS SHALL TAKE PRECEDENCE OVER THE GENERAL INFORMATION INDICATED HEREIN.
5. THE LOCATION OF PROPOSED IMPROVEMENTS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR WITH THE ENGINEER.
6. UTILITIES ARE LOCATED IN THE PROJECT AREA INCLUDING THOSE THAT ARE CONFLICT WITH PROPOSED WORK. LOCATIONS SHOWN ARE APPROXIMATE AND NOT ALL UTILITIES ARE INDICATED. CONTRACTOR SHALL VERIFY LOCATION WITH OWNER AND BY FIELD INVESTIGATION.
7. RELOCATIONS OF EXIST. STRUCTURES AND PIPING SHALL BE FIELD ADJUSTED AND COORD. WITH THE ENGINEER AND OWNER.
8. INTERRUPTION TO EXIST. PLANT OPERATIONS SHALL BE MINIMIZED AS MUCH AS POSSIBLE.
9. CONTRACTOR IS RESPONSIBLE FOR THE HAULING, HANDLING AND TRANSPORT OF ALL MATERIALS INCLUDING ALL PERMITS AND COSTS OR COORDINATION RELATED THERETO.
10. FILL SHALL BE FROM AN APPROPRIATE SOURCE, SUITABLE FOR CONSTRUCTION, FREE OF DEBRIS, AND COMPACTED AS REQUIRED.
11. STRUCTURAL FILL SHALL BE PLACED IN LIFTS OF NOT TO EXCEED 8".
12. ANY REMOVED CUT OR EXCESS MATERIAL SHALL BE DISPOSED OF BY THE CONTRACTOR PER APPLICABLE REQUIREMENTS.
13. STORAGE AND/OR DISPOSAL OF MATERIALS ONSITE MAY BE POSSIBLE, BUT IS SUBJECT TO THE APPROVAL AND DISCRETION OF THE OWNER. OPTIONS, LOCATIONS, AND REQUIREMENTS SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO BIDDING OR RELATED WORK. SITES ARE TO BE MAINTAINED BY THE CONTRACTOR DURING CONSTRUCTION AND ANY SITES TO REMAIN AFTER PROJECT COMPLETION SHALL BE STABILIZED AND FINISHED AS APPROVED BY THE ENGINEER AND OWNER.
14. DEWATERING IS TO BE PROVIDED WHEN REQUIRED PER APPLICABLE REGULATIONS. DISCHARGE SHALL BE CONTROLLED AND COMPLY WITH RELATED REQUIREMENTS. SEDIMENT BEYOND APPROVED LIMITS SHOULD NOT BE DISCHARGED OFFSITE.
15. EXCAVATIONS ARE TO BE PROTECTED AND PER OSHA AND OTHER GUIDELINES.
16. SUBGRADES SHALL BE PREPARED PER SPECIFICATIONS AND AS NECESSARY FOR PROPOSED IMPROVEMENTS.
17. ALL DISTURBED AREAS SHALL BE SEEDED, MULCHED, AND/OR RETURNED TO A STATE AS GOOD OR BETTER THAN EXISTED PRIOR TO CONSTRUCTION ACTIVITIES. FINAL GRADING SHALL BE SLOPED TO DRAIN AT 1% MIN. AND 4:1 MAX. SLOPES.
18. CONTRACTOR TO PROVIDE & MAINTAIN EROSION CONTROL PER PROJECT & OWNER'S REQUIREMENTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO KEEP ROCK, MUD, AND OTHER DEBRIS FROM ACCESS STREETS CAUSED BY CONSTRUCTION EQUIPMENT THROUGHOUT THE DAY AND AT THE END OF EACH WORK DAY. EROSION CONTROL SHOULD BE PROVIDED PRIOR TO OTHER SITE WORK OR AS AUTHORIZED.
19. TOP SOIL SHALL BE REMOVED AND STOCKPILED ON SITE. EXISTING AND/OR NEW TOP SOIL SHALL BE DISTRIBUTED TO A MINIMUM DEPTH OF 2" OVER DISTURBED GROUND AND SHALL HAVE ROCKS REMOVED BEFORE BEING FINISHED WITH SEED/MULCH. CONTRACTOR SHALL HAVE CLEAN-UP COMPLETED BY SUBSTANTIAL COMPLETION WITH ONE YEAR FOLLOW-UP SERVICE EXPECTED.
20. ALL DISTURBED GRAVEL SURFACES ARE TO BE REPLACED WITH A SURFACE EQUAL OR SUPERIOR TO THAT WHICH EXISTED IMMEDIATELY PRIOR TO CONSTRUCTION AND/OR AS NOTED.
21. CONTRACTOR SHALL ALLOW FOR THE VERIFICATION OF COMPACTION OF ALL FILL IN ACCORDANCE WITH PROPOSED AREAS USE OR AS INDICATED. WHERE UNDESIGNATED, 95% STANDARD PROCTOR COMPACTION SHALL BE MET OR EXCEEDED.
22. MATERIAL INSPECTION AND TESTING SHALL BE PROVIDED AND COORDINATED BY THE CONTRACTOR USING AN APPROVED INDEPENDENT CONSULTANT FOR ALL POURED CONCRETE AND PLACED SOILS/AGGREGATES. RESULTS SHALL BE PROVIDED TO THE ENGINEER AND OWNER FOR REVIEW.



SAFETY NOTES:

1. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
2. THE DUTY OF THE ENGINEER OR OWNER TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE.

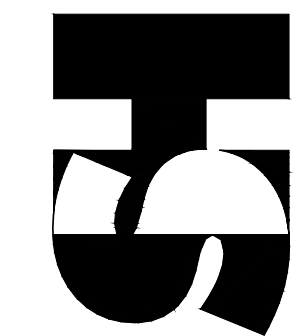
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Tel: (417) 725-4663 - Fax: (417) 725-5230
Email: chines@shaferhines.com



SITE GRADING PLAN

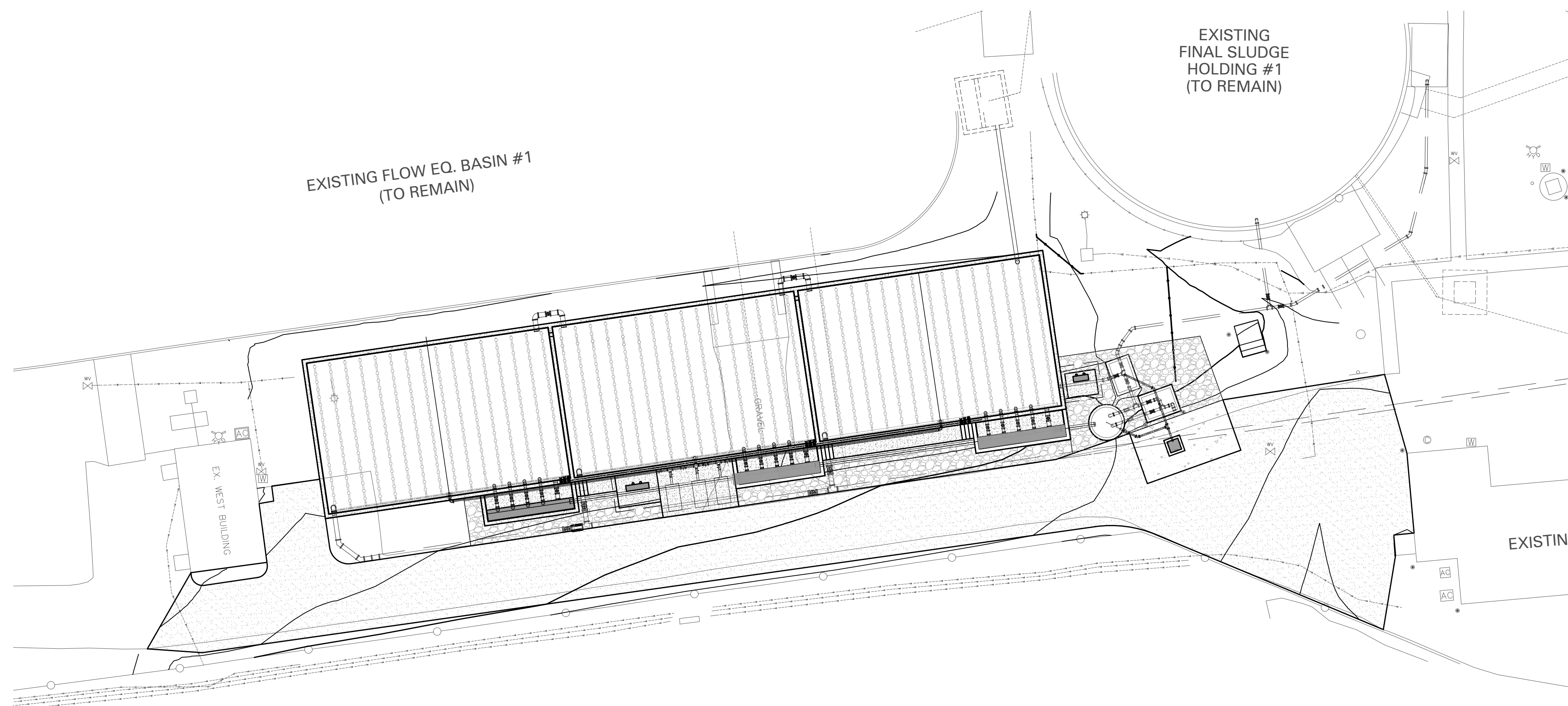
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DRAWN BY	GWS/AN
CHKD BY	AN/CMH
DATE	MARCH 2025
SCALE	AS SHOWN

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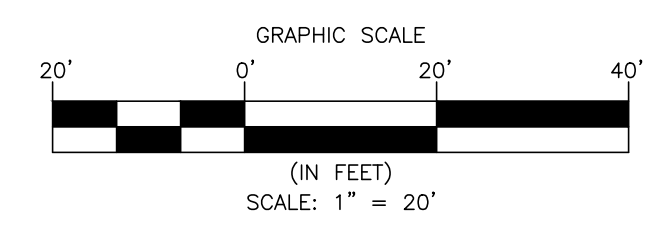
JOB NO.
242004

SHEET
4

SLUDGE STORAGE BASIN IMPROVEMENTS
NIXA WASTEWATER TREATMENT PLANT
NIXA
MISSOURI
Nixa, Christian County, Missouri



1 SITE PAVING PLAN



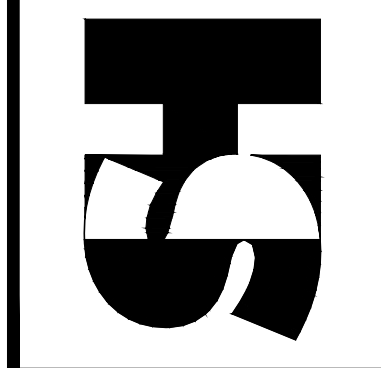
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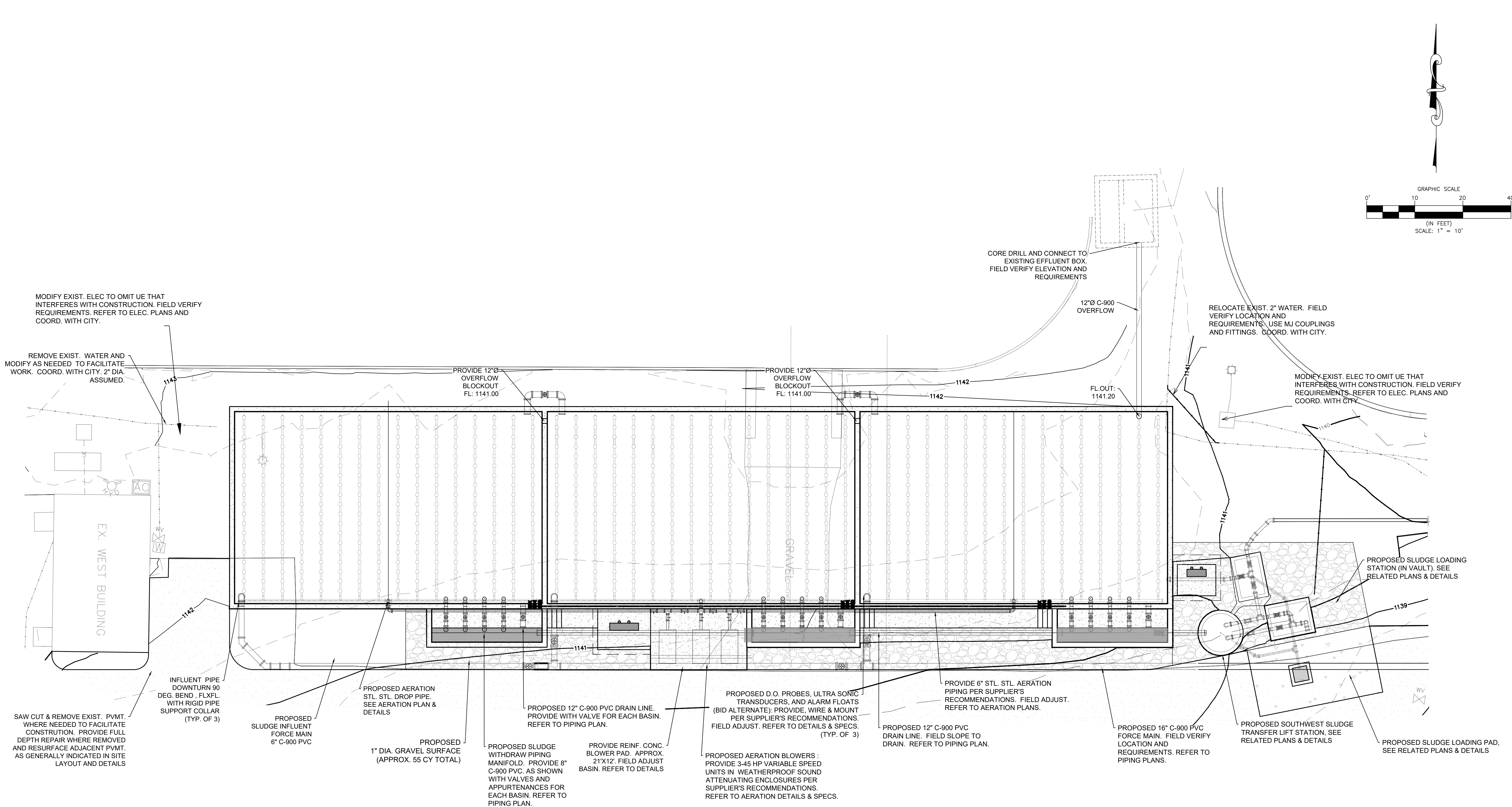
SITE PAVING PLAN

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1 SLUDGE BASIN LAYOUT

GENERAL LAYOUT NOTES

- REFER TO OTHER SHEETS, DETAILS AND SPECIFICATIONS FOR MORE DETAILED REQUIREMENTS AND INFORMATION. THIS SHEET IS GENERAL PROJECT INFORMATION. LOCATIONS SHOWN HEREIN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED. SPECIFIC SHEETS & DETAILS FOR RELATED ITEMS SHALL TAKE PRECEDENCE OVER THE GENERAL INFORMATION INDICATED HEREIN.
- THE LOCATION OF ALL EXISTING AND PROPOSED IMPROVEMENTS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. LOCATIONS INDICATED ON THE PLANS ARE APPROXIMATE AND ARE SUBJECT TO INACCURACIES AND/OR OMISSIONS. UTILITIES SHOWN ARE APPROXIMATE AND NOT ALL MAY BE INDICATED. CONTRACTOR SHALL VERIFY LOCATION WITH CITY AND BY FIELD INVESTIGATION.
- CONNECTIONS TO EXIST. STRUCTURES AND PIPING SHALL BE FIELD ADJUSTED AND COORD. WITH CITY PERSONNEL. INTERRUPTION TO EXIST. PLANT OPERATIONS SHALL BE MINIMIZED AS MUCH AS POSSIBLE.
- ALL DISTURBED AREAS ARE TO BE RESTORED. FINAL SURFACES SHALL BE GRADED TO DRAIN.
- EROSION CONTROL IS NOT FULLY SHOWN, BUT SHALL BE PROVIDED AS NEEDED TO CONTAIN SEDIMENT ON SITE AND PROTECT ADJACENT AREAS.



SAFETY NOTES:

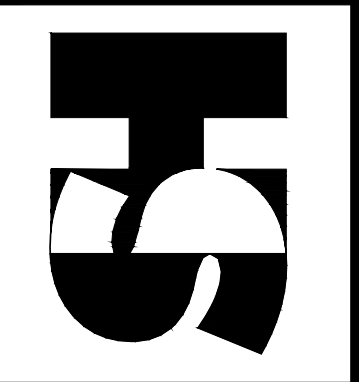
- IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
- THE DUTY OF THE ENGINEER OR OWNER TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE.

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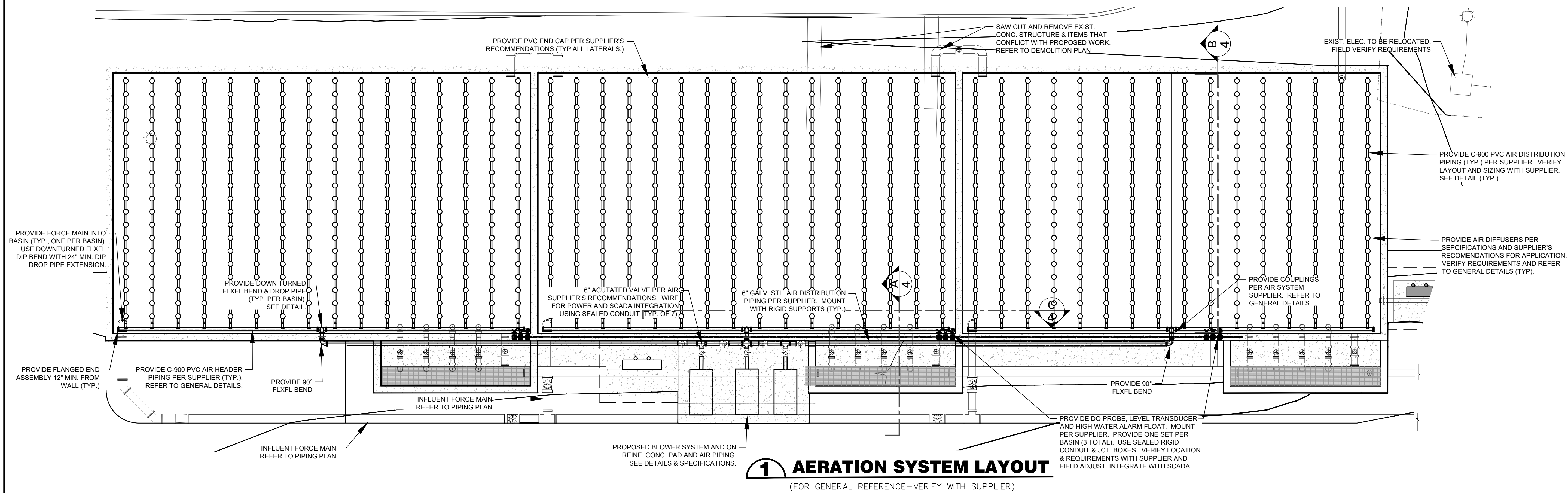
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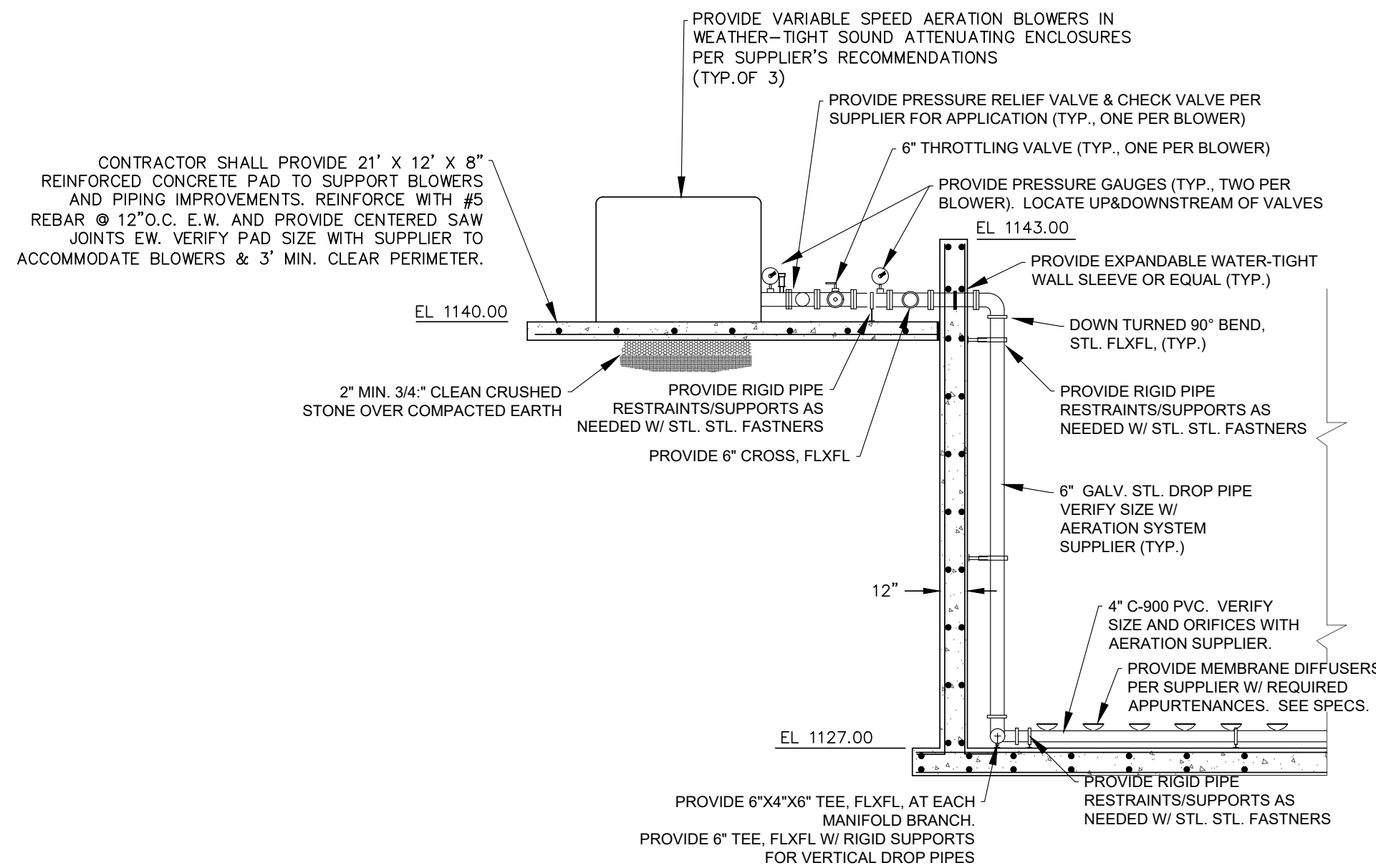


SLUDGE BASIN LAYOUT

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SHEET	8



1 AERATION SYSTEM LAYOUT
(FOR GENERAL REFERENCE—VERIFY WITH SUPPLIER)

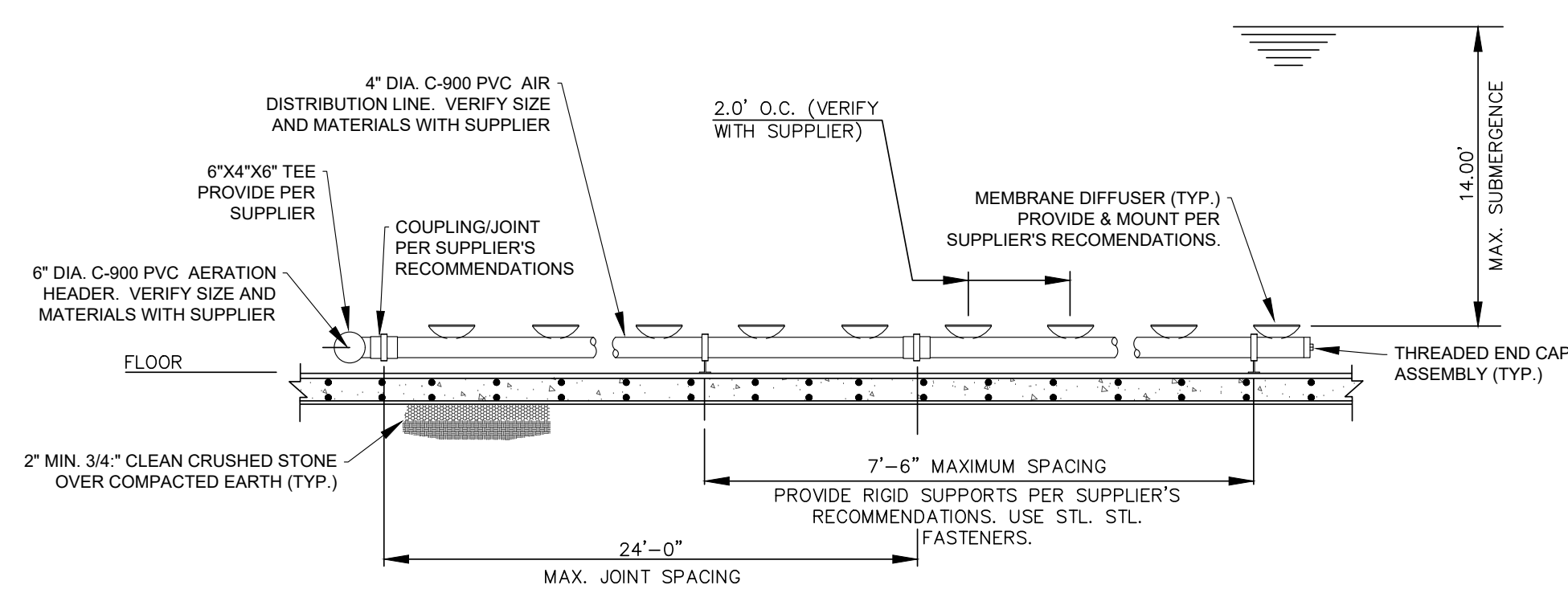


BLOWER SCHEMATIC LAYOUT
(FOR GENERAL REFERENCE—VERIFY WITH SUPPLIER)

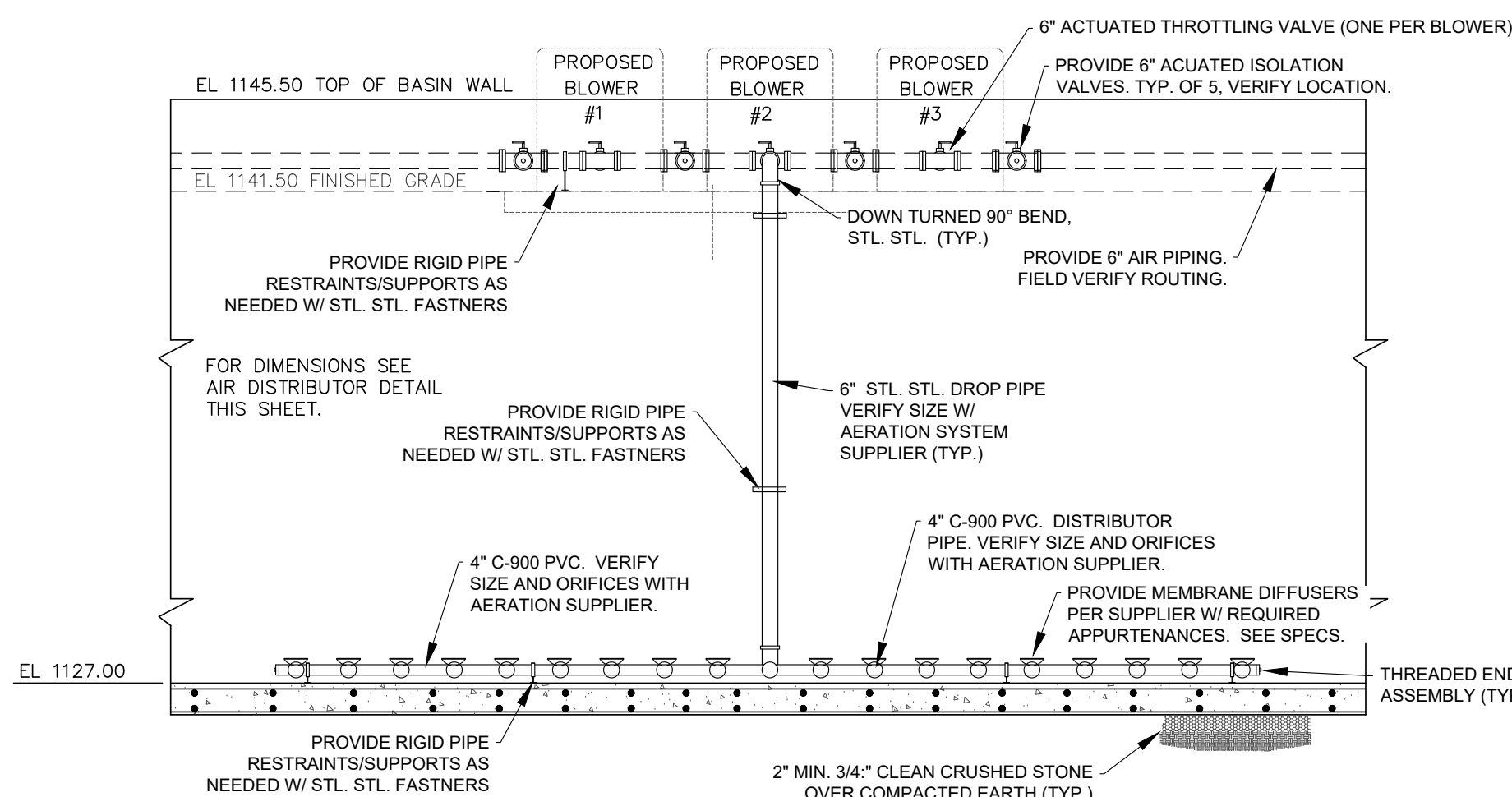
AERATION SYSTEM NOTES:

1. REFER TO OTHER SHEETS, DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION. THIS SHEET IS GENERAL IN NATURE.
2. LOCATIONS & CONDITIONS SHOWN HEREIN ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED.
3. A COMPLETE SLUDGE AERATION SYSTEM SHALL BE PROVIDED PER SUPPLIER'S RECOMMENDATIONS FOR THE APPLICATION. CONTRACTOR SHALL VERIFY REQUIREMENTS AND COORDINATE SCOPE WITH VARIOUS SUPPLIERS.
4. BLOWERS SHALL BE COMPATIBLE, VARIABLE SPEED UNITS. ONE BLOWER SHALL BE PROVIDED PER BASIN CAPABLE OF PROVIDING 2.0 MG/L OXYGEN AT FULL LOAD.
5. BLOWER & BLOWER CONTROLS SHALL PROVIDE FOR MANUAL, TIMER, AND DO INPUT BASED OPERATION AND SHALL INCLUDE ALL REQUIRED APPURTENANCES.
6. SOUND ATTENUATING, WEATHER RESISTANT ENCLOSURES SHALL BE PROVIDED FOR EACH BLOWER AND MOUNTED PER SUPPLIER'S RECOMMENDATIONS.
7. EACH BLOWER SHALL BE ACCOMPANIED WITH FAN GUARDS, A COOLING FAN, PRESSURE RELIEF VALVE, CHECK VALVE, FLEXIBLE COUPLING (TO EXTERIOR PIPING), PRESSURE GAUGES (ONE UP AND ONE DOWNSTREAM OF CHECK/THROTTLING VALVE) AND OTHER APPURTENANCES AS RECOMMENDED BY THE SUPPLIER.
8. MOUNT ALL EQUIPMENT PER SUPPLIER'S RECOMMENDATIONS IN FIELD VERIFIED LOCATIONS.
9. WIRING TO BE PER SUPPLIER AND SITE ELECTRICAL PLANS/SPECIFICATIONS. ALL WRING TO BE IN SEALED CONDUIT.
10. CONTROLS SHALL BE MOUNTED IN FIELD VERIFIED LOCATION.
11. LOCAL DISCONNECT SWITCHES TO BE PROVIDED FOR EACH BLOWER.
12. A GROUNDING SYSTEM AND SURGE PROTECTION SHALL BE PROVIDED FOR ALL CONTROLS AND EQUIPMENT. VERIFY REQUIREMENTS WITH SUPPLIER.
13. UTILITIES SHOWN ARE APPROXIMATE IN LOCATION AND NOT ALL MAY BE INDICATED OR REFLECTED ACCURATELY. CONTRACTOR SHALL VERIFY LOCATIONS WITH CITY AND BY FIELD INVESTIGATION.
14. PIPING & DIFFUSERS INDICATED ARE SCHEMATIC IN NATURE. CONTRACTOR SHALL VERIFY LAYOUT AND SIZES WITH SUPPLIER FOR THEIR SYSTEM AND ADJUST AS REQUIRED.
15. RIGID PIPE SUPPORTS SHALL BE PROVIDED PER PIPE SUPPLIER'S RECOMMENDATIONS AND AS NEEDED FOR STABILITY. FIELD ADJUST.
16. SUBMITTALS RELATED TO THE AERATION SYSTEM AND PIPING ARE TO BE PROVIDED AND APPROVED PRIOR TO CONSTRUCTION OR THE ORDERING OF MATERIALS.

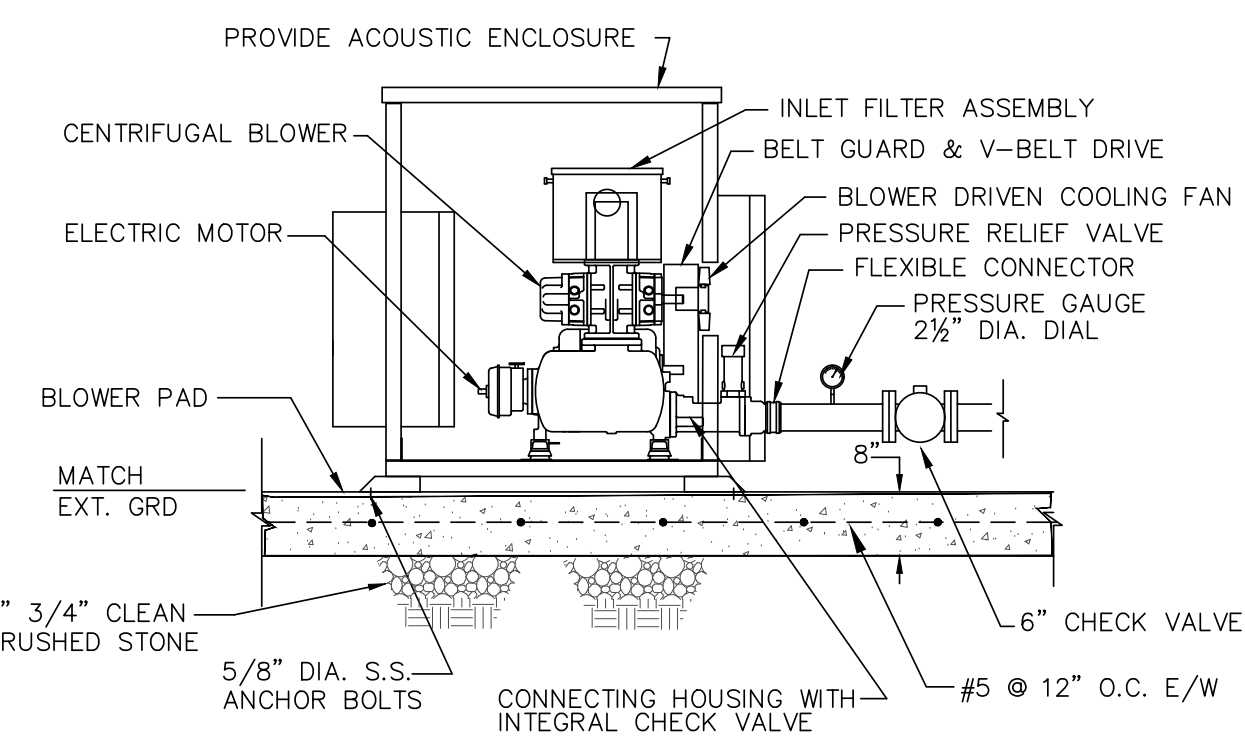
SECTION A-A
NTS



SECTION B-B
NTS



SECTION C-C
NTS

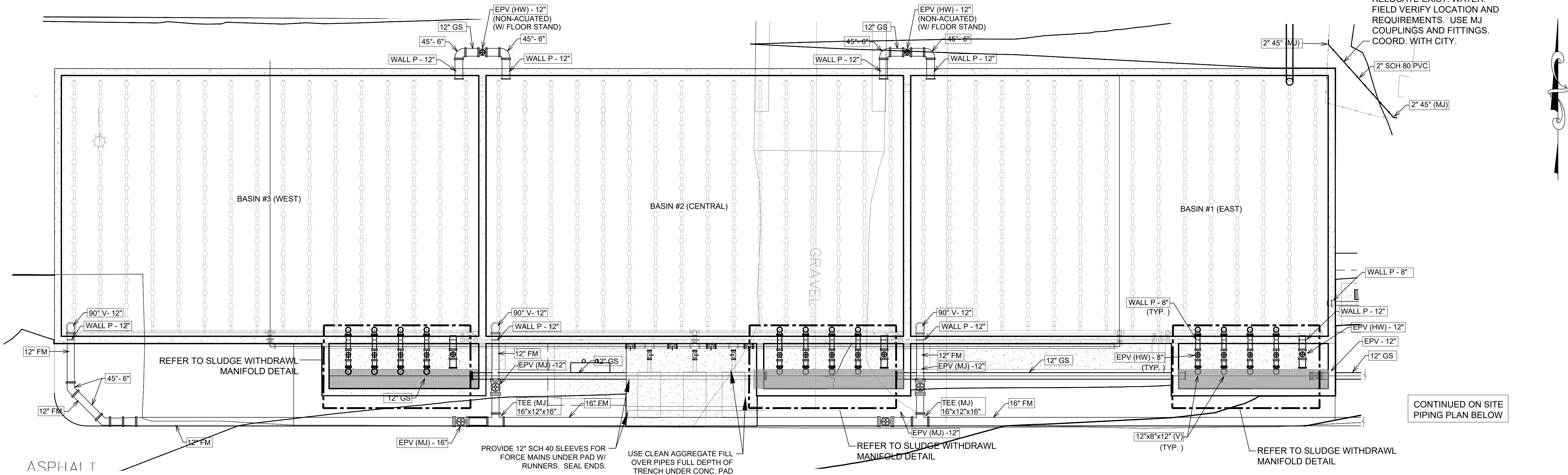


TYPICAL BLOWER SECTION
(FOR GENERAL REFERENCE—VERIFY WITH SUPPLIER)

FITTING SCHEDULE

2" W	2" SCH. 80 PVC FORCE MAIN
6" FM	6" C-900 PVC FORCE MAIN
16" FM	12" C-900 PVC FORCE MAIN
8" GS	8" C-900 PVC GRAVITY SEWER
12" GS	12" C-900 PVC GRAVITY SEWER
45°- 4"	4" 45° VERTICAL BEND, FLXFL
45°- 6"	6" 45° BEND, MJ, & THRUST BLOCKING
90°- 6"	6" 90° BEND, MJ, & THRUST BLOCKING
90° (V) FL- 6"	6" 90° VERTICAL BEND, FLXFL, WITH 18" DIP EXTENSION, FLXPE
90° (V) MJ- 8"	8" 90° VERTICAL BEND, MJ, WITH DIP EXTENSION (TO TEE)
12°-8" (V) MJ 90°	12" TO 8" 90° REDUCING BEND, VERTICAL, MJ, & THRUST BLOCKING
6"x6"x6"	6"x6"x6" TEE, MJ, & THRUST BLOCKING
12"x12"x8" (V)	12"x12"x8" VERTICAL TEE, MJ, & THRUST BLOCKING
12"x12"x12"	8"x6"x8" TEE, MJ, & THRUST BLOCKING
WYE - 6"	6" WYE, MJ, & THRUST BLOCKING
6" > 4"	6" TO 4" REDUCER, MJ, & THRUST BLOCKING
4" GV	4" GATE VALVE
EPV (FL) - 6"	6" ECCENTRIC PLUG VLAVE, FLXFL
EPV (MJ) - 6"	6" ECCENTRIC PLUG VALVE, MJ
EPV (HW) - 6"	6" ECCENTRIC PLUG VALVE, MJ, W/ EXTENDED HAND WHEEL
EPV (MJ) - 8"	8" ECCENTRIC PLUG VALVE, MJ, W/ EXTENDED HAND WHEEL
EPV (HW) - 12"	12" ECCENTRIC PLUG VALVE, MJ, W/ EXTENDED HANDWHEEL
EPV - 12"	12" ECCENTRIC PLUG VALVE, MJ
CHECK - 6"	6" SILENT CHECK VALVE, FLXFL W/POSITION INDICATOR & RELEASE
WALL P - 4"	4" WALL PIPE
WALL P - 6"	6" WALL PIPE
WALL P - 8"	8" WALL PIPE
WALL P - 12"	12" WALL PIPE

- NOTE:
1. FIELD VERIFY ALL ELEVATIONS, DIMENSIONS AND POSITIONS PRIOR TO CONSTRUCTION.
 2. USE APPROPRIATE GASKETS ON ALL PIPES THROUGH WALLS.
 3. ALL EXPOSED PIPING TO BE FLANGED DIP AND PAINTED PER SPECIFICATIONS IN ENGINEER APPROVED COLOR.
 4. VALVE HAND WHEELS TO BE MOUNTED APPROX. 42" ABOVE GRATING/STRUCTURE OR AS RECOMMENHED BY SUPPLIER.
 5. HANDWHEELS SHALL BE A MIN. OF 8" DIA. W/ POSITION INDICATORS OR AS APPROVED.
 6. ALL VALVE OPERATORS TO BE EXTENDED WITH APPURTENANCES AS RECOMMENDED BY SUPPLIER.
 7. GRATING AND SUPPORTS TO BE DESIGNED BY SUPPLIER FOR APPLICATION AND OCCUPANCY BY PERSONNEL. BLOCK OUT AS NEEDED.
 8. ACTUATORS SHALL BE VAL-MATIC FOR COMPATIBILITY WITH EXIST. FACILITY ACUATORS. PROVIDE AND INSTAL PER SUPPLIER FOR APPLICAITON.



1 SLUDGE BASIN FLUID PIPING

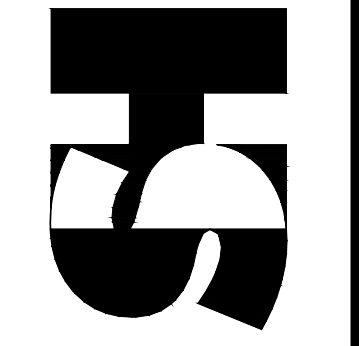
GENERAL SCHEMATIC
SCALE 1"=20'

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SLUDGE STORAGE BASIN IMPROVEMENTS
NIXA WASTEWATER TREATMENT PLANT
NIXA MISSOURI
Nixa, Christian County, Missouri

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SLUDGE BASIN
FLUID PIPING

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DRAWN BY GWS/AN
CHKD BY AN/CMH
DATE MARCH 2025
SCALE AS SHOWN

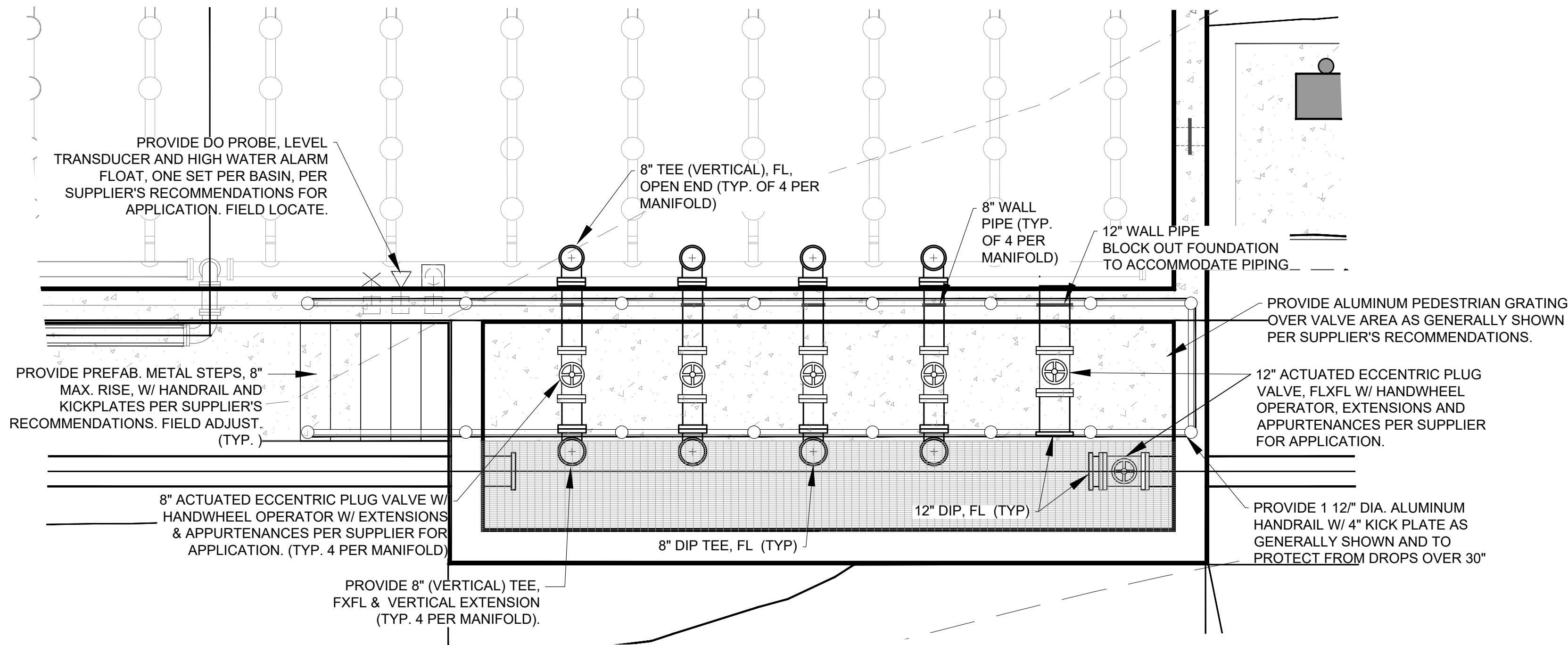
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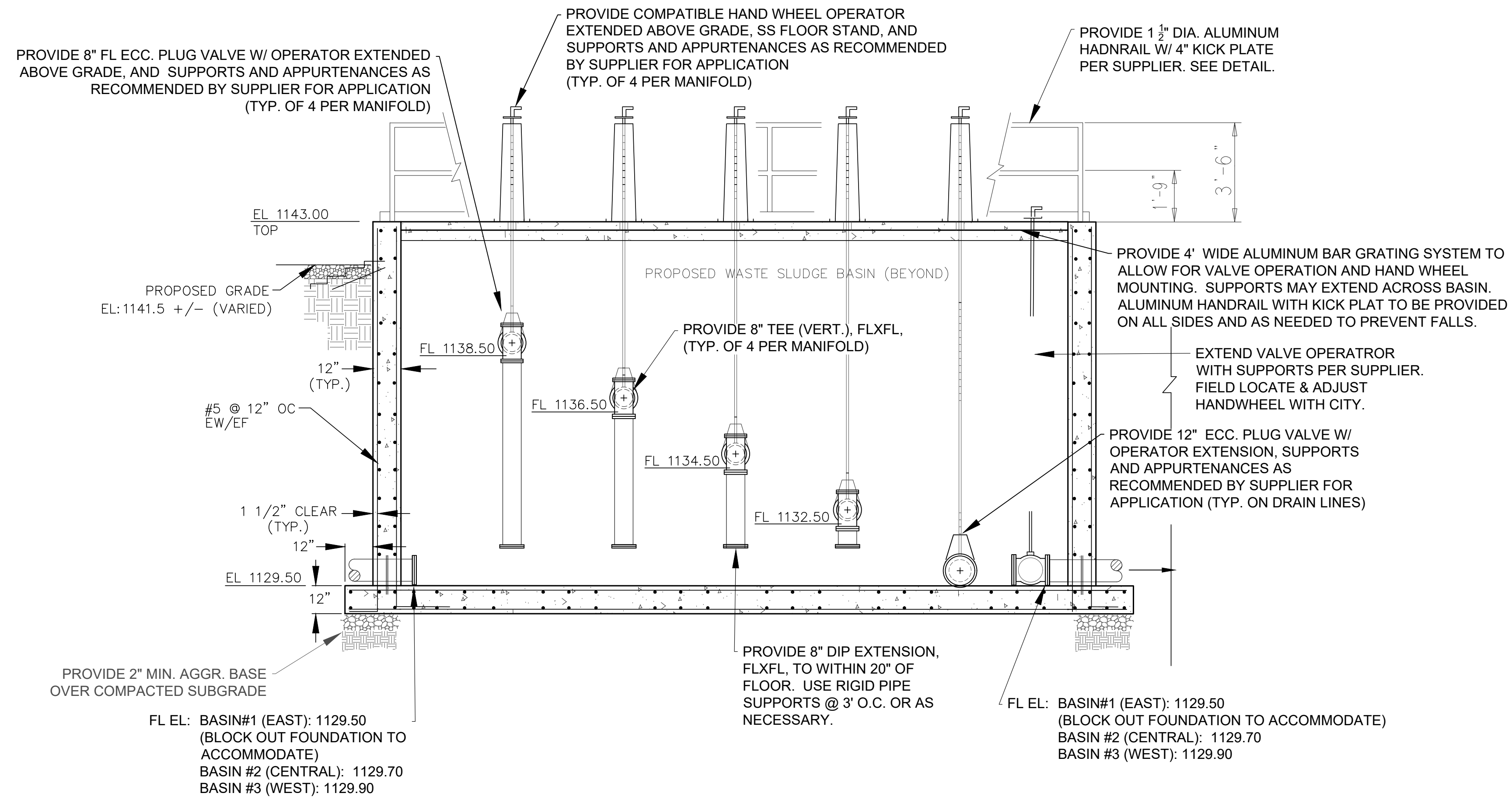
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11



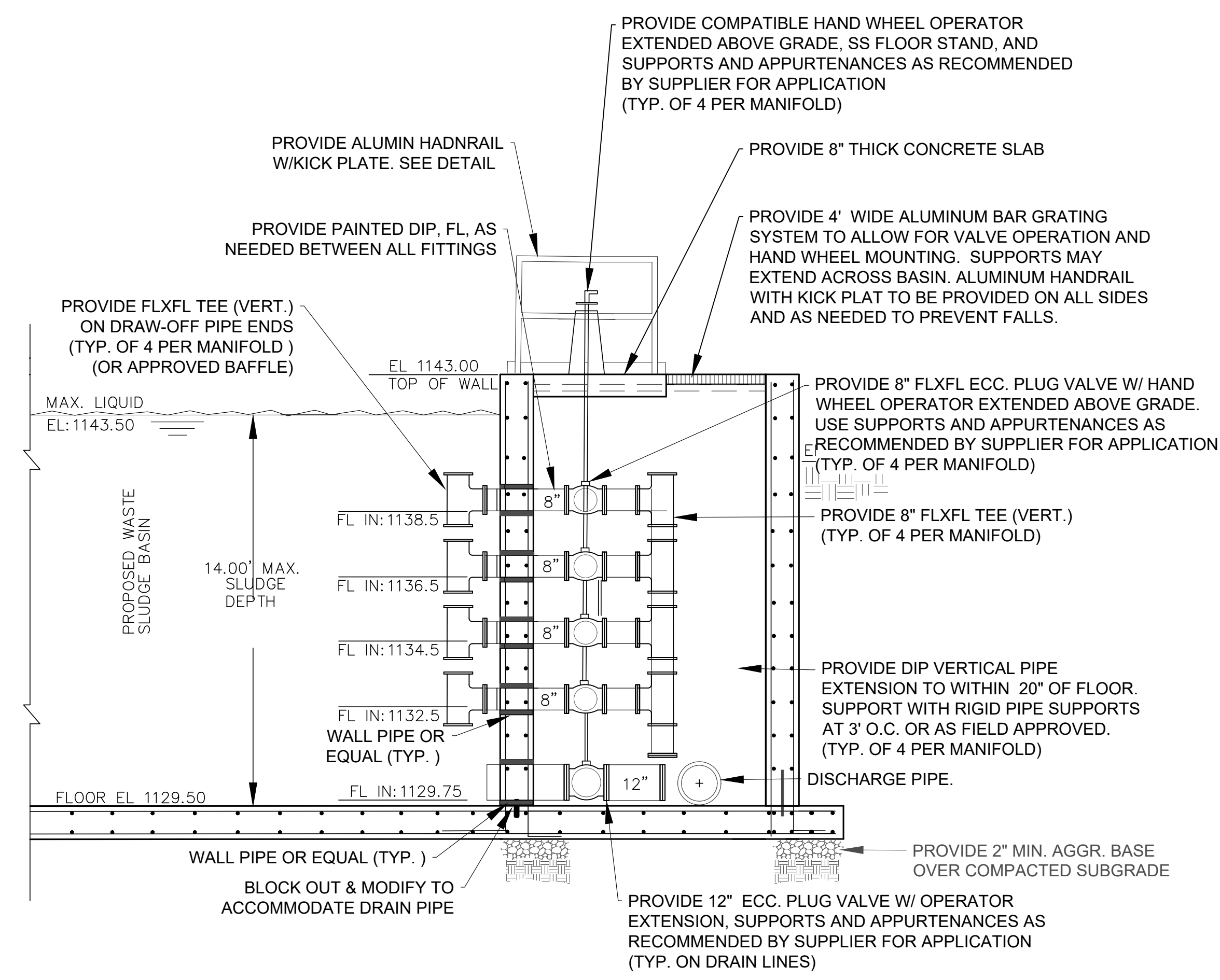
1 SLUDGE DEWATERING MANIFOLD PLAN (TYP.)

GENERAL SCHEMATIC (NOT TO SCALE (NTS))



2 SLUDGE DEWATERING MANIFOLD PROFILE (TYP.)

GENERAL SCHEMATIC
NOT TO SCALE (NTS)



3 SLUDGE DEWATERING MANIFOLD SECTION (TYP.)

GENERAL SCHEMATIC
NOT TO SCALE (NTS)

- NOTE:
1. FIELD VERIFY ALL ELEVATIONS, DIMENSIONS AND POSITIONS PRIOR TO CONSTRUCTION.
 2. USE APPROPRIATE GASKETS ON ALL PIPES THROUGH WALLS.
 3. ALL EXPOSED PIPING TO BE FLANGED DIP AND PAINTED PER SPECIFICATIONS IN ENGINEER APPROVED COLOR.
 4. VALVE HAND WHEELS TO BE MOUNTED APPROX. 42" ABOVE GRATING/STRUCTURE OR AS RECOMMENDED BY SUPPLIER.
 5. HANDWHEELS SHALL BE A MIN. OF 8" DIA. W/ POSITION INDICATORS OR AS APPROVED.
 6. ALL VALVE OPERATORS TO BE EXTENDED WITH APPURTENANCES AS RECOMMENDED BY SUPPLIER.
 7. GRATING AND SUPPORTS TO BE DESIGNED BY SUPPLIER FOR APPLICATION AND OCCUPANCY BY PERSONNEL. BLOCK OUT AS NEEDED.
 8. ACTUATORS SHALL BE VAL-MATIC FOR COMPATIBILITY WITH EXIST. FACILITY ACUATORS. PROVIDE AND INSTAL PER SUPPLIER FOR APPLICATION.

PRE-FABRICATED METAL STAIR GENERAL NOTES:

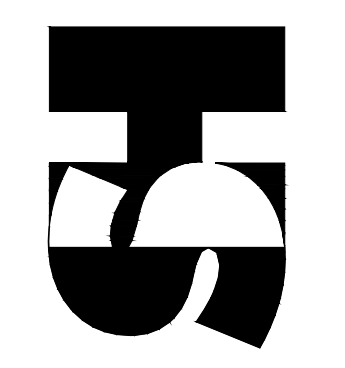
1. ALL STAIR TREADS SHALL BE 2", DIAMOND PATTERN, PRE-GALV., 12 GA. STEEL TREADS, "GRIP-STRUT" SAFETY TREAD OR EQUAL.
2. ALL TREADS AND/OR PLANKS LISTED IN NOTE 1 SHALL BE BOLTED TO STRINGERS WITH 3/8" ϕ STAINLESS STEEL BOLTS WITH LOCK WASHERS & DOUBLE NUT.
3. HANDRAIL SHALL BE WALL MOUNTED OR STRINGER MOUNTED AS SHOWN ON THE DWGS. ALL HAND- RAIL SHALL BE 1-1/2" ϕ ALUMINUM PIPE WITH MAX. 5'-0" VERTICAL POST SPACING.
 - A. STRINGER MOUNTED HANDRAIL SHALL BE ATTACHED TO OUTSIDE OF OR DIRECTLY ON TOP OF STRINGERS. HANDRAIL SHALL BE 2'-10" HIGH FROM TREAD NOSING WITH AN INTERMEDIATE RAIL.
 - B. WALL MOUNTED HANDRAIL SHALL BE ATTACHED DIRECTLY TO THE ADJACENT WALL AT 2'-10" HIGH FROM TREAD NOSING WITH WALL BRACKETS AT MAX. SPACING OF 5'-0". MINIMUM CLEARANCE BETWEEN WALL AND HANDRAIL SHALL BE 2". INTERMEDIATE RAIL IS NOT REQUIRED.
 - C. ISOLATE ALUMINUM HANDRAIL FROM GALVANIZED STEEL SURFACE TO PREVENT GALVANIC CORROSION.
4. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM DESIGNATION A36.
5. ALL CONNECTIONS SHALL BE WELDED OR BOLTED THROUGHOUT AS SHOWN IN DETAILS. ALL MISCELLANEOUS CONNECTIONS NOT SHOWN IN DETAILS SHALL BE WELDED OR BOLTED. WELDED CONNECTIONS SHALL CONFORM TO AWS STDS. ALL BOLTS SHALL CONFORM TO ASTM A307 UNLESS SPECIFIED OTHERWISE.
6. ALL BOLTED CONNECTIONS, EXCEPT THOSE LISTED IN NOTE 2 OR SPECIFIED OTHERWISE IN DETAILS SHALL BE 1/2" ϕ STAINLESS STEEL WITH LOCK WASHERS & NUTS, AND MAY BE REPLACED BY WELDED CONNECTIONS AT THE FABRICATORS OPTION. PROVIDED SUCH WELDS DEVELOP AT LEAST THE SAME STRENGTH AS THE BOLTED CONNECTION.
7. ~~SHALL~~ OTHERWISE SHOWN OR NOTED, ALL BOLT HOLES SHALL BE DRILLED ON STANDARD AISC GAGES, AND SHALL HAVE MINIMUM AISC EDGE CLEARANCES.
8. ALL STRUCTURAL STEEL MEMBERS IN STAIRS OR LADDERS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING ITEMS: STRINGERS, SUPPORT CHANNELS, ANGLES, TUBING & PLATES.

PRELIMINARY
FOR REVIEW
ONLY

SHAFFER & HINES, INC.
CERTIFICATE OF AUTHORITY
LICENSE NO. 001665

SHAFFER & HINES
CONSULTING ENGINEERS - REGISTERED LAND SURVEYORS

P.O. Box 493, Nixa, Missouri, 65714
Tel: (417) 725-4663 - Fax: (417) 725-5230
Email: chines@shafferhines.com



SLUDGE DEWATERING
PIPING DETAILS

DESIGN BY	GWS/AN
DRAWN BY	GWS/AN
CHECKED BY	AN/CMH
DATE	MARCH 2025
SCALE	AS SHOWN

REVISIONS

JOB NO.

242004

SHEET

12

2" W	2" SCH. 80 PVC FORCE MAIN
6" FM	6" C-900 PVC FORCE MAIN
16" FM	12" C-900 PVC FORCE MAIN
8" GS	8" C-900 PVC GRAVITY SEWER
12" GS	12" C-900 PVC GRAVITY SEWER
45° - 4"	4" 45° VERTICAL BEND, FLXL
45° - 6"	6" 45° BEND, MJ, & THRUST BLOCKING
90° - 6"	6" 90° BEND, MJ, & THRUST BLOCKING
90° (V) FL - 6"	6" 90° VERTICAL BEND, FLXL, WITH 18" DIP EXTENSION, FLXPE
90° (V) MJ - 8"	8" 90° VERTICAL BEND, MJ, WITH DIP EXTENSION (TO TEE)
12" (V) MJ 90°	12" TO 8" 90° REDUCING BEND, VERTICAL, MJ, & THRUST BLOCKING
6"x6"x6"	6"x6"x6" TEE, MJ, & THRUST BLOCKING
12"x12"x8" (V)	12"x12"x8" VERTICAL TEE, MJ, & THRUST BLOCKING
12"x12"x12"	8"x6"x8" TEE, MJ, & THRUST BLOCKING
WYE - 6"	6" WYE, MJ, & THRUST BLOCKING
6" > 4"	12" TO 4" REDUCER, MJ, & THRUST BLOCKING
4" GV	4" GATE VALVE
EPV (FL) - 6"	6" ECCENTRIC PLUG VALVE, FLXL
EPV (MJ) - 6"	6" ECCENTRIC PLUG VALVE, MJ
EPV (HW) - 6"	6" ECCENTRIC PLUG VALVE, MJ, W/ EXTENDED HAND WHEEL
EPV (MJ) - 8"	8" ECCENTRIC PLUG VALVE, MJ, W/ EXTENDED HAND WHEEL
PV (HW) - 12"	12" ECCENTRIC PLUG VALVE, MJ, W/ EXTENDED HANDWHEEL
EPV - 12"	12" ECCENTRIC PLUG VALVE, MJ
CHECK - 6"	6" SILENT CHECK VALVE, FLXL W/ POSITION INDICATOR & RELEASE
WALL P - 4"	4" WALL PIPE
WALL P - 6"	6" WALL PIPE
WALL P - 8"	8" WALL PIPE
WALL P - 12"	12" WALL PIPE

NOTE:

1. FIELD VERIFY ALL ELEVATIONS, DIMENSIONS AND POSITIONS PRIOR TO CONSTRUCTION.
2. USE APPROPRIATE GASKETS ON ALL PIPES THROUGH WALLS.
3. ALL EXPOSED PIPING TO BE FLANGED BID AND PAINTED PER SPECIFICATIONS IN ENGINEER APPROVED COLOR.
4. VALVE HAND WHEELS TO BE MOUNTED APPROX. 42" ABOVE GRATING/STRUCTURE OR AS RECOMMENDED BY SUPPLIER.
5. HANDWHEELS SHALL BE A MIN. OF 8" DIA. W/ POSITION INDICATORS OR AS APPROVED.
6. ALL VALVE OPERATORS TO BE EXTENDED WITH APPURTENANCES AS RECOMMENDED BY SUPPLIER.
7. GRATING AND SUPPORTS TO BE DESIGNED BY SUPPLIER FOR APPLICATION AND OCCUPANCY BY PERSONNEL. BLOCK OUT AS NEEDED.
8. ACTUATORS SHALL BE VAL-MATIC FOR COMPATIBILITY WITH EXIST. FACILITY ACTUATORS. PROVIDE AND INSTALL PER SUPPLIER FOR APPLICATION.

CALL OR CLICK 3 DAYS BEFORE YOU DIG!

 **1-800-DIG-RITE or 811**

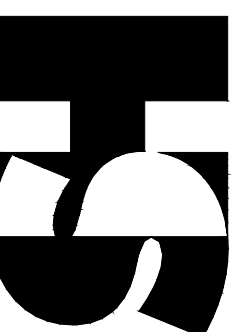
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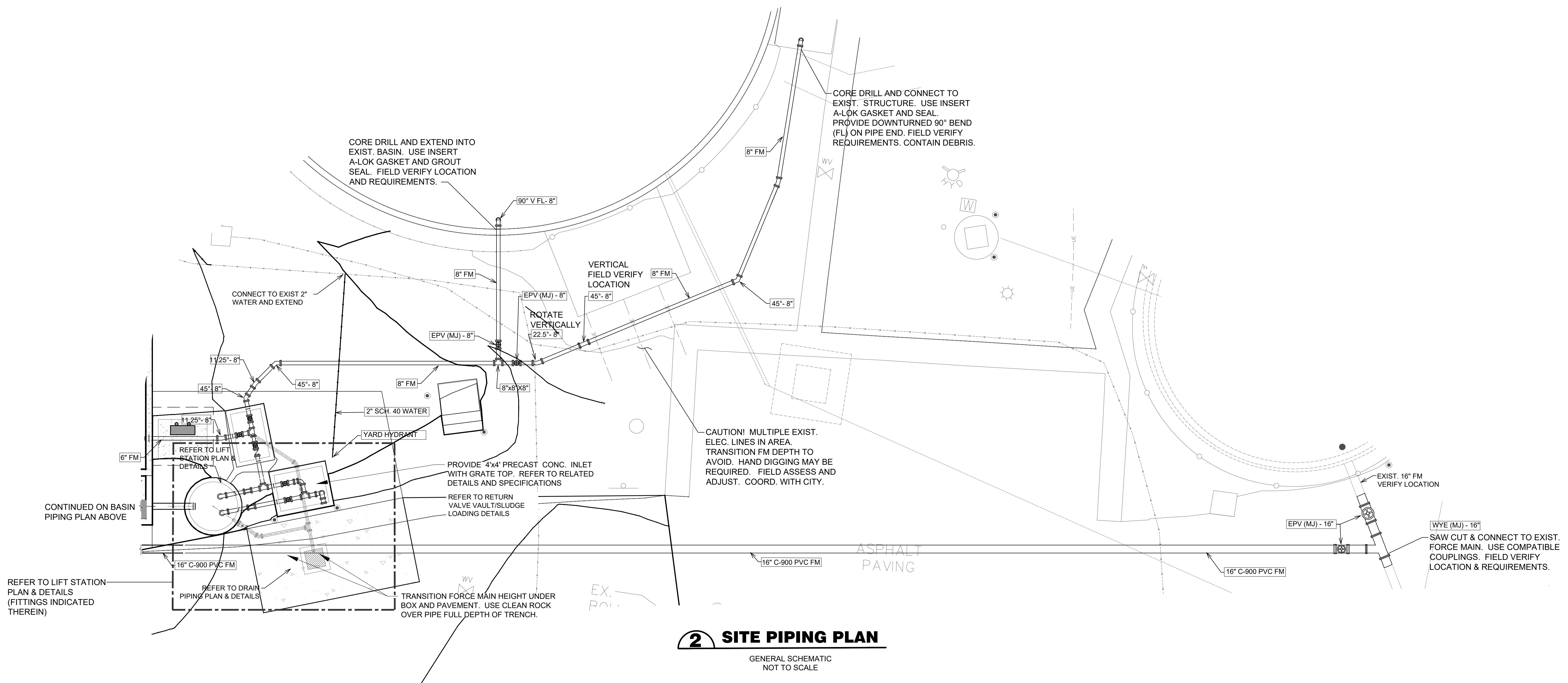
SITE PIPING (WASTEWATER)

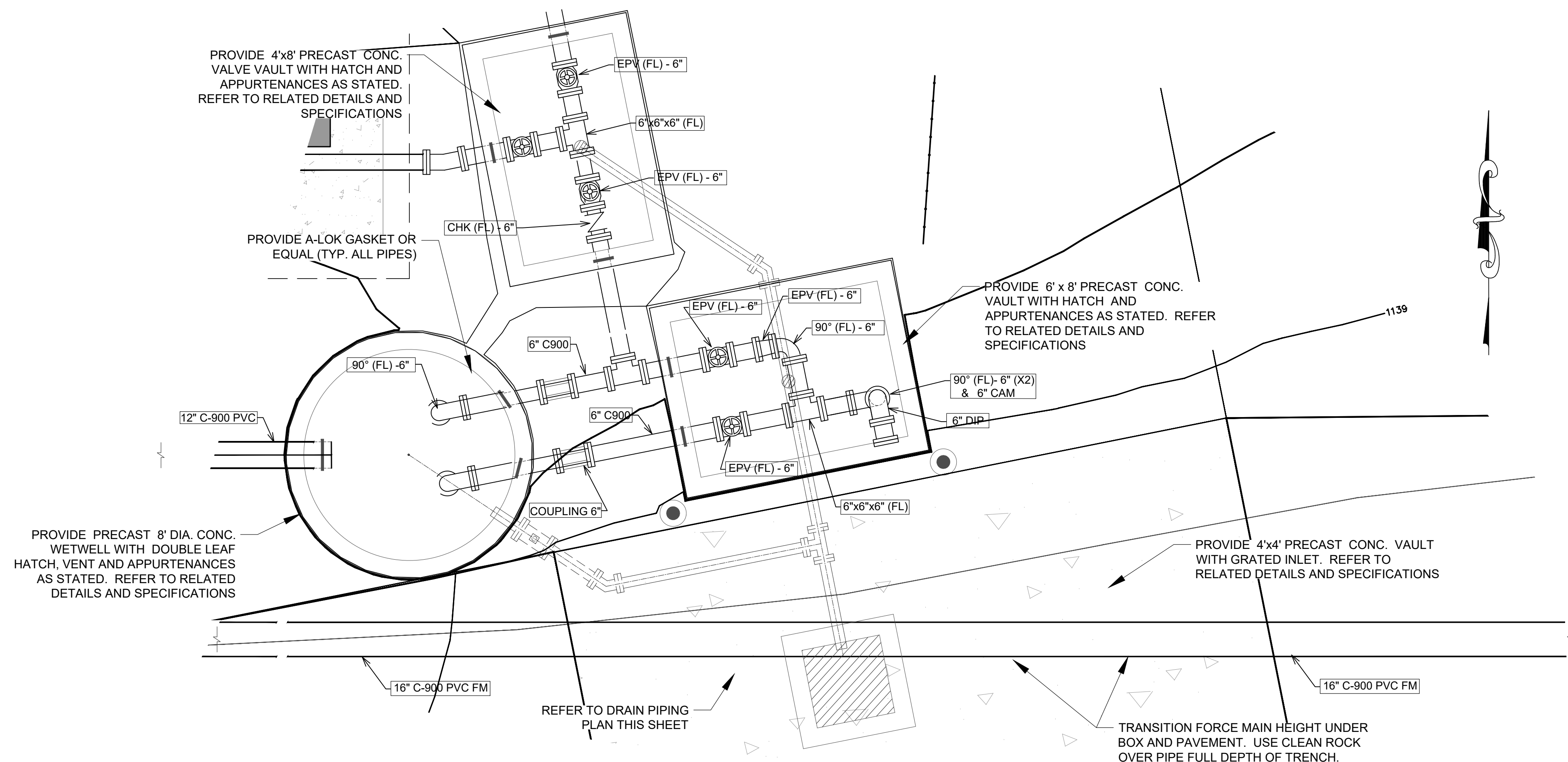
DESIGN BY	GWS/AN
DRAWN BY	GWS/AN
CHECK'D BY	AN/CMH
DATE	MARCH 2025
SCALE	AS SHOWN

REVISIONS

OB NO.
242004

HEET
13

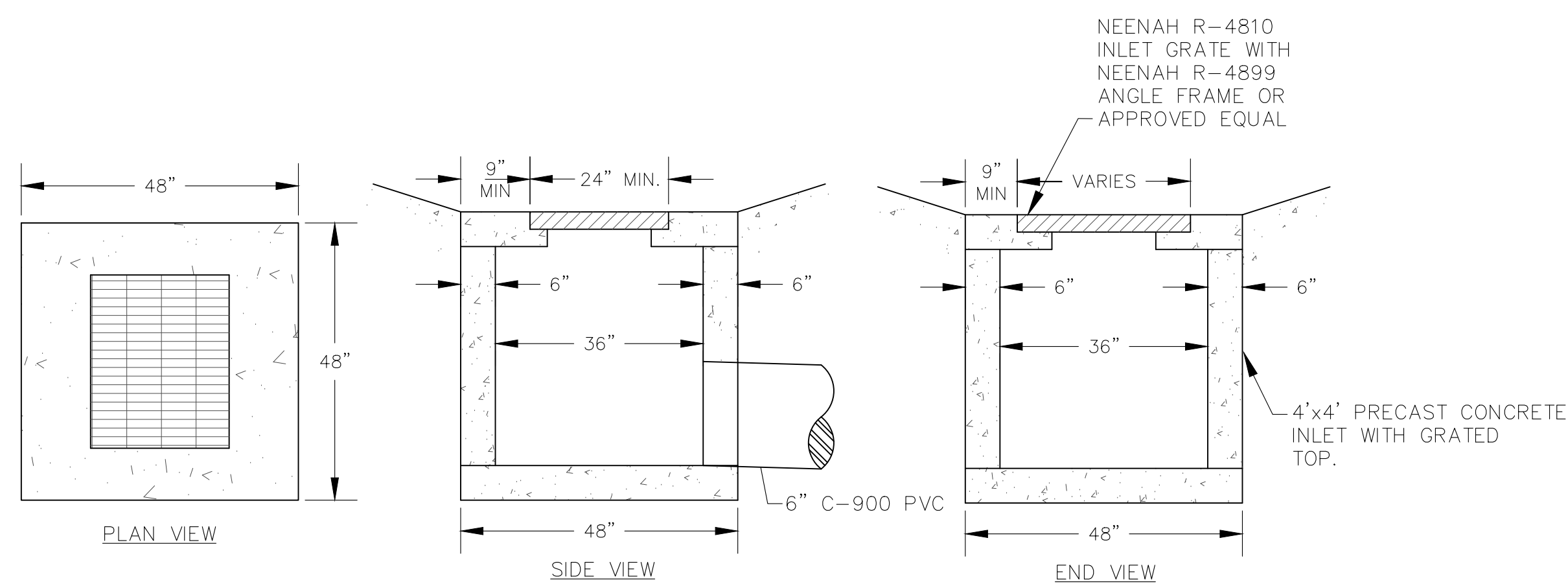




- NOTE:
1. FIELD VERIFY ALL ELEVATIONS, DIMENSIONS AND POSITIONS PRIOR TO CONSTRUCTION.
 2. USE APPROPRIATE GASKETS ON ALL PIPES THROUGH WALLS.
 3. ALL EXPOSED PIPING TO BE FLANGED DIP AND PAINTED PER SPECIFICATIONS IN ENGINEER APPROVED COLOR.
 4. VALVE HAND WHEELS TO BE MOUNTED APPROX. 36" ABOVE GRATING/STRUCTURE OR AS RECOMMENHDED BYH SUPPLIER.
 5. ALL VALVE OPERATORS TO BE EXTENDED WITH APPURTENANCES AS RECOMMENDED BY SUPPLIER.
 6. GRATING AND SUPPORTS TO BE DESIGNED BY SUPPLIER FOR APPLICATION AND OCCUPANCY BY PERSONNEL. BLOCK OUT AS NEEDED.

1 LIFT STATION PIPING PLAN (IN STURCTURE)

SCALE: NTS

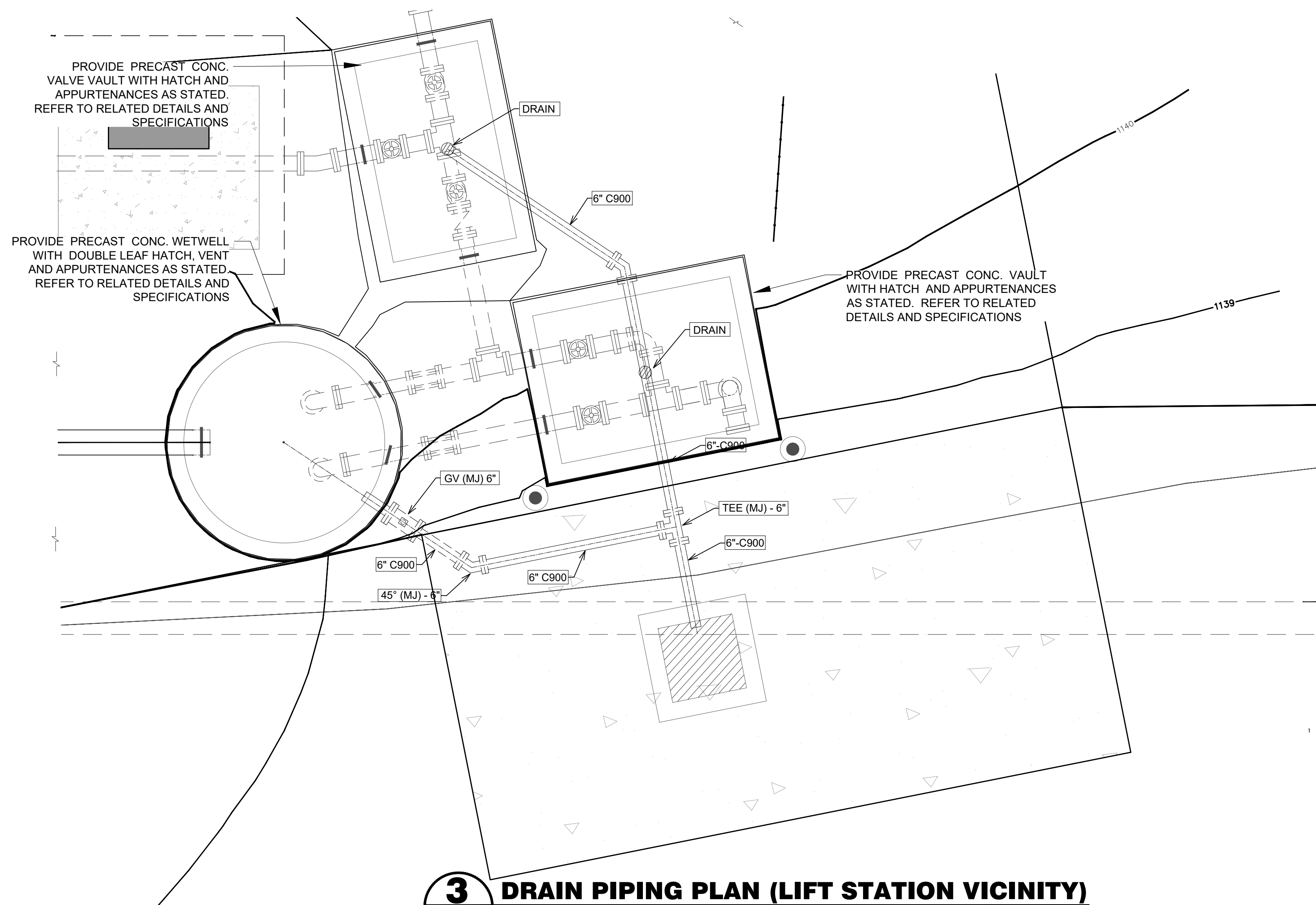


NOTE:

1. BOX TO BE PREFABRICATED CONCRETE BY QUALIFIED SUPPLIER.
2. BOX STRUCTURE, GRATE, FRAME AND APPURTENANCES TO BE HEAVY DUTY TRAFFIC RATED AND MEET HS-20 LOADING REQUIREEMTNS.
3. FIELD VERIFY ELEVATIONS AND LOCATION.
4. INSTALL PER SUPPLIER'S RECOMMENDATIONS.
5. SLOPE APPLICABLE AREA TO INLET GRATE AT 1% MIN. FIELD ADJUST.
6. BLOCK OUT FOR PIPES AND SEAL.

2 GRATED INLET - SLUDGE LOADING STATION

SCALE: NTS



3 DRAIN PIPING PLAN (LIFT STATION VICINITY)

SCALE: NTS

15



SLUDGE STORAGE IMPROVEMENTS CITY OF NIXA

SUMMARY OF WORK

The City of Nixa's wastewater treatment facility provides for the cleaning and processing of up to 4 million gallons of average flow per day from a diverse array of system users in the City. To allow for more sludge storage capacity and increased treatment flexibility, a new sludge basin is proposed with the ability to store over an additional 700,000 gallons of material.

The new sludge storage basin is to be constructed of reinforced concrete with a length of approximately 190', a width of approximately 40', and a depth of 16' (liquid depth of approximately 14'). The basin is proposed to be divided into three (3) sections to allow staff flexibility in the storage volume used and to allow for maintenance. A fine bubble aeration system consisting of three (3) variable speed blowers, each approximately 100 hp, and floor mounted, pad style, fine bubble diffusers is proposed. Dissolved oxygen (DO) and liquid level are proposed to be monitored and integrated into the control system. The addition of air is to be variable with input time and DO parameters to increase or slow biological processes to achieve the proper sludge profile while also allowing for mixing to occur in the basin.

Piping and valves will be strategically placed to allow for the removal of sludge at various levels and so that the operator may select various sludge thicknesses. Sludge may be used for recycle back into the treatment process, for land/field application or for composting. A new pumping system is proposed, generally consisting of a single submersible pump that is dedicated for use with the proposed sludge basin. The pump system is proposed to allow sludge to be distributed to sludge hauling equipment and/or the various other components of the treatment facility. To facilitate construction, site preparation and limited demolition will be necessary. In addition, pavement in the location around the proposed basin will be modified, and in some cases replaced, to allow for basin and lift station construction/access. Related electrical and control work is proposed. All work is to be performed in accordance with professionally engineered construction plans, City of Nixa Technical Specifications, and other applicable guidelines.

SUPPLEMENTAL TECHNICAL SPECIFICATIONS

SLUDGE STORAGE IMPROVEMENTS

NIXA WASTEWATER TREATMENT FACILITY



Owner:

City of Nixa
715 West Mt. Vernon Street
Nixa, Missouri 65714

July 30, 2026

{Preliminary for Review}



Project # 242004

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGES (INCLUSIVE)</u>
<u>00 00 00</u>	<u>PROCUREMENT</u>	
00 73 10	Job Special Conditions.....	1:4
<u>01 00 00</u>	<u>GENERAL REQUIREMENTS</u>	
01 20 00	Measurement And Payment	1:6
01 74 00	Cleaning and Waste Management.....	1:3
01 78 39	Project Record Documents	1:2
<u>02 00 00</u>	<u>EXISTING CONDITIONS</u>	
02 41 19	Selective Demolition	1:2
<u>03 00 00</u>	<u>CONCRETE</u>	
03 15 13	Waterstops.....	1:2
03 30 00	Cast-in-Place Concrete.....	1:13
03 41 00	Precast Structural Concrete	1:3
03 62 00	Non-Shrink Grouting	1:1
03 81 00	Concrete Cutting.....	1:3
<u>05 00 00</u>	<u>METALS</u>	
05 00 00	Miscellaneous Metal	1:5
<u>09 00 00</u>	<u>FINISHES</u>	
09 91 00	Painting	1:8
<u>13 00 00</u>	<u>SPECIAL CONSTRUCTION</u>	
13 34 19	Steel Building Systems.....	1:4
<u>33 00 00</u>	<u>UTILITIES</u>	
33 14 19	Valves	1:4
33 05 00	Pressure Conduits, Force Mains, Fittings and Valves	1:8
33 31 05	PVC Sewer Pipe	1:3
33 32 11	Non-Clog Lift Station	1:17
<u>40 00 00</u>	<u>PROCESS INTEGRATION</u>	
40 71 69	Level Process Measuring Devices.....	1:2
40 91 23	Flow Process Measurement Devices	1:3
<u>46 00 00</u>	<u>WATER AND WASTEWATER EQUIPMENT</u>	
46 11 31	Aeration Blowers.....	1:12
46 55 33	Wastewater Treatment Equipment (Aerated Lagoon).....	1:13

SECTION 00 73 10
JOB SPECIAL PROVISIONS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

Specifications for the work shall consist of the project specifications and the contract drawings. Supplemental details and specifications referenced may be found in the City of Nixa's City Code as well as the current editions of Missouri Department of Transportation's (MODOT's) Standard Plans for Highway Construction and Standard Specifications for Highway Construction. The more stringent requirements between the Contract Drawings and Technical Specifications and any supplementary references shall take precedence whenever any disagreement exists or as approved by the City.

1.2 SCHEDULE OF WORK

- A. The Contractor shall furnish the Engineer a detailed schedule setting forth the procedure he proposes to follow and giving the dates he expects to start and to complete separate portions of the work and this schedule must meet with the Engineer's approval prior to issuing the "Notice to Proceed." If in the opinion of the Engineer proper progress is not being maintained, changes shall be made in the Contractor's operation to assure proper progress.
- B. Unless otherwise provided, all public traffic shall be permitted to pass through the work, and the Contractor shall so conduct his operations as to offer the least possible obstruction and inconvenience to the public. He shall have under construction no greater length or amount of work than can be prosecuted properly with due regard to the rights of the public; the Engineer shall be the sole judge of the length or amount of work which will afford proper convenience to the public.

1.3 ESTIMATES AND PAYMENTS

- A. On or about the first day of each month, the Contractor will make an estimate of the value of the work done and of unused materials stored on the site. The estimated cost of repairing, replacing, or rebuilding any part of the work or replacing materials which do not conform to the drawings and specifications will be deducted from the estimated value.
- B. After each estimate has been approved by the Engineer and Owner, the Owner will pay to the Contractor within 30 days, ninety-five percent (95%) of the estimated value less any previous payments.
- C. If the Owner fails to make payment thirty (30) days after receipt of the Contractor's application for payment, in addition to other remedies available to the Contractor, then shall be added to each such payment interest in accordance with section 34.057 RSMo. (Supp. 1991).
- D. Payments for materials stored on site shall be based only upon the actual cost of such materials to the Contractor and shall not include any overhead or profit to the Contractor.

1.4 WAGE PROVISIONS

The Contractor shall pay prevailing wages in accordance with the current prevailing wage determination issued by the Missouri Department of Labor and Industrial Relations, Division of Labor Standards and the Davis-Bacon Act regulating wages (when required).

1.5 EMPLOYMENT OF UNAUTHORIZED ALIENS PROHIBITED

- A. Pursuant to Section 285.530.1, RSMo, the subrecipient assures that it, as well as its subrecipients do not knowingly employ, hire for employment, or continue to employ an unauthorized alien to perform work within the State of Missouri, and shall affirm, by sworn affidavit and provisions of documentation, its enrollment and participation in a federal work authorization program with respect to the employees working in connection with the contracted services. Further, the subrecipient assures that it, as well as its subrecipients shall sign an affidavit affirming that it does not knowingly employ any person who is an unauthorized alien in connection with the contracted services.
- B. In accordance with Sections 285.525 to 285.550, RSMo a general contractor or subcontractor of any tier shall not be liable when such contractor or subcontractor contracts with its direct subcontractor who violates subsection 1 of Section 285.530, RSMo if the contract bidding the contractor and subcontractor affirmatively states that the direct subcontractor is not knowingly in violation of subsection 1 of Section 285.530, RSMo and shall not henceforth be in such violation and the contractor or subcontractor receives a sworn affidavit under the penalty of perjury attesting to the fact that the direct subcontractor's employees are lawfully present in the United States.
- C. The Affidavit of Work Authorization form is included as Section 00 45 15.

1.6 ACCESS

- A. The City and their representatives shall have access, during normal business hours or at any time work is being performed, to the premises where any portion of the Work is being performed.
- B. Each contract entered into by the Owner for construction work, and every subagreement, shall provide access to the work. The Contractor or subcontractor shall provide facilities for access and inspection. The contract or subagreement shall also provide that any authorized representatives shall have access to any books, documents, papers and records that are pertinent to the project for the purpose of making audit, examination, excerpts and transcriptions.

1.7 CLEAN AIR ACT

All work performed as part of the Contract, by the parties involved, be it the Contractor, his subcontractors or the Owner, shall assure that the work is in compliance with the Clean Air Act (42 U.S.C. 7506(C)).

1.8 CLEAN WATER ACT

All work performed as part of the Contract, by the parties involved, be it the Contractor, his subcontractors or the Owner, shall assure that the work is in compliance with the Clean Water Act (33 U.S.C. 1368).

1.9 CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The Contractor shall comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by Department of Labor regulations (29 CFR Part 5).

1.10 FALSE CLAIMS ACT

The Contractor and Subcontractors, if required by future OMB guidance, shall promptly refer to the State of Missouri or other appropriate Inspector General any credible evidence that a principal, employee, agent, contractor, sub-grantee, subcontractor or other person has submitted a false claim under the False Claims Act or has committed a criminal or civil violation of laws pertaining to fraud, conflict of interest, bribery, gratuity or similar misconduct involving those funds.

1.11 STORMWATER PERMIT

In accordance with 10 CSR 20-6.200(1)(A) and (1)(B)(7), if the proposed project disturbs one (1) contiguous surface acre or more of land, then a land disturbance permit to discharge stormwater is required and the contractor shall comply with the terms thereof.

1.12 HISTORICAL AND ARCHAEOLOGICAL

If during the course of construction evidence of deposits of historical or archaeological interest is found, the Contractor shall cease operations affecting the find and shall notify the Owner who shall notify the Missouri Department of Natural Resources and the Director, Division of Parks and Historic Preservation, P.O. Box 176, Jefferson City, Missouri 65102-0176, Telephone (573) 751-2479. No further disturbance of the deposits shall ensue until the Contractor has been notified by the Owner that he may proceed. The Owner will issue a notice to proceed only after the state official has surveyed the find and made a determination to the Missouri Department of Natural Resources and the Owner. Compensation to the Contractor, if any, for lost time or changes in construction to avoid the find, shall be determined in accordance with changed conditions or change order provisions of the specifications.

1.13 OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) TRAINING

- A. Contractor shall provide a ten (10) hour Occupational Safety and Health Administration (OSHA) construction safety program for all employees who will be on-site as part of this contract for City improvements. The construction safety program shall include a course in construction safety and health that is approved by OSHA or a similar program approved by the Missouri Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program as required by Section 292.675, RSMo.
- B. Contractor shall require its on-site employees to complete a construction safety program within sixty (60) days after the date work as part of this contract for City improvements commences.
- C. Contractor acknowledges and agrees that any of Contractor's employees found on the project site without documentation of the successful completion of a

construction safety program shall be required to produce such documentation within twenty (20) days, or will be subject to removal from the project.

- D. Contractor shall require all of its subcontractors to comply with the requirements of this paragraph and Section 292.675, RSMo.

1. Notice of Penalties for Failure to Provide Safety Training

- a. Pursuant to Section 292.675, RSMo, Contractor shall forfeit to City as a penalty Two Thousand Five Hundred and no/100 (\$2,500.00), plus One Hundred and no/100 (\$100.00) for each on-site employee employed by Contractor or its Subcontractor, for each calendar day, or portion thereof, such on-site employee is employed without the construction safety training required in Paragraph A. This penalty shall not begin to accrue until the time periods described in Paragraph B above have lapsed.
- b. Violations and imposition of the penalty described shall be investigated and determined by the Missouri Department of Labor and Industrial Relations.

1.14 RECORD RETENTION

The Contractor and Subcontractors shall retain all project related records for three years after final payment(s) and all other pending matters are closed.

1.15 EXCESSIVE UNEMPLOYMENT LAW

The Contractor shall agree to comply with the provisions of RSMo Sections 290.550 through 290.580 which states that only Missouri laborers and laborers from nonrestrictive states are allowed by law to be employed on Missouri's public works projects when the unemployment rate exceeds 5% for two consecutive months. For questions call (573) 751-3403, ext. 0.

1.16 "OR EQUAL" STATEMENT

In accordance with 10 CSR 20 4.040(18)(C), when manufacturers' names are used, they are used to establish a standard and the words "or equal", if not stated, are implied.

END OF SECTION

SECTION 01 20 00 MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

This section generally covers methods of measurement and payment for items of work under this contract and is provided for general guidance. Some select items are included herein for clarification. Additional item details may be verified with the Engineer prior to bidding.

1.2 GENERAL REQUIREMENTS

The total bid price shall cover all work shown on the contract drawings and required by the specifications and other contract documents. All costs in connection with the work, including furnishing all materials, equipment, supplies and appurtenances; providing all construction plant, equipment, and tools; and performing all necessary labor and supervision to fully complete the work, shall be included in the unit and lump sum prices bid. No item that is required by the contract documents for the proper and successful completion of the work will be paid for outside of or in addition to the prices submitted in the bid. All work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of the Contractor and all costs in connection therewith shall be included in the prices bid.

1.3 ESTIMATED QUANTITIES

Estimated quantities indicated in the Bid Form or other contract documents are approximate and are to be used only as a basis for estimating the probable cost of the proposed work and for the purpose of comparing the bids submitted for the proposed work. The actual amounts of work done and materials furnished under the unit price items may differ from the estimated quantities. The basis of payment for work and materials will be based on the actual amount of work done and materials furnished. The Contractor agrees that he will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts therefore.

1.4 UNIT PRICES

Values provided for unit price items shall include the cost of all work associated with provision of the item including, but not limited to, provision of the specified item, furnishing all materials and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and the installation complete of all appurtenances necessary for the provision, construction, and provision complete of the item in conformance with the drawings, specifications and other contract documents. The quantity of items may vary, in some cases substantially, from that indicated in the bid form and payment will be based on the actual quantity installed. Documentation shall be provided by the Contractor to verify

quantities the extent of which should be confirmed with the Owner and Engineer. Load and delivery tickets specific to the project should be submitted along with other supporting information as necessary. Field measurements and pictures may also be required at no additional payment for provision thereof.

1.5 LUMP SUM VALUES

Values provided for lump sum items shall include the cost of all work associated with provision of the item including, but not limited to, provision of the specified item, furnishing all materials and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and the installation complete of all appurtenances necessary for the provision, construction, and provision complete of the item in conformance with the drawings, specifications and other contract documents. The quantity of appurtenances and incidental work is understood to be non-designated, and the bidder/contractor is responsible for the verification of requirements and assessment of conditions in consideration of item values.

1.6 DEMOLITION

When designated, a lump sum price shall be provided for the demolition of items designated and non-designated items that interfere with construction. The provided cost shall include, but is not limited to, removal of the existing culvert, removal of existing pavement and surfacing, and other related work as necessary and as indicated in the construction plans, specifications, and other contract documents. Costs shall include furnishing all materials and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, all coordination, loading and hauling, disposal per applicable regulations, permitting, dewatering, sorting and services for provision of demolition in conformance with the drawings, specifications and other contract documents.

1.7 SITE GRADING

The price related to site grading shall be included in the Total Lump Sum Project Price in the bid form including all costs for furnishing all materials, grading equipment and supplies, all stormwater drainage structures; piping, all construction equipment and tools, the performance of all necessary labor, supervision, and services; soil placement, removal of rock, clearing and grubbing, erosion control, stabilization, compaction testing, and the provision complete of site grading in conformance with the drawings, specifications and other contract documents.

1.8 SITE PIPING

- A. The lump sum price in the bid schedule is related to fluid carrying pipe and shall generally include all required pipe, tracer wire, fittings, valves, valve boxes, operators, extensions, handwheels, anchors, supports, manholes, junction boxes, joints, gaskets, fasteners, braces, brackets, couplings, adapters, heat tracing (where required), related excavation (which is unclassified), trenching, dewatering, sheeting, shoring, compacted backfill, bedding, encasement, thrust blocking, modification of existing manholes, core drilling, gaskets, grout, field location, connection to exist.

pipework, alignment, testing, placement, painting (for exposed), and all other appurtenant work to allow for provision complete in accordance with the plans, specifications and other contract documents.

- B. The lump sum price provided shall include, but is not limited to, all costs for furnishing all materials, equipment and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and related work for complete provision of all items necessary for the provision, furnishing, construction, and installation complete in conformance with the drawings, specifications and other contract documents.

1.9 SURFACING (PAVED & GRAVEL)

- A. The Lump Sum Price provided shall include the cost for all work including, though not limited to, new asphalt, tack coats and primers, aggregate base, aggregate surfaces, leveling and sloping, saw cutting, surface prep, weeds barriers (under gravel), and all related work and appurtenant work in accordance with the project construction plans, specifications, and contract documents.
- B. The lump sum price shall include mobilization, insurance, bonding, labor, supervision, coordination and other related services and the provision complete of the improvements and work indicated in conformance with the drawings, these specifications, and other contract documents. All materials shall be quantified and provided by the bidder. Material quantities shall be documented and inspected and if required, excess materials paid for any changes in scope.

1.10 CONCRETE SIDEWALKS

The price for concrete sidewalks shall be included in the Total Base Bid price in the bid form and shall include all costs for furnishing all materials, grading, equipment and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and the installation complete of the paved surfacing in conformance with the drawings, specifications and other contract documents.

1.11 SLUDGE LOADING PAD

The lump sum price for the sludge loading pad shall be included in the Total Base Bid price in the bid form and shall include all costs to provide the reinforced concrete sludge loading pad and the grated inlet with all materials, concrete, woven wire, reinforcement, vaults, grates, drains, grading, equipment and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and the installation complete of the paved surfacing in conformance with the drawings, specifications and other contract documents.

1.12 SEEDING & MULCHING AND EROSION CONTROL

The costs related to seeding and mulching along with erosion control shall be included in the Total Base Bid price in the bid form and shall include all costs for furnishing all materials, equipment and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and the provision complete of all required seeding and mulching in conformance with the drawings, specifications, and other contract

documents. It shall be assumed that all disturbed areas are to be seeded and mulched as required to provide a full grass surface and reseeded and mulched during construction and for a period of one year from the date of construction completion.

1.13 MISCELLANEOUS WORK (Site)

The lump sum price provided for MISCELLANEOUS WORK (Site) shall include all items and services as required to properly complete the work generally described by the plans and specifications which is not included in any other item such as, but not limited to, general clean-up, temporary relocation of signs, construction barriers and other minor work. The price shall include all costs for providing all materials, equipment and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and the installation complete of all items necessary for the provision, construction, and provision complete of all required services in conformance with the drawings, specifications and other contract documents.

1.14 EXCAVATION AND TRENCHING

Except where otherwise specified, the price of excavation is to be made a part of the lump sum price for the related item of work. All costs for such work and incidental work shall be included in the provided prices including, but not limited to, the cost of dewatering, shoring, provision of access slopes/ramps, removal and disposal of excess of material, compaction of placed material, rock removal, all equipment and labor needed, coordination, and all other related work. The characteristics of project soils and subsurface conditions is not fully known and field verification by the contractor is required during construction. All excavation and trenching for bidding will be unclassified as to materials which may be encountered. Excavation and trenching will be unclassified as to depth unless otherwise noted. No direct payment will be made for excavation unless otherwise noted.

1.15 MISCELLANEOUS CONCRETE

Unless otherwise authorized by the Engineer, concrete for thrust blocks, utility stabilization, posts and signs, relocations, and miscellaneous appurtenances will be considered a subsidiary obligation of the Contractor and no direct payment will be made therefore. The related cost may be included in the unit price for applicable items and in the overall project cost.

1.16 SLUDGE STORAGE BASIN

The Lump Sum Price provided shall include all costs for provision of the proposed concrete structure including, but not limited to, furnishing all materials, equipment and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and the installation complete of the diversion structure at the proposed secondary clarifiers in conformance with the drawings, specifications and other contract documents. The work shall include, but is not limited to, the provision of all concrete, rebar, waterstops, wall pipes, gaskets, sleeves, embedments, forms, blocks, admixtures, coatings, gates, fasteners, and all other appurtenant work for the complete provision of the structure.

1.17 AERATION SYSTEM

- A. The lump sum price provided for the Aeration System shall include the cost for all work including, though not limited to, the provision of a complete aeration system with all blowers, diffusers, piping, valves, fittings, gauges, fasteners, supports, fixtures, couplings, brackets, blower pad, wiring, conduit, junction boxes, control systems, panels, SCADA output, integration with monitoring equipment, and all items required for a complete system. Communication and output shall be provided for integration into the Facility SCAD system, but actual programming of the facility SCAD is to be by others. Integration and programming shall be provided for the supplier's control (local) panel.
- B. The lump sum price shall include all costs related to, but not limited to, all costs for furnishing all materials, all manufacturer costs, start-up costs, equipment, and supplies; all construction equipment and tools, shipping and storage, the performance of all necessary labor, supervision, and services; and the provision complete of the equipment in conformance with the drawings, these specifications, and other contract documents.

1.18 SLUDGE PUMP STATION

- A. The related lump sum price provided shall include costs related to the provision of new submersible pump station including, but not limited to pumps, pump controls, level sensing/controls, wet-well, valve vault, sludge loading vault, valves, actuators, piping, fittings, supports, gauges, and related work per the plans and specifications. Work shall include, but is not limited to, the provision and installation of a new submersible pump, guide rails, lifting chains, brackets, fasteners, anchors, ports, in ground prefabricated concrete wetwell, prefabricated valve and sludge loading vaults, excavation (unclassified), dewatering, bedding, shoring, placement, compacted backfill, hatches, controls, control mounting, wiring, conduit, connection to power, junction boxes, switches, fixtures, hoist, grating, frames and supports, and related work. Communication and output shall be provided for integration into the Facility SCADA system, but actual programming of the facility SCADA is to be by others. Integration and programming shall be provided for the supplier's control (local) panel.
- B. The lump sum price provided shall include, but is not limited to, all costs for furnishing all materials, equipment and supplies; all manufacturer costs, start-up costs, all construction equipment and tools, shipping and storage, the performance of all necessary labor, supervision, training, and services; and the provision complete of the work in conformance with the drawings, these specifications, and other contract documents.

1.19 MONITORING EQUIPMENT (DO, LEVEL, ALARM & WIRING)

- A. The price for flow monitoring equipment shall be included in the Total Base Bid price in the bid form with all costs for furnishing all materials, equipment and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and the installation complete of the flow monitoring equipment in conformance with the drawings, specifications and other contract documents.

- B. The work shall include, but is not limited to the D.O. Probe, level transducers, alarm float and beacon, all control panels, local displays for DO, electrical conduit, wiring, electrical work, integration with local system and site control systems and all other appurtenant work for the complete provision of the flow monitoring system.

1.20 YARD LIGHTING

- A. The price for additional on-site yard lighting shall be included in Lump Sum price in the Bid Form for Electrical and shall include all costs for furnishing all materials, equipment and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and services; and the provision complete of the yard lighting and standards in conformance with the drawings, specifications and other contract documents.
- B. The work shall include, but not be limited to, all wiring, breakers, electrical conduit, light standards, wiring electrical work, bedding, connection to power supply, posts, bases, masts, lights, and all other appurtenant work for the complete provision of additional yard lighting at the wastewater treatment plant.

1.21 TESTING

No separate payment will be made for testing in accordance with the specifications. All costs in connection therewith will be considered a subsidiary obligation of the Contractor and should be included as part of the Total Base Bid price provided and/or applicable unit prices indicated.

1.22 ALTERNATES

- A. Prices provided for Alternates (Deductive or otherwise) in the Bid Schedule shall include all costs for providing all materials, equipment and supplies; all construction equipment and tools, the performance of all necessary labor, supervision, and all items that would have been necessary for the provision of the related work described in conformance with the drawings, specifications and other contract documents.
- B. Where prices were previously provided in the bid form are to be applied in full to the deduct applicable, then, a duplicate or revised price might not be requested, and in such cases, the previously given price will be applied to the deduct value for that item. Due to the complexity of transferring numbers and correctly quoting each deductive option, the City will verify and correct the values of each deductive alternate after the bid opening and may treat as an irregularity any discrepancies disclosed, and may revise amounts to the corrected value(s) for use in further consideration.

END OF SECTION

**SECTION 01 74 00
CLEANING AND WASTE MANAGEMENT**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project cleanup.

1.02 RELATED SECTIONS

- A. Cleaning for Specific Products or Work – Related Specification Section for that work.

1.03 SAFETY REQUIREMENTS

- A. Hazards Control:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- B. Conduct cleaning and disposal operations to comply with local ordinances and antipollution laws.
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.

PART 2 PRODUCTS

2.01 SAFETY REQUIREMENTS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 GENERAL

- A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.
- B. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

3.02

DURING CONSTRUCTION

- A. Execute cleaning to ensure that building, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. At reasonable intervals during progress of Work, clean site and public properties, and dispose of waste materials, debris, and rubbish.
- D. Provide on-site dump containers for collection of waste materials, debris, and rubbish.
- E. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.
- F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
- G. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- H. Remove from the Owner's property and from all public and private property, at Contractor's expense, all temporary structures, rubbish, excess excavation, and waste material resulting from his operations.
- I. Clean all dirt from paved surfaces, not allowing same to pack on the roadway or to create a traffic nuisance. Insofar as practicable, clean all dirt from gravel and oil aggregate surfaces.
- J. All existing sod areas shall be hand raked to remove earth deposited on or in them during construction.
- K. All ditches shall be graded and properly sloped.
- L. Shoulders where sodding, seeding, or surfacing is not required shall be bladed and shaped.
- M. Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.

3.03

FINAL CLEANING

- A. Employ experienced workmen, or professional cleaners, for final cleaning.
- B. In preparation for substantial completion or occupancy, conduct final review of sight exposed interior and exterior surfaces, and of concealed spaces.
- C. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.

- D. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.
- E. Broom clean paved surfaces; rake clean other surfaces of grounds.
- F. Remove snow and ice from access to building.
- G. Replace air conditioning filters if units were operated during construction.
- H. Clean ducts, blowers, and coils, if air conditioning units were operated without filters during construction.
 - 1. Maintain cleaning until project, or portion thereof, is occupied by Owner.

END OF SECTION

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Record documents.

1.02 MAINTENANCE OF DOCUMENTS

- A. Maintain at job site, one copy of:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Reviewed Shop Drawings.
 - 5. Change Orders.
 - 6. Other Modifications to Contract.
 - 7. Field Test Records.
- B. Maintain documents in clean, dry, legible condition.
- C. Do not use record documents for construction purposes.
- D. Make documents available at all times for inspection by Engineer, appropriate State and Federal Regulatory Agencies, and Owner.
- E. Store documents in temporary field office apart from documents used for construction.
- F. Provide files and racks for storage of documents.
- G. File documents in accordance with Project Filing Format of Uniform Construction Index.

1.03 RECORDING

- A. Label each document "PROJECT RECORD" in 2 inch high printed letters.
- B. Keep record documents current.
- C. Do not permanently conceal any work until required information has been recorded.
- D. Contract Drawings: Legibly mark to record actual construction:
 - 1. Depths of various elements of sewer pipe and manholes in relation to survey datum.
 - 2. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
 - 3. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

4. Field changes of dimension and detail.
 5. Changes made by Change Order or Field Order.
 6. Details not on original contract drawings.
- E. Specifications and Addenda: Legibly mark up each section to record:
1. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually installed.
 2. Changes made by Change Order or Field Order.
 3. Other matters not originally specified.
- F. Shop Drawings: Maintain as record documents; legibly annotate following drawings to record changes made after review.
1. Electrical controls.
 2. Equipment.
 3. Structural.
 4. Mechanical.

1.04 SUBMITTAL

- A. At completion of project, deliver record documents to the Engineer.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
1. Date.
 2. Project title and number.
 3. Contractor's name and address.
 4. Title and number of each record document.
 5. Certification that each document as submitted is complete and accurate.
 6. Signature of Contractor, or his authorized representative.

END OF SECTION

SECTION 02 41 19 SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. Removal and Demolition to be per the construction drawings and as required to accommodate new construction, as shown on the drawings and set forth herein.
- B. Field verify with the Engineer items to be removed or demolished prior to their removal.
- C. Remove and legally dispose of demolished materials off-site. Some structures are of reinforced concrete construction and may include miscellaneous metals and equipment.
- D. Protect site work and adjacent structures.
- E. Seal any exposed reinforcing steel to prevent corrosion.
- F. Maintain service and operation of facility except as approved by Owner.
- G. All work to be coordinated with the Owner.

1.02 RELATED SECTIONS

- A. Clearing and Grubbing
- B. Excavation and Fill
- C. Structure Excavation
- D. Trenching and Backfilling

1.03 QUALITY ASSURANCE

Contractor shall have experience in demolition of comparable structures.

1.04 DOCUMENT

- A. Permit for transport and disposal of debris.
- B. Demolition procedures and operational sequence for review and acceptance
- C. Certification of hauler and proposed disposal method and destination to be approved by Owner.

PART 2 PRODUCTS

Not applicable.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify that the structures to be demolished are discontinued in use or appropriately diverted around and unoccupied.
- B. Do not commence work until conditions are acceptable to the Owner.

3.02 PREPARATORY WORK

- A. Prior to demolition of structures, all water and wastewater shall be removed and properly disposed of by the Contractor in accordance with applicable rules.
- B. The Contractor shall review in with the Owner and Engineer all items to be removed and coordinate all related work.

3.03 DEMOLITION

- A. The Contractor shall remove from the site all demolition debris. Exposed reinforcing steel shall be cut from the attached concrete and removed from the site. The exposed steel surface shall be sealed to prevent corrosion.
- B. Existing structures shall be removed as required to allow for construction of new structures and as indicated on the construction drawings. Any buried pipe uncovered during grading shall be considered abandoned pipe and shall be removed to a depth of one foot below finished grade and/or two feet from any trench wall or embankment.
- C. All regulated waste materials not salvaged or recycled shall be disposed of in a licensed landfill, and Contractor will be required to provide proof of proper disposal (landfill receipts, etc.) to the Owner for all regulated waste material removed from the site.
- D. Liquid effluent in north tank may be pumped down by using bed with no influent after new system is functional. After sludge removal, effluent in south tank may be left in place.

3.04 GRADING AND SEEDING

There shall be no remnants of structures or demolition debris in the top twelve inches of soil upon completion of the project unless approved by Owner.

END OF SECTION

SECTION 03 15 13 WATERSTOPS

PART 1 GENERAL

1.01. SUMMARY

This section consists of furnishing and installing waterstops at the locations as shown on the drawings and specified herein including all tools, labor, materials, equipment and incidentals necessary complete this section.

1.02. RELATED SECTIONS

The following sections shall be considered with the waterstops.

1. Section 03 30 00 Cast-in-Place Concrete, and all related sections.

1.03. SUBMITTALS

A. Submit for approval 4 copies of the following:

1. Product literature.
2. Complete description.
3. Dimensions and required clearances.
4. Weights.
5. Performance characteristics.
6. A list of all deviations from drawings and specifications.
7. Affidavits of compliance with referenced standards and codes.
8. Manufacturers' Warranty.

1.04. QUALITY ASSURANCE

Reference Standards: Comply with all applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. ACI 224.3R-95 Joints in Concrete Construction

PART 2 PRODUCTS

2.01. MATERIALS

A. PVC Waterstops:

1. Shall be manufactured from virgin polyvinyl chloride (PVC) plastic compound and shall not contain any scrap or reclaimed material or pigments.
2. PVC waterstops shall be 4" wide.

B. Bentonite Waterstops:

1. Shall be an active bentonite/butyl rubber based waterstop with 75% minimum of sodium bentonite content.

2.02. MANUFACTURERS

PVC waterstops shall be as manufactured by Greenstreak Group, Inc., a division of Sika Group, or approved equal.

Bentonite waterstops shall be Waterstop-RX as manufactured by CETCO Building Materials Group or approved equal.

PART 3 EXECUTION

3.01. LOCATIONS OF WATERSTOPS:

Waterstops shall be required at all construction joints unless deviations are specifically requested by the contractor and approved by the Engineer.

3.02. Installation:

PVC waterstops shall be of maximum practicable length which will limit the number of splices to a minimum. Joints at intersections and at ends of pieces shall be made according to the manufacturer's recommendations and shall develop water tightness fully equal to that of continuous waterstop material.

Bentonite waterstops shall be of maximum practicable length.

1. When installed in new construction material shall be centered in concrete component (slab or wall).
2. When installed on existing construction, the existing concrete shall be cleaned thoroughly prior to application of waterstop material.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide cast-in-place concrete for general building construction where indicated on drawings and specifications:
 - 1. Footings, foundations, piers and retaining walls (where indicated).
 - 2. Building slabs on grade, sidewalks and curbs (where indicated).
 - 3. Requirements (materials, mixes, finishes) apply to concrete work specified in other sections, refer to individual sections for reference.

1.02 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Product Data: Submit manufacturer's data with application and installation instruction for materials to be used as follows:
 - 1. Admixtures.
 - 2. Curing and Sealing Materials.
 - 3. Miscellaneous Materials.
- C. Shop Drawings: Concrete reinforcement fabrication, bending and placement. Comply with ACI 315 showing bar schedules, stirrup spacing, diagrams of bent bars and arrangement of concrete reinforcement.
- D. Concrete Mix Design: Submit 3 copies of concrete mix design for each strength or composition of concrete to be used.
- E. Laboratory Strength Test: Submit 3 copies of all strength tests.

1.03 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Standards: Comply with the provisions of the following specifications and standards, except as otherwise noted or specified, or as accepted or directed by the Architect.
 - 1. ACI 301, Specifications for structural Concrete for Buildings.
 - 2. ACI 304.2R-96, Specifications for Concrete Placement by Means of Pumping.
 - 3. ACI 305R-91 and ACI 306.1-90, Specifications for Hot and Cold Weather Concreting.
 - 4. ACI 318, Building Code Requirements for Reinforced Concrete.
 - 5. Concrete Reinforcing Steel Institute, Manual of Standard Practice.

6. Environmental Protection Agency (EPA) volatile organic compound (VOC) evaporation requirements.
- C. Testing: Contractor shall employ a qualified independent testing laboratory acceptable to Owner and Architect to perform material evaluation as specified under FIELD SAMPLING AND TESTING paragraph.
- D. Tolerances:
 1. ACI Standards shall govern concrete work except where specified differently.
 2. Floor flatness and levelness tolerances: ACI 302.1R and ASTM E 1155
 - a. Subfloors Under Materials Such As Vinyl Tile, Paint, and Carpet: Floor flatness (Ff) of 20, floor levelness (Fl) of 17.
 - b. Subfloors exposed or for polished concrete finishing: Floor flatness (Ff) of 40, floor levelness (Fl) of 40.
 3. Variation from plumb:
 - a. 0 to 10 feet: 1/4" maximum.
 - b. 20 feet or more: 3/8" maximum.
 4. Variation in thickness: 1/4" to 1/2", 5% for footings.
 5. Variation in grade:
 - a. 0 to 10 feet: 1/4" standard, 1/8" for floor slabs.
 - b. 10 to 20 feet: 3/8" standard, 1/4" for floor slabs.
 - c. 40 feet or more: 3/4" standard, 3/8" for floor slabs.
 6. Variation in plan:
 - a. 0 to 20 feet: 1/2"
 - b. 40 feet or more: 3/4" standard, plus 1/2" for footings.
 7. Variation in eccentricity: 2% for footings.
 8. Variation in openings:
 - a. Size: plus 1/8"
 - b. Location: 1/4"

1.04 FIELD SAMPLING AND TESTING

- A. The following samples and test will be preformed by an independent testing laboratory approved by the Architect.
- B. Samples:
 1. Field slump test shall be tested per 25 cu. yds. or each placement concrete to be mixed per ASTM C94, recording location for report.
 2. Field samples shall be made and cured in accordance with ASTM C 31, for each concrete strength, at the rate of 4 test cylinders and one slump test for each 50 cubic yards or each 5,000 sq. ft. surface area or fraction thereof, from each day's pour and record locations for report.
 3. Test cylinders shall be as follows: 2 at 7 days and 2 at 28 days. Test in accordance with ASTM C 173 Volumetric Method, or ASTM C231 Pressure Method, make air content check

for each set of test cylinders.

4. The taking of samples from small pours of 10 cubic yards or less may be omitted at the discretion of the Architect.
5. When early form removal is requested, field cure cylinders tested at 7 or less days to determine sufficient strength.

C. Testing:

1. Where strength of any group of 2 cylinders or of any individual cylinder fall below minimum compressive strength specified, the Architect shall have the right to require that test specimens be cut from the structure. Specimens shall be selected by Architect from location in structure represented by test specimen or specimens which failed.
2. Specimens shall be secured, prepared, and tested in accordance with ASTM C 42, within a period of 60 days after placing concrete.
3. Concrete shall be considered to meet the strength requirement of this specification if it meets the strength requirements of paragraph 5.6.4 of ACI 318.
4. Should laboratory analysis indicate that the proper concrete mix has not been used by the Contractor, all such concrete poured using the improper mix shall be subject to rejection.
5. The cost of cutting specimens from the structure, patching the resulting holes, and making the laboratory analysis shall be borne by the Contractor.
6. The holes from which the cored samples are taken shall be packed solid with no slump concrete proportioned in accordance with the ACI 211 "Recommended Practice for Selecting Proportions of No-Slump Concrete". The patching shall have the same design strength as the specified concrete.
7. If any of the specimens cut from the structure fail to meet the requirements outlined in paragraph 5.6.4 of ACI 318, The Architect shall have the right to require any and all defective concrete to be replaced and all cost resulting therefrom shall be borne by the Contractor.
8. Additional Sampling: In addition to the slump tests specified above, the Contractor shall keep a cone (mold) and rod apparatus on the job site for random testing of batches. When concrete does not meet the specified slump requirements, and when directed by the Architect or Owner, immediately perform a slump test in accordance with ASTM C 143. Concrete not meeting the slump requirements shall be removed from the job site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Form Materials:

1. For Exposed Finish Concrete: Plywood, metal, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces.
2. For Unexposed Finish Concrete: Use plywood, lumber, metal, or other acceptable material. If lumber is used, it must be dressed on at least 2 edges and 2 sides for a tight fit.

- B. Form Coatings: Commercial formulated form coating compound with maximum VOC of 350 mb/l that will not bond with, stain, nor adversely affect concrete surfaces, will not impair subsequent

treatments or finishes requiring bond or adhesion, nor impede wetting of concrete surfaces by water or curing compound.

C. Steel Reinforcement:

1. Reinforcing Bars: ASTM A 615(S1), Grade 60, deformed billet steel bars of grades as indicated on the drawings, free from loose rust, scale and other coatings that may reduce bond.
2. Mesh or Fabric Reinforcement: ASTM A 185, welded wire fabric, of sizes and types indicated on the drawings.
3. Fiber Reinforcement: Contractor's option to provide engineered polypropylene fibers for secondary reinforcement of slabs in lieu of mesh or fabric reinforcement. "Fibermesh" or W.R. Grace "Grace Fibers, (no substitutes), in multi-design fiber length (MD Graded), shall be applied at 1.5 pounds per cu. yd. of concrete, or 0.1% by volume, in accordance with ASTM C 1116.
4. Accessories: Include all spacers, chairs, ties, and other devices necessary for properly spacing and fastening reinforcement in place. Use plastic protected reinforcing bar supports conforming with CRSI Class 1 specification for exposed finish concrete.
5. Tie Wires: Soft annealed iron wire not smaller than 18 gage.

D. Concrete Materials:

1. Portland Cement: ASTM C 150, Type I.
2. Normal Weight Concrete Aggregates: ASTM C 33, and the following:
 - a. Fine Aggregate: Clean, sharp, natural or manufacturer sand, free from loam, clay, lumps, or other deleterious substances.
 - b. Coarse Aggregate: Clean, uncoated, processed, locally available aggregate, containing no clay, mud, loam, or foreign matter; maximum size 1 ½".
3. Mixing Water: Clean, free from oil, acid, salt, injurious amounts of vegetable matter, alkalies, and other impurities; potable.
4. Admixtures:
 - a. Water-Reducing Admixture: ASTM C 494, Type A. Euclid "Eucon WR-75", Mater Builders "Pozzolute 344", Sika Chemical "Plastocrete 160", or Chem-Masters "Chemtard".
 - b. Water-Reducing Retarding Admixture: ASTM C 494, Type D. Euclid "Eucon Retarder 75", Master Builders "Pozzoith 300-R", W.R. Grace "Daratard", or Sika Chemical "Plastiment".
 - c. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or G. Euclid "Eucon 37", W.R. Grace "WRDA 19", Protex "PSP", Anti-Hydro "Super P", Sika Chemical "Sikament", Gifford-Hill "PSI Super", or Master Builders "Pozzolute 400".
 - d. Non-Corrosive, Water Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E. Admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least one year duration) using an acceptable

accelerated corrosion test method such as that using electrical potential measures. Euclid "Accelguard 80", W.R. Grace "Daraset", or Master Builders "Pozzutec 20".

- e. Air Entrained Admixture: ASTM C 260, 5% plus or minus 1% for concrete exposed to freeze-thaw. Sika "Sika Aer", Master Builders "MB-VR" or "MB-AE, or W.R. Grace "Dorex AEA".
- f. Fly Ash Admixture: Use of quality fly by weight will be permitted as a cement reducing admixture by 15% maximum. Provide fly ash meeting requirements of ASTM C 618 Class C or Class F with the following special requirements. Loss on ignition in Table I shall not exceed 3%. Compliance to Table IA shall apply. Amount retained on the 325 sieve in Table 2 shall not exceed 20%. Chemical analysis of the fly ash shall be reported in accordance with ASTM C 114. Submit report indicating for a 6 month period immediately prior to submittal date, weekly test and tests results performed on concrete with fly ash admixture. The option to use fly ash must be submitted to the Architect for approval.
- g. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions.
- h. Certification: Upon request, provide admixture manufacturer's written certification that chloride ion content complies with specified requirements.
- i. Other Admixtures: Do not use other admixtures unless accepted in writing by Architect.

E. Curing and Sealing Materials:

- 1. General: Provide products compatible with flooring and special finish systems specified. Refer to drawing finish schedule for types and locations.
- 2. Comply with Environmental Protection Agency (EPA) volatile organic compound (VOC) evaporation requirements.
- 3. Curing Compound:
 - a. High Solids Curing & Sealing Compound: Clear styrene acrylate type, providing 30% solids content minimum and moisture loss of not more than 0.030 grams per sq. cm. when applied at coverage rate of 300 sq. ft. per gallon. Curecrete Distribution "Ashford Formula", Euclid "Super Rez-Seal" or "Aqua-Cure VOX", Master Builders "Masterseal 66", or Sonneborn "Kure-N-Seal 30".
 - b. Dissipating Resin Curing Compound: Euclid "Kurex DR", or approved equal; ASTM C 309, Type I dissipating resin type compound with fugitive dye; film must chemically break down in two to four week period.
- 4. Concrete Sealer: Sonneborn "Kure 1315", Euclid "Eucopoxy Tufcoat VOX", L&M "Dress & Seal WB 30", or approved equal.

F. Miscellaneous Materials:

- 1. Connectors: Provide all metal connectors required for placement in cast-in-place concrete, for the attachment of structural and non-structural members.
- 2. Expansion Joint Filler: ASTM D 1751, non-extruding premoulded material, 1/2" thick, unless otherwise noted, composed of fiberboard impregnated with asphalt, except use ASTM D 1752, Type II, resin-bound cork for walks and other exposed areas. Sonneborn "Sonoflex F" closed cell polyurethane foam expansion joint filler is acceptable.

3. Vapor Barrier: ASTM E 1745, Polyethylene film, .010" thick; Visqueen or approved equal.
4. Non-Shrink Grout: CRD-C 621, factory pre-mixed grout, compressive strength 6000 psi minimum.
 - a. Metallic: Master Builders "Embeco 636", Sonneborn "Ferrolith GDS, Euclid "Hi-Mod Grout", or L&M "Ferrogrout".
 - b. Non-Metallic: Master Builders "Construction Grout", Sonneborn "SonogROUT", Euclid "Eucon-NS", or L&M "Crystex".
5. Bonding Agent: Polyvinyl acetate, rewettable type; W.R. Grace "Daraweld C", Larsen "Weldcrete", Euclid "Euroweld", or L&M "Everbond".
6. Patching Mortar: Free-flowing, polymer-modified cementitious coating; BASF MBT "Underlayment, Self-leveling", Euclid "ThinCoat", Sika Chemical "Sikatop 120", or Thoro "Thoro Underlayment".

2.02 PROPORTIONING OF MIXES:

- A. Strength: Concrete minimum ultimate strength at 28 days in accordance with ASTM C 94 shall be as follows unless otherwise noted on drawings:
 1. Building Foundations, Footings, Walls, Slabs on Grade, and Ground Supported Post-Tension Foundation Systems: 3500 psi with 6 bags minimum of cement per cubic yard.
 2. Exterior Site Concrete exposed to Weather including Retaining Wall Systems: 4000 psi with 6 bags minimum of cement per cubic yard.
- B. Mix Design:
 1. Prepare design mixes for each type of concrete, in accordance with ACI 301 and ACI 318, except as otherwise specified.
 2. Proportion design mixes by weight for class of concrete required, complying with ACI 211, except as otherwise specified.
- C. Proposed mix designs shall be accompanied by complete standard deviation analysis or trial mixture test date. Proposed mix shall list the following characteristics:
 1. If trial batches are used, gross weight and yield per cu. yd. of trial mixtures.
 2. Measured slump.
 3. Air content range.
 4. Compressive strength developed at 7 days and 28 days, trial batches.
 5. Submit written reports to the Architect for design mix at least 15 calendar days prior to the start of work.
 6. Use air-entrained mixture in strict compliance with manufacturer's directions.
 7. Water/Cement Ratio: Concrete subject to freezing and thawing shall have a maximum water/cement ratio of 0.50 by weight.
 8. Admixture Usage: Concrete must contain specified water-reducing admixture or water-

reducing -retarding admixture and/or specified high-range water-reducing admixture (superplasticizer). Concrete slabs placed at air temperatures below 50 degree F shall contain specified non-corrosive non-chloride accelerator. Concrete required to be air entrained shall contain an approved air entraining admixture. Pumped concrete, architectural concrete, concrete required to be watertight and concrete with water/cement ratio below 0.50 shall contain specified high-range water-reducing admixture (superplasticizer).

- D. Slump Limits: 2" to 4". Concrete containing high-range water-reducing admixture (superplasticizer) shall have a maximum slump of 8" unless otherwise approved by Architect. Concrete shall arrive at job site at slump of 2" to 3", be verified, then high-range water-reducing admixture added to increase slump to approved level. Other concrete shall arrive at job site at maximum slump of 3" for slabs and 4" for other members. No water shall be added on site which will increase the slump above 4"

2.03 BATCHING AND MIXING:

- A. Concrete may be ready-mixed or job-mixed at the Contractor's option, in accordance with governing building code and with the referenced ACI 318. No hand mixing allowed.

PART 3 - EXECUTION

3.01 FORM WORK:

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by the concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.
- B. Construct forms complying with ACI 347, to sizes and shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, molding, rustications, reglets, chambers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
- C. Fabricate forms for easy removal without hammering or prying against the concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.
- D. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings on forms at inconspicuous location.
- E. Chamfer exposed corners and edges 3/4" unless otherwise indicated, Where applicable use wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
- G. Preparation of Form Surfaces: Coat the contact surfaces of forms with a form-coating compound where applicable before reinforcement is placed.
- H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such ties. Accurately place and securely support items built in to form.
- I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete.

Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms after concrete placement, if required, to eliminate mortar leaks.

3.02 PLACING REINFORCEMENT:

- A. Comply with the Concrete Reinforcing Steel Institute (CRSI) "Recommended Practice for Placing Reinforcing Bars", and as indicated on drawings and herein specified.
- B. Clean reinforcement of loose rust, mill scale, dirt, and other materials or coatings which reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by chairs, spacers, and hangers as required. Set wire ties so ends are pointed into concrete.
- D. In all cases, provide minimum concrete protection over bar reinforcement of at least 3" unless otherwise indicated on drawings.
- E. Do not place bars more than 2" beyond the last leg of continuous support. Do not use supports to hold runways for conveying equipment.
- F. Install mesh welded wire fabric reinforcement in as long lengths as practicable, lapping pieces at least one mesh plus 2" but in no case less than 8". Lace splices with wire. Offset end laps to prevent continuous laps in either direction. Lift mesh to middle third of slab by use of hooks.

3.03 JOINTS AND INSERTS:

- A. Joints: Provide slab joints, sawed joints and formed construction joints. Locate and install joints, which are not shown on drawings, so as not to impair the strength and appearance of the structure. Submit joint layout to Architect if requested.
- B. Inserts: Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Properly locate all embedded items in cooperation with other trades, and secure in position before concrete is placed. Use setting drawings, diagrams, instructions, and directions provided by suppliers of the items to be attached thereto.

3.04 CONCRETE PLACEMENT:

- A. Comply with ACI 304, and as herein specified.
- B. Pre-Placement Inspection: Before placing concrete, clean and inspect formwork, reinforcing steel, and items to be embedded or cast-in. Notify other crafts in ample time to permit the installation of their work, and cooperate with them in setting such work, as required. Make sure soil treatment for termite control has been applied, where required, to cushion fill before vapor barrier and concrete are installed. Coordinate the installation of joint materials and vapor barriers with placement of forms and reinforcing steel.
- C. Vapor Barrier: Apply directly over base. Lay with 6" wide side laps and end laps and seal watertight with manufactures adhesive. Lay film just before reinforcement is placed and concrete is poured, and protect against punctures. Repair punctures with adhesive-applied extra sheet before proceeding.
- D. Notify the Architect 24 hours before placing any concrete. Coordinate governmental inspections, if required, with agency having jurisdiction.
- E. Conveying: Convey concrete from the mixer to the place of final deposit by methods which will

prevent the separation or loss of materials. Provide equipment for chuting, pumping, and pneumatically conveying concrete of proper size and design as to insure a practically continuous flow of concrete at the point of delivery and without segregation of the materials. Keep open troughs and chutes clean and free from coatings of hardened concrete. Do not allow concrete to drop freely more than 10 feet. Do not use vibrators to transport concrete inside of forms. All equipment and methods used for conveying are subject to the approval of the Architect.

- F. Depositing: Deposit concrete continuously or in layers of such thickness that no concrete will be placed on hardened concrete so as to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete near or in its final location to avoid segregation due to rehandling or flowing, and displacement of the reinforcement.
- G. Cold Weather Placing: Comply with the requirements of ACI 306.
- H. Hot Weather Placing: Comply with the requirements of ACI 305.
- I. Compaction: Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners. When using vibrators, insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate the placed layer of concrete and at least 6" into the proceeding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit the duration to the time necessary to consolidate the concrete and complete embedment of reinforcement and other embedded items without causing segregation of the mix.

3.05 FINISH OF FORMED SURFACES:

- A. Rough Form Finish: For formed concrete surfaces not exposed to view in the finished work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smooth.
- C. Smooth Rubbed Finish: Provide a smooth rubbed finish for exposed concrete surfaces and surfaces which have received smooth form finish treatment not later than one day after form removal. Moisten concrete surfaces and rub smooth with carborundum brick or other abrasive until uniform color and texture is produced. Do not apply cement grout other than that created by rubbing process.

3.06 SLAB FINISHES:

- A. Place, consolidate, strike off and level concrete slab to proper elevation. After the concrete has stiffened sufficiently to permit the operation, and water sheen has disappeared, float surface at least twice to uniform sandy texture.
- B. Trowel Finish: After floating, trowel surface at least twice to smooth dense finish.
- C. Slabs to Receive Floor Covering: Finish as in paragraph "Trowel Finish" above, except trowel to remove trowel marks and to smooth, even finish; omit second troweling.

- D. Non-Slip Broom Finish: (At exterior walks, steps, and elsewhere as indicated). Specified in Section 32 13 13.
- E. Concrete Sealer: Apply two coats in accordance with manufacturer's instructions.

3.07 CONCRETE CURING AND PROTECTION:

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by curing and sealing compound, and by combinations thereof, as herein specified.
 - 1. Provide moisture curing by keeping concrete surface continuously wet by covering with water, by water-fog spray, or by covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
 - 2. Provide moisture-cover curing by covering concrete surface with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Provide curing and sealing compound on interior slabs to receive resilient flooring or left exposed; and to exterior slabs, walks, and curbs, as follows:
 - a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - b. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, waterproofing, painting, and other coatings and finish materials, unless otherwise acceptable to Architect.
 - 4. Curing Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
 - 5. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs and other flat surfaces by application of appropriate curing compound. Final cure concrete surfaces by moisture-retaining cover, unless otherwise directed.

3.08 PROTECTION

- A. No wheeling, working, or walking on finished surfaces will be allowed for 16 hours after concrete is placed.
- B. Provide plywood or other acceptable protective cover at all traffic areas throughout the job.
- C. Protect all exposed concrete floors, steps, and walks from paint and other materials or equipment

which may mar or damage these surfaces.

3.09 REMOVAL OF FORMS:

- A. Do not remove forms until the concrete has attained 67% or 28 day strength or minimum of 4 days. Use a method of form removal which will not cause overstressing of the concrete.

3.010 MISCELLANEOUS ITEMS:

- A. Filling Holes: Fill in holes and openings left in concrete for the passage of work by other trades after their work is in place. Mix, place, and cure concrete to blend with in-place construction. Provide all other miscellaneous concrete filling required to complete work.
- B. Non-Shrink Grout Application: Grout out equipment bases and other locations indicated with non-shrink grout. Provide non-metallic type where grout is exposed.
- C. Drainage Items: Unless otherwise indicated, provide 3000 psi concrete for culverts and other items required for drainage installation.

3.011 CONCRETE SURFACE REPAIRS:

- A. General: Repair and patch defective areas with cement mortar of the same type and class as the original concrete, immediately after removal of forms. Cut out honeycomb, rock pockets, voids over ½" diameter, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface, before placing cement mortar in the same manner as adjacent concrete. Proprietary patching compounds may be used when acceptable to the Architect.
- B. Smooth, Exposed-To-View Surfaces: Blend cements so that, when dry, patching mortar will match color of surrounding concrete. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Concealed Formed Surfaces: Repair defects that adversely affect the durability of the concrete. If defects cannot be repaired remove and replace the concrete.
- D. Other repair methods may be used, subject to Architect's acceptance.

3.012 CLEAN-UP:

- A. Do not allow debris to accumulate. Clean up all concrete and cement materials, equipment and debris upon completion of any portion of the concrete work, and upon completion of the entire cast-in-place concrete work.

END OF SECTION

SECTION 03 41 00

PRECAST STRUCTURAL CONCRETE

PART 1 GENERAL

1.01 SUMMARY

Provide precast structural concrete units, reinforced and designed for in ground service and HS-20 loading unless otherwise noted.

1.02 SUBMITTALS

- A. Submit for approval product data, concrete mix design, test reports in accordance with Section 03 30 00.
- B. Submit for approval shop drawings, structural calculations, product data and test reports. Perform design under direct supervision of a professional structural engineer licensed in the state where the project is located. Drawings shall be sealed, signed and dated.

1.03 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Casting: Plant cast.
- C. Standards: ACI 318 Building Code Requirements for Reinforced Concrete, and CRSI Manual of Standard Practice.
- D. Testing: See Special Inspections Requirements Schedules on Drawings.
- E. Field and Shop Welding: All structural welding shall be performed in accordance with AWS standards and by welders holding valid certificates and having current experience in the type and positions of welds shown on drawings or in notes. Certificates shall be issued by an accredited testing agency.
- F. Erection Tolerance Limits: PCI MNL 127.

PART PRODUCTS

2.01 MATERIALS

- A. Design Mix:
 - 1. 5000 psi, 28 day compressive strength for typical units.
- B. Formwork: Plywood or metal panel formwork sufficient for structural and visual requirements.

C. Reinforcing Materials:

1. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
2. Reinforcing Bars: ASTM A706.
3. Reinforcing Bars: ASTM A 767, Class II, galvanized.
4. Reinforcing Bars: ASTM A 775, epoxy coated.
5. Steel Wire: ASTM A82.
6. Steel Wire Fabric: ASTM A185 welded.
7. Steel Wire Fabric: ASTM A 497, welded, deformed.
8. Supports for Reinforcement for Exposed to View Concrete: CRSI Class 1, plastic protected legs.
9. Supports for Reinforcement for Exposed to View Concrete: CRSI Class 2, stainless steel protected legs.
10. Prestressing Tendons: ASTM A416, Grade 250 or 270, 7-wire low relaxation strand.

D. Concrete Materials: ASTM C 150, Type I or Type III, Portland cement; potable water.

1. Normal weight aggregates: ASTM C 33.
2. Light weight aggregates: ASTM C 330.
3. Fly Ash: ASTM C 618, Class C or F.
4. Silica Fume: ASTM C 1240, amorphous silica.

E. Concrete Admixtures: Containing less than 0.1 percent chloride ions.

1. Air-Entraining Admixture: ASTM C 260.
2. Water-Reducing Admixture: ASTM C 494, Type A.

F. Connection Materials:

1. Steel Plate: ASTM A283, Grade C.
2. Steel Shapes: ASTM A36.
3. High Strength Threaded Fasteners: ASTM A325.
4. Steel Finish: ASTM A 153 galvanizing for exposed steel; primed for non-exposed steel.
5. Bearing Pads: Elastomeric or TFE to suit bearing stresses.

G. Grout:

1. Portland cement, ASTM C 150, Type I; sand, ASTM C 404.
2. Metallic shrinkage-resistant grout.
3. Nonmetallic shrinkage-resistant grout, CE CRD-C621.

H. Finish:

1. Unformed Surfaces: Trowel finish.
2. Formed Surfaces (Not Exposed to View): Standard form finish.
3. Formed Surfaces (Exposed to View): Commercial finish, Type III 650, Limestone 1975, Lime Sand 950, Water 32.

I. Hatches: Provide for hatches as indicated and coordinate work. For compatibility.

- J. Insulation Materials (if required):
1. Type: Extruded polyisocyanurate, rigid, ASTM C518, "R" of 6.0 minimum per nominal inch, compressive strength 25 psi minimum, water absorption 0.5 percent by volume maximum per ANSI/ASTM D 2842, edge profiles as required.
 2. Refer to drawings for thickness and/or "R" values required.
 3. Unless otherwise indicated, system performance shall comply with the International Energy Conservation Code (IECC) Latest Edition design requirements for project location.

PART 3 EXECUTION

3.01 ERECTION

- A. Verify that field conditions are acceptable. See that all anchorages are properly set to template.
- B. Set structural precast units to lines and elevations indicated. Align and adjust the various members forming a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
- C. Allow for erection loads. Provide temporary shoring and bracing to maintain framing in alignment until completion of erection and installation of permanent bridging and bracing.
- D. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.
- E. Alterations to Structural Precast Framing: Do not field cut or alter structural members without approval of Engineer.
- F. Tolerances: 1/4" in 20' for plumb and location. Comply with requirements of PCI MNL-127 Recommended Practice for Erection of Precast Concrete.
- G. Restore damaged units and finishes. Clean and protect work from damage.

END OF SECTION

SECTION 03 62 00

NON-SHRINK GROUTING

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers grouting of pump, motor, and equipment baseplates or bedplates; other miscellaneous baseplates; and other uses of grout as shown on the drawings. All grouting shall be done with non-shrink grout.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Non-shrink Grout: Master Builders "Special LL-713 Grout", Sauereisen Cements "F-100 Level Fill Grout", U.S. Grout "Five Star Grout", or equal.
- B. Water: Clean and free from deleterious substances.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS:

- A. Grout shall be furnished factory premixed so that only water is added at the job site. Grout shall be mixed in a mechanical mixer. No more water shall be used than is necessary to produce a flowable grout.
 - 1. Preparation: Concrete to receive grout shall be saturated with water for 24 hours prior to grouting.
 - 2. Placement: Grout shall be placed in strict accordance with the directions of the manufacturer so that all space beneath baseplates and bedplates is completely filled without voids.
 - 3. Edge Finishing: In all locations where the edge of the grout will be exposed to view, the grout after it has reached its initial set shall be finished smooth. Except where shown to be finished on a slope, the edges of grout shall be cut off flush at the baseplate, bedplate, member, or piece of equipment.
 - 4. Curing: Grout shall be protected against rapid loss of moisture by covering with wet rags or polyethylene sheets. After edge finishing is completed, the grout shall be wet cured for at least 7 days.

END OF SECTION

SECTION 13 34 19

STEEL BUILDING SYSTEMS (PRE-ENGINEERED)

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Description: The work of this section consists of furnishing and erecting a pre-engineered metal shelter as shown on the drawings and specified herein and shall include all materials, labor, supervision, and incidentals required to provide a complete metal building.
- B. Structure Type: The structure shall be of the size and type as generally shown on the drawings and shall be either rigid frame or tapered beam construction. Column spacing, column footings, truss types, truss spacing and similar information indicated on the construction drawings is for general display only and shall be per the supplier for the application based on their engineered design.
- C. All columns, roofing and trim shall be finish painted of a matching standard color selected by the Owner.

1.02 DESIGN CRITERIA

- A. Design Loads: The building shall be designed in accordance with the City's building code requirements and in accordance of the latest edition of the Metal Building Systems Manual (MBMA) or as herein indicated. The more stringent requirement of either code of these specifications shall be utilized for design.

A minimum wind load of 165 MPH for 1 minute duration and a minimum snow load of 30 pounds per square foot is required.

- B. Engineering Certifications: The building shall be designed by a registered professional engineer licensed to practice in the State of Missouri and all drawings furnished for the project shall bear the engineer's seal.

PART 2 MATERIALS

2.01 GENERAL REQUIREMENTS

- A. Primary Structural Members shall be the main load carrying structural members and shall support secondary structural members.
 - 1. Primary framing shall be manufactured of solid web members having tapered or uniform depth rafters, rigidly connected to tapered or uniform depth columns. The system shall provide a clear span, gabled, rigid frame designed to support the specified loads.
 - 2. Materials used in the fabrication of primary framing systems shall be designed utilizing in compliance with the A.I.S.C. code.
 - a. Structural, Flat Plate, Strip and/or Bar stock shall conform to the physical requirements of ASTM A529 or ASTM A572 as applicable, and

- shall have a minimum yield strength of 50,000 psi for web plates and 55,000 psi for flange bars.
- b. W, M and S shapes, Angle Rods, Channels and other hot rolled shapes shall be of material conforming to the physical requirements of ASTM A572 or ASTM A992, and shall have a minimum yield strength of 50,000 psi.
 - c. Members fabricated from plate or bar stock materials shall have flanges and webs joined on one side of the web by a submerged arc continuous weld process.
- B. Secondary Framing shall be the structural members which distribute the loads to the primary framing system and shall include eave struts, purlins, girts, wind bracing and other miscellaneous structural members. They shall be manufactured of cold-formed light gage sections, welded plate sections and/or structural sections.
- 1. Eave Struts shall be nominal 6" deep "c" shape members of unequal flange manufactured of cold-formed light gage steel and shall be designed as simple span for the specified loads.
 - 2. Purlins and Girts shall be nominal 8" deep "z" or "c" shaped members and shall be manufactured of cold-formed light gage steel designed as simple span, partially continuous or continuous for the specific loads.
 - 3. Wind Bracing shall be a system of bracing designed for the specified loads in accordance with standard design practices. Bracing shall utilize rods, cables, diaphragm action, angles and/or welded plate or structural members as determined by the building manufacturer.
 - 4. Miscellaneous framing shall normally be those members which work in conjunction with primary and secondary framing systems. They shall include members such as: base angles, flange braces, jambs, headers, bridging, or sag members, and shall be designed to be supportive of the framing systems.
 - 5. Materials using in the fabrication of secondary framing systems shall be designed in compliance with the applicable sections of A.I.S.C. and A.I.S.I.
 - a. Cold Formed Members shall be fabricated from material conforming to the physical requirements of ASTM A653, structural steel Grade 50 or ASTM A1011 structural steel or high strength low alloy steel Grade 55. Either material shall be required to have a minimum yield strength of 55,000 psi.
 - b. Cable Bracing shall be fabricated of material conforming to the physical requirements of ASTM A475, 7-Strands, Extra High Strength grade.
 - c. Rod Bracing shall be fabricated of material conforming to the physical requirements of ASTM A36 and shall have a minimum yield strength of 36,000 psi.
 - d. Members fabricated from plate or bar stock materials shall have flanges and webs joined on one side of the web by submerged arc continuous weld process.
- C. Roof shall be of a standing seam type, steel roof per the supplier. Covering shall consist of the roof panels, their attachments, trim and sealant for use on the exterior of the roof. Panels shall provide 36" wide net coverage and have 1-1/4" high major ribs at 12" centers. Side laps shall be one full major rib and

shall utilize the bearing edge of the underlying major rib for support. Panels shall be continuous from ridge to eave.

1. Panels shall be Grade 50 (24 gage) pre-finished with modified silicon polyester over G90 galvanized steel substrate in accordance with ASTM A792. Panel color to be selected by owner from building manufacturer's standard color chart.
2. Materials used in the fabrication of architectural roof and wall trim and flashing shall normally be a prefinished Kynar over 26 gage, grade 50 aluminum-zinc alloy-coated steel substrate, ASTM A792, coating designation AZ50. Color to be selected by owner from building manufacturer's standard color chart.
3. Painted finishes for roof and columns and their flashing shall unless otherwise specified, consists of 0.2 mil baked on primer coat applied to each side. An 0.8 mil baked-on finish coat will be applied on one side, while a 0.3 mil baked-on straight polyester wash coat will be applied on the other. Total thickness of the finish coat side will be nominal 1.0 mil (including the primer coat). Thickness of the backside will be a nominal 0.5 mil (including the primer coat). Color to be selected by Owner.
4. Systems Covering Sealants shall normally be roll tape sealant, tube sealant, and closures as required for weather-tightness of the roof.
5. Tape Sealants shall be of performed butyl rubber base, and shall be supplied as a 3/32" x 1/2" extruded shape.
6. Tube Sealants shall be of a polyurethane type material for applications where color sealant is required. Clear tube sealants shall be of an acrylic type material.
7. Closures shall be a closed cell polyethylene material of a gray neutral color, and shall be die cut to panel profiles. Closures shall be supplied as required to provide weather tightness.
8. Fasteners for roof and wall covering systems shall be self-drilling or self-tapping screws. Blind rivets shall normally be used in trim and accessory attachment and trim splicing.

D. Manufacturing Criteria

1. Structural Members shall be fabricated by shearing, flame cutting, forming, welding, punching, drilling, reaming, etc., as required in accordance with the building manufacturer's standard practices.
2. Welded Plate Members fabricated from plate or bar stock materials shall have flanges and webs joined on the one side of the web by a submerged arc continuous weld process.
3. Shop Connections for built-up and/or hot-rolled members shall be welded using either a submerged or gas metal arc weld process. Welding shall be in accordance with the building manufacturer's standard practices in compliance with the applicable sections, relating to design requirements and allowable stresses of the latest edition of the "AWS Structural Welding Code D1.1".
4. Field Connections shall be the bolting of structural members using high strength bolts and machine bolts in shop drilled, punched or reamed holes, in accordance with the building manufacturer's standard practices.
5. Shop Painting of members with shop primer paint shall be provided for the purpose of protecting the steel member during transportation, job site storage, and erection.

6. Cleaning of steel members shall consist of the removal of oil, dirt, loose scale and/or foreign matter prior to painting in accordance with SSPC-SP2.
 7. Coating of steel members shall consist of one shop coat of standard primer paint in accordance with the standard practices of the building manufacturer and shall equal or exceed the end performance requirements of Federal Specifications SSPC # 15.
- E. Miscellaneous
1. Anchor Bolts shall be the size and quantity as determined by the building manufacturer and of sufficient capacity to properly resist the governing reactions induced by the design loads on the structure.
 - a. Anchor bolts are designed in accordance with ASTM F1554 and shall also meet ASTM A307 Grade C requirements.
 - b. Anchor bolts shall be set in strict accordance with the building manufacturer's detail drawings.

PART 3 EXECUTION

3.01 COMPLETION

- A. The structure system shall be constructed and erected in accordance with the appropriate erection drawings, erection guides and other documents furnished by the building manufacturer.
1. All appropriate legal and safety requirements shall be complied with.
 2. The building erecting contractor shall determine and provide any and all temporary bracing, shoring, blocking, bridging, and/or securing of components, etc., as required to construct the building.

3.02 WARRANTY

- A. The building shall be warrantied for a period of one (1) year from date of acceptance by owner for failure due to defective materials or workmanship.
- B. Building coatings shall be warrantied for a period of five (5) years from date of acceptance by owner for failure due to cracking, chipping, fading, or chalking.

END OF SECTION

SECTION 33 05 00

PRESSURE CONDUITS, FORCE MAINS, FITTINGS AND VALVES

PART 1 GENERAL

1.01 WORK INCLUDED

- A. This work consists of furnishing and installing all pipe materials, fittings, valves, thrust blocks, tools, labor, testing, and any other related item necessary to complete the work shown on the Contract Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Cast-in-Place Concrete
- B. Trenching and Backfilling
- C. Seeding

1.03 REFERENCE STANDARDS

- A. ANSI - American National Standards Institute
- B. AWWA - American Water Works Association
- C. ASTM - American Society for Testing and Materials

1.04 RELATED DOCUMENTS

- A. The General Provisions of the Contract, including the General and Supplementary Conditions and General Requirements (Division 1), apply to the work specified in this section.

1.05 SUBMITTALS

- A. As the basis of acceptance of the materials specified herein, the Contractor shall, prior to delivery, furnish a certificate of conformance to these specifications to the Engineer.

PART 2 MATERIALS

2.01 GENERAL REQUIREMENTS

- A. Pipe shall be nominal sizes as designated on the Contract Drawings.
- B. Pressure classes shall be as designated on the Contract Drawings.

2.02 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. Pipe:
 - 1. PVC pipe, 2 inches and larger, shall be SDR 21 or C-900 (see plans), Class 200. All pipes shall conform to or exceed ASTM 2241. All PVC

service lines and small diameter piping shall be schedule 40 meeting the requirements of ASTM D 1785.

2. All PVC pipe is to be certified by NSF, listed in NSF Standard 61 and have the NSF logo stamped on the pipe.

B. Fittings:

1. Ductile gray iron fittings shall conform to ANSI Specification A21.10 (AWWA C110) for dimensions, with materials per ASTM Designation A377.

2.03 DUCTILE IRON PIPE AND FITTINGS

A. Ductile Iron Pipe:

1. All ductile iron pipe 3" or larger in diameter for all joint types shall conform to ANSI Specification A21.51, and AWWA Specification C151.
2. The ductile iron pipe thickness class shall be Class 50.

B. Fittings: Ductile gray iron fittings shall conform to ANSI Specification A21.10 (AWWA C110) for dimensions, with materials per ASTM Designation A377.

C. Coatings: The outside of all ductile iron pipe and fittings shall be bituminous coated with either coal tar or asphalt base of approximately 1 mil thickness.

D. Lining: The inside of all ductile iron pipe and fittings shall be lined with cement mortar complying with ANSI A21.4, which has a minimum thickness of 1/16".

E. Joints: Mechanical, flanged, and push-on joints for pipe and fittings shall conform to ANSI A21.11, rubber gasket joints for cast iron and ductile iron pressure pipe and fittings. Joint types are designated on Contract Drawings.

F. Ductile Iron Pipe for Air Delivery:

1. Pipe: Shall meet the requirements of 2.03.A above.
2. Fittings: Shall meet the requirements of 2.03.B above.
3. Coatings:
 - a. Inside Plant Building: Shall be uncoated, suitable for painting.
 - b. Buried: Shall meet the requirements of 2.03.C above.
4. Lining: Shall be unlined, bare iron.
5. Joints: All gaskets shall be suitable for 190°F service.

G. Special Joints: Ductile iron pipe to be installed as river crossing pipe shall be of the boltless ball and socket, flexible joint type, Class 56, 350 psi and shall meet all requirements of ANSI A21.51 for ductile iron pipe.

2.04 VALVES AND FITTINGS

A. Gate Valves:

1. Gate valves shall be iron-body, bronze mounted, non-rising stem and of the resilient seat type, complying with the requirements of AWWA C509. Valves shall have standard flanged, mechanical joint, or hub ends as the nature of the connections shall require.
2. All gate valves used for air distribution systems shall be suitable for temperatures of 150°F. Supplier shall insure that all seals, gaskets,

seats, and materials are capable of withstanding the specified temperatures.

3. All direct burial gate valves shall be supplied with iron operating nuts and adjustable cast iron valve boxes and covers.
- B. Plug Valves:
1. Plug valves shall be of the flanged, eccentric type. Frames shall be of cast iron and the stem seat ring and gate ring shall be of bronze. The valves shall be of rugged construction and shall seat tightly without excessive strain on the stem. Valves shall be furnished with a wheel operated, manual traveling nut actuator.
- C. Check Valves:
1. Check valves shall have openings or waterways at least equivalent to the full area of the connecting pipes. They shall be of the silent, resilient, balanced disc, swing pattern type, with an outside spring or weight and lever, fully bronze mounted, with flanged, or mechanical joint ends as the nature of the connection shall require. Each check valve shall have a position indicator and external manual release. In general ruggedness of design and construction, and in materials and workmanship, they shall correspond to the gate valves specified herein. The bottom of the cases shall have no pockets in which gravel, stones, or grit can collect. All internal working parts shall be readily accessible and removable through flanged covers. All check valves shall be checked for water-tightness and shall be tight against a back pressure of not less than 150 psi.
- D. Butterfly Valves:
1. Butterfly valves shall be cast or ductile iron body, rubber-seated, with bronze or stainless steel mountings. Butterfly valves shall be manufactured in full compliance with AWWA C504. Valves shall have standard flange, wafer, or mechanical joint ends as the nature of the connections shall require. The operating stem shall be equipped with coupling nuts for extension stem. Extension stems and cast iron valve boxes shall be provided as shown on the plans.

2.05 MISCELLANEOUS FITTINGS

- A. Expansion Joints:
1. Expansion joints shall be installed where shown on the Contract Drawings and shall be of the flanged single or double end as required, with slip pipe and limit rods provided. The expansion joints shall be constructed of stainless steel and shall have self-lubricating packing-type gaskets.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General:
1. Use full lengths of pipe where length between fittings is less than the Mill-random lengths of pipes. Avoid extra joints.
 2. Check connections to mechanical equipment and piping equipment and provide matching piping connections as required. Piping connections to

equipment, etc., shall be made in such a manner so they do not cause damage to the equipment during connection and after the equipment is in operation.

3. Field Measurements: Field check dimensions shown on the Contract Drawings and the "certified" equipment drawings. Resolve any discrepancies before starting the work. Verify all dimensions in the field, as necessary, and be responsible for the proper dimensions and alignment of the finished piping. Interferences shall be brought to the attention of the Engineer in writing.
4. Unforeseen Obstructions: When obstructions that are not shown on the plans are encountered during the progress of work and interfere so that an alteration of the plans is required, the Owner will alter the plans or order a deviation in line and grade or arrange for removal, relocation, or reconstruction of the obstructions.
5. Clearance: When crossing existing pipelines or other structures, alignment and grade shall be adjusted as necessary, with the approval of the Owner, to provide clearance as required by federal, state or local regulations or as deemed necessary by the Owner to prevent future damage or contamination of either structure. In areas where the recommended separations cannot be obtained either the waterline or the sewer line shall be constructed of mechanical joint pipe or cased in a continuous casing that extends no less than ten feet on both sides of the crossing.

B. Flanged Systems:

1. Bolts, gaskets and installation shall conform to AWWA C110, Appendix A.
2. Bolt holes of the flanges shall straddle the normal vertical and horizontal center lines, unless otherwise shown on the Contract Drawings.
3. Use one and only one gasket per joint. Nuts on bolts and/or stud bolts shall be tightened by the crossover method to load gaskets evenly. Tightening shall be repeated by going over and across until the joint is uniformly tight. Torque wrenches shall be used where required to uniformly torque bolts as necessary.
4. Flange bolts and/or stud bolts shall be lubricated with oil and graphite at time of installation except when location is buried.
5. Furnish all pipe supports required by the piping in this section and valves as shown on the Contract Drawings. Furnish additional supports as necessary to support piping and piping equipment during construction.
6. Furnish and install all grout, sleeves, plates, flashings, seals, caulking, and other penetration requirements where piping passes through walls, floors, or roofs as shown on the Contract Drawings. Coordinate installation of imbedded items.
7. Where required, the Contractor shall core drill wall, ceiling, or floor penetrations where necessary to install the pipe as shown on the Contract Drawings. All core drilling, except that specifically shown on the Contract Drawings, shall be done only with prior approval of the Engineer.

C. Underground Piping:

1. General Requirements:
 - a. Elevations of underground piping, uniform slope in direction of flow

and installation details shall be as shown on the Contract Drawings. Excavation for underground piping shall be as detailed in Section 31 23 33 – Trenching and Backfilling.

- b. The Contractor shall be responsible for all damage caused directly or indirectly by his workmen to structures, buildings, equipment, utilities, roadways, and/or sidings. The Contractor shall repair or replace the damaged item at his own expense and to the satisfaction of the Engineer.
2. Handling and Storage:
 - a. Care shall be taken in unloading and handling coated pipe. Lift pipe with wide sling(s) to prevent damage to the coating material. Do not drag or roll coated pipe.
 - b. Rope or cable slings shall not be used unless the pipe is protected. Protection can be achieved by placing several boards around the pipe before the sling is tightened.
 - c. Coated pipe shall be placed on boards to keep it off the ground.
 - d. All outside pipe coating that has been damaged shall be repaired by the Contractor before installing the pipe. Pipe and fittings in which the cement lining has been damaged shall be replaced by the Contractor at no additional cost to the Owner.
3. Laying of Pipe on Curves:
 - a. Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflections at the joints for most "rigid" pipe and in the pipe for most "flexible" pipe. If the pipe is shown curved on the Contract Drawings and no abrupt change in alignment is shown, the Contractor can assume that the curves can be made by deflection of the joints with standard lengths of pipe. Contractor may be required to decrease laying lengths in order to construct deflection at a reduced radius of curvature.
 - b. Where field conditions require deflection of curves not anticipated by the Contract Drawings, the Engineer will determine the methods to be used. No additional payment will be made for laying pipe on curves as shown on the Plans, or for field changes involving standard lengths of pipe deflected at the joints.
 - c. Maximum deflections at pipe joints and laying radius for the various pipe lengths are as found in the following standards:

Ductile Iron Pipe Mechanical Joints:	ANSI/AWWA C600
Ductile Iron Pipe Push on Joints:	ANSI/AWWA C600
Polyvinyl Chloride (PVC) Pipe:	AWWA C900
 - d. When rubber gasketed pipe is laid on a curve, the pipe shall be jointed in a straight alignment and then deflected to the curved alignment. Trenches shall be made wider on curves for this purpose.
4. Ductile Iron Pipe Systems:
 - a. Installation of ductile iron pipelines shall conform to the latest edition of applicable sections of AWWA C600, "Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances".
 - b. Pipe, fittings, and accessories shall be handled in a manner that will insure installation in sound, undamaged condition. Equipment, tools, and methods used in unloading, reloading, hauling, and laying pipe

- and fittings shall not cause damage to the pipe or fittings.
- c. Cutting of ductile-iron pipe shall be accomplished without damage to the pipe or to the lining therein. Pipe cuts shall be smooth, straight, and at right angles to the pipe axis. All cutting of pipe shall be done with mechanical pipe cutters.
 - d. During installation, each pipe and fitting shall be inspected for defects and rung with a light hammer to detect cracks. All defective, damaged, or unsound pipe and fittings shall be rejected and removed from the site of the work.
5. Polyvinyl Chloride (PVC) Pipe:
- a. Prior to jointing, each length of pipe shall be suspended and examined for visible cracks, holes, or foreign materials. Any pipe found to be injured or damaged shall be removed from the job site. Handling and installation procedures shall be in strict accordance with pipe manufacturer's recommendations.
 - b. The trench shall be so excavated that the pipe, when laid, shall have a true and even bearing on its full length. Excavation of bell holes will be required such that even bearing is achieved. Pipe, fittings, and valves shall be placed in the trench with care and under no circumstances shall pipe or other materials be dropped or dumped into the trench.
 - c. Immediately prior to jointing, the joints and male end shall be examined and made free of foreign matter. A thin film of gasket lubricant shall be applied to the inside surface of the gasket, the pipe inserted in the bell seated to the depth mark. Field cut pipe lengths shall be beveled to avoid damage to the gasket and facilitate making the joint.
 - d. When the pipe has been laid, joined, and inspected by the Engineer, the trench may be backfilled. Select excavated materials or granular backfill shall be carefully moved back into the trench until the elevation of the backfill material reaches the spring line of the pipe. The layer shall be tamped and compacted beside and underneath the pipe haunch in such a manner as not to disturb, displace, or injure the pipe. Remaining backfill shall be placed in accordance with Section 31 23 33 of the specifications. Only material free of large rocks, brick, frozen clods, pavement surfacing, or other hard material shall be used as backfill until backfill is at least twelve (12") inches above the top of the pipe.
 - e. Whenever excavating in rock, the trench shall be overexcavated below grade line and backfilled with granular material to form a suitable bed for the pipe. Care shall be taken to prevent any portion of the pipe from coming within six (6") inches of any "in place" or loose rock.
 - f. A detectable continuous run of 14 gage copper tracer wire with underground coating shall be installed in the trench with all PVC lines. The wire shall be detectable with standard electronic pipe locating equipment. A continuous run of marking tape shall be located 12" above the top of PVC pipe. The tape shall be Terra-Tape "D" as manufactured by Reef Industries, Inc., Houston, Texas, or equal.

6. Thrust Blocking:
 - a. Thrust blocking shall be installed at all fittings where required, in accordance with details shown on the Contract Drawings.
7. Valve and Fitting Installation:
 - a. All gate valves and fittings shall be inspected upon delivery in the field to insure proper working order before installation. They shall be set and jointed to the pipe in the manner as set forth in the AWWA Standards for the type of connection ends furnished.
 - b. Valves twelve (12") inch and under shall be installed in a vertical position and be provided with a standard cast iron valve box so arranged that no shock will be transmitted to the valve. The box shall be vertically centered over the operating nut, and the cast iron box cover shall be set flush with the road bed or finished surface.
 - c. After installation, all valves shall be subjected to the field test for piping as outlined herein. Should any defects in materials or workmanship appear during these tests, the Contractor shall correct such defects with the least possible delay and to the satisfaction of the Engineer.
8. Testing:
 - a. Test all piping systems. The tests shall be conducted in accordance with AWWA C600. Test piping systems and/or portions of piping systems to be concealed before concealment. Flush all lines prior to testing hydrostatically. Restrain slip joint piping to withstand thrust forces. Isolate or remove piping equipment and/or instruments which will not safely withstand the test pressures. Provide spool pieces for any piping equipment or instrumentation items removed for testing. No test shall be performed if any joints are concealed in any manner.
 - b. Perform tests in the presence of the Engineer. Maintain pressure for a minimum period of 2 hours. During this period, the piping system shall show no sign of failure, leakage, and/or distortion. There shall be no loss of test pressure during this 2-hour period.
 - c. The Contractor shall, at his own expense, repair all defects disclosed by testing and repeat test procedure until a satisfactory test is witnessed by the Engineer.
 - d. It is the intent of this specification that all joints shall be watertight and free from visible leaks. Any leak discovered within one (1) year after the date of final acceptance of the work shall be repaired by, and at the expense of, the Contractor.
 - e. Pressure Testing of Underground Pressure Conduits:
 - (1) Pressure Test: After the pipe has been laid and partly backfilled as specified herein, all newly laid pipe or any valved sections of it shall, unless otherwise expressly specified, be subjected to a hydrostatic pressure equal to at least 1.5 x the working pressure at the point of testing. The duration of each pressure test shall be for a period of not less than two hours and not more than six hours. The basic provisions of AWWA C-600 and C-605 shall be applicable, if specified.
 - (2) Procedure for Test: Each section of pipe to be tested, as determined by the Engineer, shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump pipe

connection and all necessary apparatus, including gauges and meters, shall be furnished by the Contractor. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation and afterwards tightly plugged.

(3) Leakage Test:

- (a) After completion of the pressure test, a leakage test shall be conducted to determine the quantity of water lost by leakage under the specified test pressure. Test pressure is defined as not less than 1.25 x the working pressure at the highest point along the test section and is based on the elevation of the highest point in the line or section under test corrected to the elevation of the test gauge. Applicable provisions of AWWA C600 and C605 shall apply. Duration of each leakage test shall be a minimum of one (1) hour in addition to the pressure test period.
- (b) Allowable leakage in gallons per hour for PVC pipelines shall not be greater than that determined by the formula:

$$L = \frac{ND(P)^{1/2}}{7400}$$

Where: L = Allowable leakage in gallons per hour.

N = Number of joints in length of pipeline tested.

D = Nominal diameter of the pipe in inches.

P = Average test pressure during leakage test in pounds per square inch gauge.

- (c) Leakage is defined as the quantity of water to be supplied in the newly laid pipe or any valved section under test, which is necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.
 - (d) Flanged pipe shall be "bottle tight".
 - (e) All visible leaks are to be repaired by the Contractor regardless of the amount of leakage.
- (4) Acceptance: The Contractor shall prepare a report based on the satisfactory completion of the hydrostatic test of each piping system or portion of the system. The report shall establish the exact limits of the test. This report shall contain the test pressure at the beginning and end of the test, the time interval of the test, and other information required. This report also shall include a marked-up set of flow diagrams with the sections of pipe yellowed-out and initialed by the Contractor and Engineer, or his representative, as they are tested. The Contractor shall be responsible for maintaining this set of flow diagrams, which shall be given to the Engineer at the completion of the job.

END OF SECTION

SECTION 33 14 19

VALVES

PART 1 GENERAL

1.01 WORK INCLUDED

This section generally reviews the requirements related to proposed valves and hydrants. The Contractor shall provide all work, materials, fittings, labor, testing, and other items necessary per the contract drawings and as specified herein or in other specifications and contract documents.

PART 2 EQUIPMENT & MATERIALS

2.01 DESCRIPTION

The following is intended for general reference. Work, materials, appurtenances and requirements shall be verified by the Contractor with the supplier(s) and provided per the supplier's recommendations for complete and properly working systems.

2.02 VALVES AND FITTINGS

- A. Acceptable Manufacturers:
 - 1. Valves and Hydrants:
 - a. Mueller
 - b. American Foundry
 - c. Clow
 - d. Approved Equal
- B. Gate Valves:
 - 1. Gate valves shall be iron-body, bronze mounted, non-rising stem and of the resilient seat type, complying with the requirements of AWWA C509. Valves shall have standard flanged, mechanical joint, or hub ends as the nature of the connections shall require.
 - 2. All gate valves used for air distribution systems shall be suitable for temperatures of 150°F. Supplier shall insure that all seals, gaskets, seats, and materials are capable of withstanding the specified temperatures.
 - 3. All direct burial gate valves shall be supplied with iron operating nuts and adjustable cast iron valve boxes and covers. Valve boxes shall be cast iron, two-piece, slip or screw type and as approved by the water department.
 - 4. Adjust valve location to be above finished grade and outside of pavement, drives, ditches and similar areas unless approved by Engineer and/or City.
- C. Plug Valves:
 - 1. Plug valves shall be of the flanged, eccentric type. Frames shall be of cast iron and the stem seat ring and gate ring shall be of bronze. The valves shall be of rugged construction and shall seat tightly without

excessive strain on the stem. Valves shall be furnished with a wheel operated, manual traveling nut actuator.

D. Check Valves:

1. Check valves shall have openings or waterways at least equivalent to the full area of the connecting pipes. They shall be of the silent, resilient, balanced disc, swing pattern type, with an outside spring or weight and lever, fully bronze mounted, with flanged, or mechanical joint ends as the nature of the connection shall require. Each check valve shall have a position indicator and external manual release. In general ruggedness of design and construction, and in materials and workmanship, they shall correspond to the gate valves specified herein. The bottom of the cases shall have no pockets in which gravel, stones, or grit can collect. All internal working parts shall be readily accessible and removable through flanged covers. All check valves shall be checked for water-tightness and shall be tight against a back pressure of not less than 150 psi.

E. Butterfly Valves:

1. Butterfly valves shall be cast or ductile iron body, rubber-seated, with bronze or stainless-steel mountings. Butterfly valves shall be manufactured in full compliance with AWWA C504. Valves shall have standard flange, wafer, or mechanical joint ends as the nature of the connections shall require. The operating stem shall be equipped with coupling nuts for extension stem. Extension stems and cast-iron valve boxes shall be provided as shown on the plans.

F. Painting:

1. Refer to section 09 00 00 and below as applicable.
2. All exposed iron metal parts shall be thoroughly cleaned and painted. All outside surfaces below the ground line shall be coated with asphalt varnish. They shall be covered with two coats, the first having dried thoroughly before the second is applied. The exposed surfaces shall be coated with a factory applied, two-part, thermosetting epoxy coating with a minimum thickness of 4 mils.
3. The outsides where exposed shall be thoroughly cleaned and thereafter painted with a minimum of one coat of primer and one finished coat of enamel in a color specified by the OWNER.

2.03

FLOOR STANDS

Compatible floorstands shall be provided and of the non-rising stem, indicating type, and designed for counterclockwise operation. The distance from the base flange to the handwheel shall be 30". The pedestal shall be cast of ductile iron grade 65-45-12. The pedestal shall have a vertical indicating slot. The word "OPEN" shall be cast in the pedestal at the top of the indicating slot. A "CLOSED" tag will be field mounted to the pedestal, to indicate the closed position of the valve. A bronze indicator shall travel on a carbon steel threaded stem to indicate the position of the valve. The stem shall be Xylan coated to prevent corrosion. Where a floor is not directly over the valve and extension stem, the floorstands shall be supported by a ductile iron wall bracket mounted to the side wall. Wall brackets shall contain a carbon steel plate designed to support the floorstand. The

floorstand shall be operated by a 12" diameter cast iron handwheel. All materials shall be factory coated per supplier's recommendations for outdoor exposure in area climate. All locations shall be field verified and coordinated by the Contractor. Mounting and provision to be per Supplier's recommendations for applications. O&M guides to be provided per owner. This specification section is based on floor valves offered by Trumbull Manufacturing of Youngstown, Ohio. and exceptions or alternates may be approved by the engineer through the project submittal process.

2.04

ACTUATORS

All electric actuators shall conform to the requirements of AWWA Standard C540-93. Actuators shall contain motor, gearing, manual over-ride, limit switches, torque switches, drive coupling, integral motor controls, position feedback transmitter (where required) and mechanical dial position indicator (where required). The motor shall be specifically designed for actuator service. The motor will be of the induction type with class F insulation and protected by means of thermal switches imbedded in the motor windings. Motor enclosure will be totally enclosed, nonventilated. Motors will be capable of operating on 460 volt - 3 phase - 60 hertz power. All gate valve and sluice gate actuators will operate on 460 volt - 3 phase power. Actuator enclosure shall be NEMA 4/6 (watertight). All external fasteners on the electric actuator will be stainless steel. Fasteners on limit switch and terminal compartments shall be captured to prevent loss while covers are removed. All gearing shall be grease lubricated and designed to withstand the full stall torque of the motor. Manual over-ride shall be by handwheel. Manual operation will be via power gearing to minimize required rimpull and facilitate easy change-over from motor to manual operation when actuator is under load. Return from manual to electric mode of operation will be automatic upon motor operation. A seized or inoperable motor shall not prevent manual operation. Rimpull maximum to be 40 ft/lbs. Limit switches shall be furnished at each end of travel. Limit switch adjustment shall not be altered by manual operation. Limit switch drive shall be by countergear. Limit switches must be capable of quick adjustment requiring no more than five (5) turns of the limit switch adjustment spindle. One set of normally open and one set of normally closed contacts will be furnished at each end of travel where indicated. Contacts shall be of silver and capable of reliably switching low voltage DC source from the control system furnished by others. Mechanically operated torque switches shall be furnished at each end of travel. Torque switches will trip when the valve load exceeds the torque switch setting. The torque switch adjustment device must be calibrated directly in engineering units of torque. All wiring shall be terminated at a plug and socket connector. Furnish a positive seal between the field wiring and the actuator to prevent ingress of fluid through the customer connection. Quarterturn actuators will be furnished with mechanical stops that restrict the valve/actuator travel. Actuator must be capable of the following valve closing times/operating speeds: Quarterturn valves - 60 second closing time, gate valves and sluice gates - 12 inches per minute operating speed. Actuators will be capable of operating in an ambient temperature range of -20 to +175 degrees F (without motor controls) and -20 to +160 degrees F (with motor controls). All actuators in open/close service will be furnished with integral motor controls consisting of reversing starters, control transformer, phase discriminator, monitor relay (to signal fault conditions such as thermal switch trip, torque switch tripped in midtravel, wrong phase sequence or phase failure), "open-stop-close" pushbuttons, "local-off-remote" selector switch in addition to red and green indicating lights. An

interface with the control system must be furnished with optical isolators to separate incoming voltage signals from the internal motor controls. Actuators in modulating service will be selected such that the required dynamic valve torque is no more than 60% of the electric actuator's maximum rated breakaway torque. Power gearing in modulating actuators shall have zero backlash between the motor and actuator output. All actuators in modulating service will be furnished with a feedback potentiometer in addition to the following motor controls: reversing starters, control transformer, phase discriminator, monitor relay, positioner, "open-stop-close" pushbuttons, "local-offremote" selector switch in addition to red and green indicating lights. The positioner shall be capable of accepting a 4-20mADC command signal and positioning the valve by comparing the command signal with the present valve position as indicated by the feedback potentiometer mounted inside the actuator. The positioner shall be field adjustable to fail to the "open", "closed" or "last" position on loss of 4-20mADC command signal. This specification is based on AUMA Actuators, Inc. and exceptions or alternates may be approved by the engineer through the project submittal process.

END OF SECTION

SECTION 33 31 05

PVC SEWER PIPE

PART 1 GENERAL

1.01 SUMMARY

This section covers Polyvinyl Chloride Piping (PVC). PVC pipe shall be furnished complete with all fittings, jointing materials, anchors, blocking, encasement, and other necessary appurtenances.

PART 2 PRODUCTS

2.01 MATERIALS

- A. PVC pipe and fittings 4" through 15" shall meet or exceed the requirements of the latest revision of ASTM D-3034 and shall be cell classification of 12454-B, 12454-C or 13364-B as defined in ASTM D 1784.
- B. Pipe and fittings 18" through 27" shall meet ASTM F-679 and shall be cell classification of 12364-C or 12454-C.
- C. Minimum pipe stiffness (F/Y) at 5ø deflection shall be 46 for all sizes when tested in accordance with ASTM D2412.
- D. All Joints of pipe and fittings shall have elastomeric gaskets and shall show no signs of leakage when tested in accordance with D 3212. Solvent weld joints will not be permitted below grade.

<u>SIZES</u>	<u>O.D. DIMENSIONS</u>	<u>WALL THICKNESS</u>
4"	4.215	.125 inches
6"	6.275	.180 inches
8 "	8.400	.240 inches
10"	10.500	.300 inches
12"	12.500	.360 inches
15"	15.300	.414 inches
18" (T-1)	18.700	.536 inches
21" (T-1)	22.047	.632 inches
24" (T-1)	24.803	.711 inches
27" (T-1)	27.953	.801 inches

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. For residential lots, where applicable. All service wyes or tee fittings will be located in the center of each lot for ease of location on future hookups. All service lateral lines shall be schedule 40 meeting the requirements of ASTM D2665 or D2441.

- B. All sewer lines at a bury depth of over 12'0" will be SDR-21\Class 200 PVC pipe meeting the requirements of ASTM D2241 or C-900 PVC when designated. All other pipes shall be SDR 35 or as designated on the construction plans. Any adaptation from SDR sizes shall be completed with a suitable adapter.

3.02 HANDLING

Pipe, fittings, and accessories shall be handled in a manner that will insure installation in sound, undamaged condition. Equipment, tools, and methods used in unloading, reloading, hauling and laying pipe and fittings shall be such that the pipe and fittings are not damaged. Hooks inserted in ends of pipe shall have broad, well-padded contact surfaces.

3.03 CUTTING PIPE

Cutting shall be done in a neat manner, without damage to the pipe. Cuts shall be smooth, straight, and at right angles to the pipe axis. After cutting, the end of the pipe shall be dressed with a file to remove all roughness and sharp corners.

3.04 CLEANING

- A. The interior of all pipe and fittings shall be thoroughly cleaned of foreign matter before being installed and shall be kept clean until the work has been accepted. Before jointing, all contact surfaces shall be wire brushed, if necessary, wiped clean, and kept clean until jointing is completed.
- B. Every precaution shall be taken to prevent foreign material from entering the pipe during installation. No debris, tools, clothing, or other materials shall be placed in the pipe.

3.05 INSPECTION

Pipe fittings shall be carefully examined for cracks and other defects immediately before installation. Spigot ends shall be examined with particular care since they are vulnerable to damage from handling. All defective pipe and fittings shall be removed from the site of the work.

3.06 ALIGNMENT

Pipelines or runs intended to be straight shall be laid straight.

3.07 LAYING PIPE

Pipe shall be protected from lateral displacement by placing the specified pipe embedment material. Under no circumstances shall pipe be laid in water and no pipe shall be laid under unsuitable weather or trench conditions.

3.08 PUSH-ON-JOINTS

All instructions and recommendations of the pipe manufacturer, relative to gasket installation and other jointing operations shall be followed by the Contractor. All joint surfaces shall be lubricated with heavy vegetable soap solution immediately before the joint is completed.

3.09 RELATION TO WATER MAINS

3.09.1 *Horizontal Separation*

Sewer mains shall be laid at least 10 feet (3.0 m) horizontally from any existing or proposed water main. The distances shall be measured edge to edge. In cases where it is not practical to maintain a 10-foot separation, the City may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviations may allow installation of the sewer closer to a water main, provided that the water main is in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches (46 cm) above the top of the sewer.

3.09.2 *Crossings*

Sewers crossing water mains shall be laid to provide a minimum of vertical distance of 18 inches (46 cm) between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equal distance and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main.

3.09.3 *Special Conditions*

When it is impossible to obtain proper horizontal and vertical separation as stipulated above, the sewer shall be designed and constructed equal to water pipe, and shall be pressure tested to assure water tightness prior to backfilling.

3.10 STREET CROSSING

No cutting of concrete/asphalt surfaces shall be allowed unless prior City approval is obtained in writing. At all locations where sewer lines are placed within the street, sewer trench shall be backfilled with 3/4" crushed limestone to the subgrade of the proposed pavement. Creek gravel or similar material will not be allowed.

3.11 MARKING

- A. Each pipe and fitting shall have plainly and permanently marked thereon:
1. Manufacturer's name or trademark.
 2. Nominal pipe size.
 3. ASTM Designation D3034 and Class Number
 4. SDR number.
 5. Material designation.

3.12 ACCEPTANCE TESTS

Each reach of sewer shall meet the requirements of Section 33 01 30 - SEWER ACCEPTANCE TESTING.

SECTION 33 32 11
NON-CLOG LIFT STATION

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers the provision of a duplex, submersible, centrifugal, non-clog pump station and accessories for service in raw, unscreened sewage. The provided system shall be supplied with submersible electric motors and programmable variable frequency drives (VFDs). The system is to have two pumps, each having a unique design point, to accommodate municipal sludge return and sludge loading from a single wetwell. Controls may be in a shared panel.
- B. Each pumping unit shall be furnished complete as appropriate with close-coupled, submersible, variable speed electric motors; a floor-mounted discharge base and elbow; guide rails; controls; access hatch covers; and all other appurtenances specified or otherwise required for proper operation. The contractor is responsible for verifying requirements directly with the manufacture and coordinating any deviations from the plans and/or specifications as well as any additional appurtenances as necessary to provide a complete and properly operating system.
- C. A prefabricated conc. wet well, and valve enclosure is to be provided along with a compatible float and timer level control system, related valves, hatches, transfer switch, alarm, timers, piping, and other related equipment and appurtenances.

1.02 RELATED SECTIONS

Reference shall be made to electrical, piping, and other sections of the contract documents as well as the project plans and references.

1.03 SUBMITTALS

- A. Two hard copies and one digital copy of shop drawings, shop tests, and operation and maintenance manuals shall be submitted to the Engineer or Owner. In addition, the manufacturer shall supply a descriptive overview of controls.
- B. Shop Drawings:
 - 1. Submit complete fabrication, assembly, foundation and installation drawings, together with detailed specifications, and data covering materials used, parts, devices, and other accessories forming a part of the equipment furnished.
 - 2. The data and specifications for each unit shall include, but shall not be limited to, the following:
 - a. Name of pump manufacturer.
 - b. Type and model of pump.
 - c. Rotational speed.
 - d. Pump Curves/Tables for operational options (simplex, duplex).

- C. **Shop Tests:**
Each pumping unit shall be tested at the factory for capacity, power requirements, and efficiency at specified rated head, shutoff head, operating head extremes, and at as many other points as necessary for accurate performance curve plotting. All tests and test reports shall be made in conformity with the requirements and recommendations of the Hydraulic Institute Standards.
- D. **Shop Test Results:**
Upon completion, two certified copies of a report covering each test shall be prepared by the pump manufacturer and submitted to the Engineer not less than ten days prior to the shipment of the equipment from the factory. The report shall include data and test information as stipulated in the Hydraulic Institute Standards, copies of the test log originals, test reading to conversion equations, and certified performance curves. The curves shall include head, kilowatt input, wire-to-water efficiency, and shop test NPSH available, plotted against capacity. The curves shall be easily read and plotted to scales consistent with performance requirements, and all test points shall be clearly shown.

1.04 QUALITY ASSURANCE

All pumps and controls specified in this section shall be provided by the same manufacturer. Equipment furnished and installed under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer unless exceptions are noted by the Engineer.

1.05 BALANCE

All rotating parts shall be accurately machined and shall be in as nearly perfect rotational balance as practical. Excessive vibration shall be sufficient cause for rejection of the equipment. The mass of the unit and its distribution shall be such that resonance at normal operating speeds is avoided. In any case, the vibration displacement (peak-to-peak) as measured at any point on the machine shall not exceed 4.0 mils for 1700 to 1800 rpm motors.

1.06 SPARE PARTS

- A. At a minimum, provide the following spare parts for each pump furnished:
1. One complete set of seals, o-rings and gaskets.
 2. One mechanical seal set, including upper and lower seals.
 3. 6 spare fuses for each type of fuse used.
 4. 1 spare relay for each type used.
 5. 5 lamps for each type used.
 6. A spare filter element for the seal filter shall be provided.
- B. Individual spare parts shall be boxed or bagged and clearly labeled with the part number, applicable model number and reordering information. Individual spare parts shall be grouped and boxed by the appropriate pump model number as identified on the pump nameplate.

1.07 WARRANTY

- A. Each pump shall be provided with a minimum five year pro-rated warranty including 100% parts and labor coverage for a minimum of 18 months. Further, the Manufacturer shall assume prime responsibility for the warranty of the station and all components.
- B. In the event a component fails to perform as specified or is proven defective in service during the warranty period, the Manufacturer shall repair or replace such defective part and shall further provide, without cost, such labor as may be required to replace, repair or modify major components such as the steel structure, main pumps, main pump motors and main piping manifold.

PART 2 PRODUCTS

2.01 MANUFACTURERS

Pumps shall be by a reputable pump manufacturer and shall meet all the requirements of these specifications. Preapproved manufacturer's are Flyght, Ebara, HOMA, and KSB. Submittals shall be accepted for equivalent equipment from bidding contractors a minimum of 10 days prior to the date of bid opening and should include all items indicated under the submittal section (Section 1.03) of this specification.

2.02 GENERAL PUMP REQUIREMENTS

The Contractor shall provide totally sealed submersible electrically operated, variable speed pumps capable of pumping raw unscreened sewage. The pump performance shall be stable and free from cavitation and noise throughout the specified operating head range at minimum suction submergence. Each pump shall be non-overloading and the pump head-capacity curve shall be continuously falling from shutoff head. Each pump shall operate at an acceptable efficiency at operating conditions. All equipment to be installed inside the wet well shall be rated explosion proof for use in Class I, Division I, Group C and D areas.

2.03 PUMP PERFORMANCE REQUIREMENTS

- A. Pumping units shall be non-overloading and designed for the following operating conditions and requirements:

Loading Pump:

1. Number of pumps and motors	1
2. Minimum Capacity at rated head	600 gpm
3. Rated total Dynamic Head	37' TDH
4. Max. Operation Speed	1800 rpm
5. Max. Motor Horsepower	10 hp
6. Min. diameter of test sphere, inches	3"
7. Min. suction inlet diameter, inches	6"
8. Min. discharge outlet diameter, inches	6"

Return Pump:

1. Number of pumps and motors	1
2. Minimum Capacity at rated head	1120 gpm
3. Rated total Dynamic Head	50' TDH
4. Max. Operation Speed	1800 rpm
5. Max. Motor Horsepower	25 hp
6. Min. diameter of test sphere, inches	3"
7. Min. suction inlet diameter, inches	6"
8. Min. discharge outlet diameter, inches	6"

- B. The supplier shall provide a system that will meet the above stated flow and head conditions.
- C. Each pump shall be capable of operating properly in a range of flow and head conditions utilizing VFD drives. Variations in head conditions will occur depending on VFD speed, wet well level and other factors. Supplier shall verify potential conditions and shall provide pumps that operate properly over the potential range of heads and flows without detrimental performance. Some, but not all, of the head conditions that should be considered by the supplier and accounted for are low wetwell, high wetwell, lower pipe friction (c=140+), the design pipe friction (c=120), losses in the pump and fittings, and potential combinations thereof.
- D. The Supplier shall review and provide pump curves and a summary table clearly indicating head and flow for simplex and duplex conditions including for the full range of possible variable motor outputs in simplex operation and for low and high head conditions.
- E. Head losses through the pump, including pump suction losses, are not included in the total pumping heads stipulated in the foregoing design data tabulation. The contractor shall confirm with the pump supplier the ability of the selected pumps to provide the desired flow at a total dynamic head which includes a static loss of approximately 25', dynamic losses through a force main of not less than 250' (@ c=120).

2.04

PUMP MATERIALS

A. Motor and Pump Construction

1. Stator Housing, Oil Chamber Housing, and Sliding Bracket	Cast Iron, ASTM A48, Class 30 or higher
2. Casing Wearing Ring (if req'd)	Martenistic stainless steel Brinell 300+
3. Impeller Wear Ring (if req'd)	Martenistic stainless steel Brinell 200-250
4. Impeller Casing	Cast Iron, ASTM A48, Class 30 or higher
5. All wetted assembly fasteners	AISI Series 300 stainless steel
6. Impeller	Cast Iron, ASTM A48, Class 30 or higher
7. Shaft	Stainless Steel; or Alloy Steel, hard chrome plated

8. Shaft Seals	Two mechanical seals arranged in tandem, made of tungsten carbide or silicon carbide at all points
9. Discharge Base	Cast Iron, ASTM A48, Class 30 or higher
10. Guide rails	Stainless steel pipe, ASTM A312, Schedule 40S
11. Coatings:	
a. Primer	Koppers "200 HB Epoxy", Tnemec "20-1255 Pota-Pox Primer", Valspar "78-D-7 Tank Lining Epoxy", or equal
b. Finish Coat	Koppers "200 HB Epoxy", Tnemec "20-2000 Pota-Pox", Valspar "78-W-3 Tank Lining Epoxy", or equal

2.05 PUMP CONSTRUCTION

- A. Impeller Casing: The impeller casing shall have well-rounded water passages and smooth internal surfaces free from cracks, porosity, blow holes or other irregularities. Discharge nozzle shall be flanged with dimensions and drilling conforming to ANSI B16.1, Class 125 and sufficiently rigid to support the guide-rail mounted pumping unit under all operating conditions.
- B. Impeller: The pump impeller shall be compatible with high solids content effluent (sludge) and shall generally be of the non-clog, enclosed, semi-open type made of close-grained cast iron and shall be balanced. The eye of the impeller as well as the ports shall be large enough to permit the passage of a sphere 3" in diameter in accordance with nationally recognized codes. The impeller shall be secured to the shaft with pinned fasteners to prevent slipping in either direction and shall be balanced statically and dynamically to eliminate vibration and minimize hydraulic end thrust. Castings shall not have been repaired by plugging, welding, or other means.
- C. Shaft: The shaft shall be of ample diameter to assure first critical speed will occur at not less than 150% of rated pump speed.
- D. Bearings: The bearings shall have a minimum AFBMA L10AA life of 50,000 hours. The pump shaft shall rotate on two (upper and lower) permanently lubricated bearings without end movement.
- E. Shaft Seals: The shaft seals shall be two mechanical seals arranged in tandem in an oil chamber for lubrication. Each interface shall be held in contact by an independent spring system designed to withstand maximum suction submergences. Each seal shall contain one stationary ring and one positively driven rotating ring. The seals shall require neither maintenance nor adjustments, shall be easily inspected and replaceable, and shall not be damaged if the pumps are run unsubmerged for extended periods of time or in a dry pit installation. The seals shall be able to be reconditioned.

- F. Oil Chamber: Oil chamber, if applicable, shall contain an inspection plug, drain plug and vent plug.
- G. Mating Surface Seals: All mating surfaces of major components shall be machined and fitted with O-rings where watertight sealing is required. The use of elliptical O-rings, gaskets, or seals requiring specific fastener torque to obtain and maintain seal compression and watertightness will not be acceptable.
- H. Coating: All submerged iron and steel parts which will be submerged or in contact with pumped liquid after installation shall be coated. Surfaces shall be prepared in accordance with SSPC-SP5. The coating shall be a minimum of 10 mils dry film thickness. The Contractor shall provide at least one quart of the finish material for field touch-up painting.
- I. Pump Discharge Base: The pump discharge base shall be furnished by pump manufacturer for each pumping unit installation and sized for the largest pump. The base shall be sufficiently rigid to firmly support the guide rails, discharge piping and pumping unit under all operating conditions. The base shall be provided with integral support legs suitable for bolting to the floor of the wet well with galvanized steel anchor bolts. The face of the inlet flange shall be perpendicular to the station floor and make contact with the face of the pump discharge nozzle flange. The base shall be designed to automatically connect to the pump discharge without bolts. Diameter and drilling of the elbow outlet flange shall conform to ANSI B16.1, Class 125. Pump and motor assembly shall be automatically connected to and supported by the discharge base and guide rails such that the unit can be removed from the wet well and replaced without the need for operating personnel to enter the wet well.
- J. Sliding Bracket. Each pumping unit shall be provided with an integral, self-aligning guide rail sliding bracket and sized for the largest pump. The bracket shall be designed to obtain a wedging action between flange faces as final alignment of the pump occurs in the connected position. The bracket shall maintain proper contact and a suitably sealed connection between flange faces under all operating conditions.
- K. Guide Rails. The guide rails shall not support any portion of the pump weight. The supplier shall provide a minimum of two guide rails for each pump and sized for the largest pump. The guide rails shall extend to the top of the wet well at the access hatch cover.
- L. Lifting Cable. Provide one stainless-steel cable for each pump. Each lifting cable shall be designed to raise and lower the largest pump with additional safety factor for overcoming force of pump hang-ups. The supplier shall provide a hook for the cable when not in use.
- M. Cable Holder. Provide grip holders for pump and control cables. Cables shall be easily adjusted to pumping level without splices. Provide continuous cables from control panel to pumps and level controls.

2.06

ELECTRIC MOTORS

- A. Each pump shall be driven by an air-cooled, totally submersible, variable speed electric motor furnished by the pump manufacturer. Each motor shall be rated 480 volts, 60 Hz, 3-phase. The starter housing shall be an air-filled, watertight casing. Motor insulation shall be moisture resistant, Class F, 155°C and shall be NEMA Design B for continuous duty. Each pump motor shall be provided with a special cable suitable for submersible pump applications. Cable size shall conform to NEC requirements. The cable entry water seal design shall be such that a specific fastener torque is not required to ensure a watertight and submersible seal. The use of epoxies, silicones or other secondary sealing systems will not be acceptable. Motor shall be capable of continuous unsubmerged operation under full pump load conditions without exceeding the temperature rise limitations for the motor insulation system. Stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. The thermal switches shall open, stop the motor and activate an alarm at a temperature not greater than 140°C. A float switch leakage sensor shall be provided to detect water in the stator chamber. When activated, the leakage sensor shall stop the motor and activate an alarm.

2.07

CONTROLS

- A. An appropriately sized cable restraint and cord for the power and control cord shall be provided for each pump. Rigid, spacious, PVC conduit shall be provided for routing the cables from the pump to the top of the lift station and the junction box. All internal station electrical service cabling will be run in flexible PVC non-corrosive conduit. Auxiliary equipment items such as dehumidifiers and heaters with UL approved rubber cords and plugs may be plugged into grounded adjacent convenience outlets. There will be no less than two 120 VAC duplex outlets provided. A separate 120 VAC circuit will be provided for local plugs and lighting.
- B. An integrator control panel and HOA switch will be provided integral to the pump station control panel to be remotely mounted in a field verified location near the location indicated on the drawings. A disconnect for each pump will be provided in a NEMA outdoor enclosure adjacent to the lift station site for the pump and control disconnect. The free standing control panel will be prewired and pre-tested prior to shipping the panel to the jobsite. See related sections of these specifications for additional information.
- C. The NEMA enclosure will be PLC based with a manual option to turn pumps on/off in case of a PLC failure. A panel view color 1000 or approved equal touch screen will be located on the front of the enclosure and have the complete pumping system designed into the touch pad screen.
- D. The lift station is intended to operate based on a reaction to changes in the wet well level as indicated by a float system and/or timers with selected run-times by the operator.
- E. As water level falls, the pumps will turn off accordingly at an operator input level. Floats shall be mounted in a stilling well and wired and hung per the

manufacture's recommendations.

- F. The control equipment is to be mounted on an equipment mounting plate per NEMA standards and installed in a NEMA 4x enclosure complete with a hinged outer door. Circuit breakers, motor starter reset buttons, and H-O-A switches shall be door mounted. The station will incorporate a UPS power supply for backup of the PLC system in case of power outages. The UPS will be sized for no less than 24 hours of continuous duty maintaining the PLC system. The UPS system will only keep the controls active for alarm conditions, not power the pumps.
- G. All station equipment and convenience outlets shall be terminal strip wired and all panel wiring shall be numbered at termination points with permanent black stamped sleeve type devices. The supplied panel "as built" ladder diagram shall accurately reflect the numbers installed. All panel wiring shall be a minimum 14 ga. MTW 600 volt rated wire and as sized by supplier.
- H. VFDs are to be provided by the supplier and will be part of the system control and incorporate electrical reactors and filters appropriately sized for the distance from the pump motors. Seal and thermal overloads will also be inputs to the PLC for monitoring and control. If a pump has a seal fail, a low priority alarm will be generated. If a thermal or VFD fault causes an error, then a high priority alarm will be alarmed and contact the alarm system.
- I. If VFD failure occurs a by-pass shall be provided to allow hard start of the pumps as needed to facilitate operation.
- J. A float system will be incorporated for the following conditions for each pump: Low water pump off, lead pump start, secondary pump start, high water emergency alarm..
- K. PLC and/or VFD failure will allow for the hard start of at least one pump and float based operation.
- L. Alternation and lead pump selection shall be standard features furnished with the equipment.
- M. Controls shall allow for pumps to operate per easily input times by the operator. The alarm float shall override timer control and result in the largest pump starting and running until the off float is triggered. The off float shall result in override of the timer.
- N. The PLC shall be compatible for Ethernet communication and with other PLCs in the system as well as the site SCADA system.

2.07.1 Control Mounting:

All control equipment shall be mounted in a weatherproof NEMA 4X steel cabinet(s) of solid construction, or the approved equivalent. Entry into the cabinets shall be via hinged doors. A locking mechanism shall be included and at least three sets of keys shall be provided to the owner. The control panel shall be supported on two adjustable, extruded aluminum-mounting

legs, secured to the station base plate. The slotted legs shall also serve as mounting points for auxiliary items, such as the vacuum priming subassembly. All equipment and devices expressly intended as a means of switching, adjusting, or actuating shall be mounted within convenient reach of an attendant and per supplier's recommendations.

2.07.2 Control Cabinet Indicators:

The control cabinet shall include all indicators recommended by the pump and control manufacturers. In addition, the interior of the cabinet shall have plainly visible the following indicators accompanied by a suitable nameplate:

1. Separate green pump running lights for each pump.
2. Elapsed time meter for each pump.
3. Amber seal failure indicator for each pump.
4. Wet well level high (via dialer) and local indicator.

2.07.3 General Control Cabinet Features:

- A. The control cabinet provided by the Contractor shall be capable of securely withstanding all potential local weather conditions and temperatures allowing for proper operation of the controls. The pump station controller shall be operable without removing the access cover, for deadfront operation. The motor circuit breakers, starter reset buttons, and Hand-Off-Auto control switches shall be operable without opening the panel door. All components within the control panel shall be UL listed or recognized, and the complete station control panel itself shall be labeled as a UL 508A General Use Industrial Control Panel. The electrical equipment in the panel shall be protected by a lightning arrestor and a surge suppression capacitor.
 1. A duplex GFI protected convenience outlet shall be provided in the station for operation of 120-volt AC devices.
 2. A compatible transformer shall be provided as required by the supplier, to transition voltage from 480 to 120 voltage.
- B. Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short circuit protection of all auxiliary circuits, and motor circuit protectors shall be provided for each pump motor. Only instantaneous trip magnetic type motor circuit protectors, matched to the motor inrush current, shall be used for the motor circuits, for added protection from low level faults. Thermal magnetic circuit breakers will not be allowed for pump motor service.
- C. Magnetic cross-the-line starters with 24-volt coils and solid state overload protection for each phase shall be provided for applicable pump motors to give positive protection against phase unbalance, thermal overload, phase loss and ground fault. Single-phase auxiliary motors shall be equipped with an over-current protection device in addition to the branch circuit breaker, or shall be impedance protected. All switches shall be labeled and a coded wiring diagram shall be provided.
- D. All 120 volt control wiring shall be red (or white for neutrals) in color. All line power wire shall be black and sized for the ampacity draw as determined by the NEC. All control wire terminations shall be numbered using black

imprinted PVC sleeves and the numbers shall be transferred to the as built ladder diagram to be placed in both the O & M Manual and a special pocket on the inside of the control panel door.

- E. Individual NEMA 4X oil-tight Hand-Off-Automatic selector switches shall be provided for each pump. The switches shall be 3-position rotary type with spring return on the Hand position.
 - F. The controller shall interface with the transducer, floats, panel indicators, motor starters, environmental system, accessories and alarm functions as required. Transient voltage protection shall be provided for all control inputs.
 - G. The control system shall be designed to allow alternation of the pumps by the manual selection on-site of either a time clock or alternation per the end of each pumping cycle. Selection of the alternation method and setting of the interval for timed alternation shall be easily done. The panel shall indicate which pump is currently the lead pump. A manual switch shall allow for any pump to be selected as base pump or to revert back to automatic alternation.
 - H. Controls shall include interlocks to allow only one pump to start at a time with both pumps allowed to operate via standby power. Contractor and supplier shall verify with electrical contractor and Engineer prior to provision and modify accordingly after field assessment and testing of existing generator).
 - I. To control the operation of the pumps with variations of liquid level in the wet well, and monitor the station control, environmental and alarm functions, a specially preprogrammed, dedicated microprocessor-based digital control system shall be provided. The controller shall interface with the wet well level pressure transducer/sensor, redundant floats, panel display unit, motor starters, environmental system, accessories and alarm functions through optically isolated digital and analog input and output ports as required. Transient voltage protection shall be provided for all control inputs. The digital controls shall operate 24 volts or less, to eliminate shock hazard. Program integrity shall be maintained by battery-backed RAM.
1. A NEMA 4x rated display unit shall be mounted through the front of the control cabinet panel to provide operator input to and visual output from the microprocessor controller. This interface shall be a multiline x 20-character (min.) backlit Liquid Crystal Display message center with at least 8 pre-programmed function keys and four additional keys for data input and scrolling. The display characters shall be at least 0.23" high. Functions shall include menu selection, digital input and selection of output data and indications, as described in the following lists:

Display Functions:

- Pump running indication
- Individual alarm indication for each alarm function
- Hand-Off-Auto indication for each pump
- Lead pump indication

Alarm reset and silencing
Digital indication of ambient air temperature
Digital indication of wet well level
Digital indication of elapsed run time for each pump
Digital indication of elapsed run time for parallel pump operation
Digital indication of level control and alarm settings

Field Programming Functions:

Reset wet well on, off and alarm levels or return to default settings
Reset heater or vent fan thermostat set points or return to default settings
Select sequenced or timed pump alternation and select alternation time interval
Select any pump to remain as lead pump
Silence audible alarm
Reset tripped alarm
All pumps stop – single button

2. The panel display shall be capable of indicating the total running time, in hours and tenths of an hour, of each pump individually, as well as the total time that both pumps have been running in parallel. Provision shall be made so that it is possible to reset the timers to zero, if necessary.
- J. Provisions shall be made for the pumps to operate in parallel should the level in the wet well continue to rise above the starting level for the low-level pump. A high water alarm shall also be provided for remote and local alarm indication.
- K. Four (4) back-up displacement switches shall be provided to automatically operate the pumps. A 30' cord shall be provided with each switch. The cord shall have a corrosion-resistant vinyl jacket and be multi-stranded in order to prevent fatigue. The displacement switch cords and the cable for the submersible pressure transducer shall enter the wet well through cord grip seals mounted to a removable, gasketed floor plate. The floor plate shall allow the displacement switches and transducer to be adjusted or removed and replaced without having to enter or reach into the wet well. The level control sequence for the back-up displacement switches shall be set as recommended by the manufacturer in the wet well and as approved by the engineer and shall generally consist of a low water "OFF", lead pump "ON", lag pump "ON", and high water alarm/secondary pump "ON".
- L. The Contractor shall consult with the manufacturer regarding climate conditions and their recommendation for cold and hot weather operation. If necessary, shall provide a dual range auxiliary heater, cabinet air conditioning, automatic circulating fan, thermostat control and an on/off switch(es). The auxiliary heating/cooling device may be plugged into a dedicated receptacle. In addition, the fiberglass cover may be equipped with

a minimum of 1" thick urethane insulation, protected by fiberglass, with an "R" value of 7 or more and/or as recommended by the supplier.

- M. An insulating-type transformer shall be provided to supply power for lights, controls and auxiliary devices. The transformer shall have 208/240/480 volt primary, 120/240 volt secondary, Class F insulation, with temperature rise not to exceed 115o C above 40o C ambient. The core and coil assembly shall be given a double dip and bake. The coil shall be protected by a metal housing to prevent damage. The transformer shall be protected by a separate circuit breaker on the supply side. The Contractor shall verify the required transformer requirements with the manufacture and provide in accordance therewith.
- N. An optional Submersible Hydrostatic Pressure Transducer/ Level Sensor may be provided with Owner approval with floats also provided (as redundant): The transducer/sensor shall have a stainless steel sensor diaphragm, providing a 4-20 mA signal to the pump control unit in addition to back-up floats. The body of the transducer shall be made of stainless steel. The pressure transducer shall have a permanent hermetically sealed connection to a polyethylene insulated cable, which shall support the transducer 6" from the bottom of the wet well, and shall pass through a cord grip seal in the wetwell top/station cover. The pressure transducer/sensor unit shall be rated for wastewater or potable water service, and for operation in explosion hazardous areas. The unit shall be dual mode (pressure transducer/level sensor), compatible with the PLC, have atmospheric compensation without breathing tubes, be able to monitor liquid levels above the top of the probe, have dual-level redundancy, and shall be unaffected by grease, foam or turbulence. Contractor shall verify requirements with and provide per supplier for application.
- O. Lightning surge protection shall be provided on each phase and shall be installed prior to the entrance main and in accordance with the manufactures recommendations. In addition, a transient voltage suppressor being a category C3 high exposure, UL revision 2 listed, rated at 100,000 amps per each phase, shall be provided and installed at the power distribution center inside the pump control panel.
- P. A compatible communication system for the proposed lift station ,approved by the Owner, shall be furnished by the Contractor. The Contractor shall be responsible for the wiring and connection of the system to the proposed control system and all appurtenances incidental thereto and as required to properly utilize the system. The system shall contact a list of numbers provided by the Owner in sequence until a verification of notification is received.

2.08 ELECTRICAL SYSTEM

- A. The pumping station shall be designed for 480 volt, three phase, primary power service, with 120 volt auxiliary power requirements and 24 volt control power requirements provided for by furnishing suitably sized dry type

transformers within the station. All wiring shall conform to the National Electrical Code and shall comply with local regulations and ordinances of the community for which the station is constructed. The contractor shall be responsible for coordinating the installation of adequate power between the local power company and the equipment supplier. This included the provision of power from the nearest mainline power source to the lift station by the contractor and at his/her expense.

- B. Conduit: Except for plug-in cords and in control enclosures, all wiring shall be in rigid galvanized steel or aluminum conduit or enclosed galvanized steel or aluminum rectangular raceways. Conduit entering the wet well and control panel shall be sealed to prevent the movement of gases from the wet well into the control panel.
- C. Cable:
 - 1. Except for continuation of exterior cables, cable and wiring shall be factory installed. On stations where the disconnect means employ more than one breaker, breaker cable lugs shall be sized to fully accommodate both service entrance conductors and branch service conductors. Removal of outer strands of conductors to make up branch connections will not be permitted. Where breaker lugs will not accommodate service, and branch conductors, T type connectors or double lugs shall be provided. Thermoplastic insulated neoprene covered service entrance conductors of the size required shall be provided.
 - 2. All power and control cable installed in the station shall be copper, insulated for 600 volts, 75C, wet and dry locations, Underwriters Laboratories Type RHH for power cable and Type RHH or THW for control cable. Bare copper conductors shall be installed in all but lighting conduits for grounding connections.
- D. Panel Wiring: All control wiring in switching and control assemblies shall be color coded or numbered. Color coding shall be such that electrically common interconnections of devices are the same color. The colors may be used more than once but not in the same circuit or cable grouping. Color of plug-in cord conductors does not need to comply with the color code. The power and control enclosure shall contain ground lugs or an AWG ground in the service entrance circuit and each ground cable to devices in the station. The enclosure shall be well grounded to the station shell by mounting or by an AWG band jumper.
- E. Wiring Diagrams: The manufacturer shall provide both connection diagrams and schematics, identifying all items in wiring connections in accordance with terminal identification of equipment.

2.09

ALARM SYSTEM

The alarm system shall be activated in cases of power failure, pump failure and high water level. When activated, the alarm system shall signal the PLC and a notification system as well as activate an annunciator, and flash a red warning beacon to be located remotely and mounted in a visible location. The alarm beacon

shall be vapor-tight with a $\frac{3}{4}$ inch bottom hub, red globe, guard, 60 watt equivalent bulb and shall be mounted on top of the control enclosure with a $\frac{3}{4}$ inch hub.

PART 3 EXECUTION

3.01 MANUFACTURER'S FIELD SERVICES

The manufacturer shall provide installation, start-up, testing and operator instruction services for all equipment. A minimum of one full day shall be provided, at no cost, each for start-up and testing, installation, and operator instruction. Warranty service and service required to achieve proper operation shall be provided at no charge.

3.02 INSTALLATION

Each discharge base shall be leveled, aligned, plumbed, and wedged into position to fit connecting piping. Installation procedures shall be as recommended by the pump manufacturer and the Hydraulic Institute Standards. Grouting shall be as specified.

3.03 FIELD TEST

The Supplier shall demonstrate each pump is capable of pumping the specified flow at rated head through pumping tests of not less than five minutes for each pump. A minimum of two tests shall be run on each pump or as needed to produce flow rates with a deviation of 10% or less. The Engineer shall be notified a minimum of 48 hours prior to the testing date so that their authorized representative may be allowed to observe and document testing. The supplier shall provide any necessary appurtenances and labor for testing.

3.04 PIPING

- A. The discharge line from each pump shall be fitted with a check valve and eccentric plug valve. Size, location and quantity of check valves and level (or wheel) operated plug valves shall be as shown on the construction drawing. The check valve shall be of the spring-loaded, silent and resilient type with external lever arm and an easily replaced resilient seat for added assurance against vacuum leaks. Check valves shall have stainless steel shaft with replaceable bronze shaft bushings and shall be sealed with an adjustable Teflon seal. Ball type check valves are specifically unacceptable for this application. An operating wrench shall be provided for the plug valves. All station piping and fittings shall be capable of passing a 3" spherical solid.
- B. Except where otherwise shown, all sewage piping from the pump through the valves shall be ductile iron. Pipe shall be ANSI Class 22 conforming to ANSI A21.6 or A21.. Fittings shall conform to ANSI A21.10. Mechanical joints shall conform to ANSI A21.11 and flanges shall be ANSI 125 lb. All pipe and fittings shall be coated inside and out with the manufacturer's standard bituminous coating. Flange bolts and nuts shall be ASTM A307, Grade B, of such length that, after installation, bolts will project $\frac{1}{8}$ to $\frac{3}{8}$ inch beyond the outer face of the nut. Flange gaskets shall be of ring type made from $\frac{1}{11}$ inch thick red rubber or other approved material. Flanged or mechanical joint

pipe and fittings shall be used inside the pumping station, and mechanical joint type bells shall be provided outside the station walls.

- C. Whenever screwed-on flanges are used, the pipe shall extend completely through the flange. The pipe end and flange face shall be finish machined in a single operation. Flange faces shall be flat and perpendicular to the pipe centerline.
- D. When bolting flange joints, care shall be taken to ensure that there is no restraint on the opposite end of the pipe or fitting which would prevent uniform gasket compression or which would cause unnecessary stress in the flanges. One flange shall be free to move in any direction while the flange bolts are being tightened. Bell and spigot joints shall not be packed or assembled until all flanged joints affected thereby have been tightened. Bolts shall be tightened gradually and at a uniform rate, so that gasket compression is uniform.
- E. Special care shall be taken when connecting to pumping equipment to insure that no stresses are transmitted to the pump flanges by the connected piping. All such piping shall be permanently supported so that accurate matching of bolt holes and uniform contact over the entire surface of abutting pump and piping flanges are obtained before installation of any bolts in those flanges. In addition, pump connection piping shall be free to move parallel to its longitudinal centerline while the bolts are tightened.

3.05 WET WELL

- A. The wet well shall meet the requirements of the construction plans, specifications, and all applicable regulatory agencies. The wet well shall have a grouted bottom with a minimum slope of one to one to the hopper bottom. Adequate venting shall be supplied per current MDNR guidelines. Vent pipes shall be down turned and/or screened. Float levels in the wet well shall be established to allow for a cycle time not less than 10 minutes. The wet well shall be able to withstand soil pressure based on a soil weight of at least 120 pounds per cubic feet. All sizes, thickness, and deflection of the component parts shall be acceptable to the Engineer and as recommended by the supplier. The outside of the wet well shall be coated with a compatible damp proofing material and all joints thoroughly sealed with a standard mastic sealer. The wet well shall be field leak tested prior to the introduction of wastewater. The top of the wet well shall be a minimum of 3" above finished grade. Underlying soil conditions shall be field verified by the Contractor and any stability concerns addressed with the Engineer.
- B. Aluminum Access Hatch: The pump station access hatch shall be installed into the wet well top. The hatch shall be of Heavy Duty construction – 300 P.S.F. load rating in accordance with O.S.H.A. standard 1910.23 and accompanied with a hinged and removable safety grate compatible with confined space entry shall be in accordance with O.S.H.A. standard 1910.146. The hatch shall be of sufficient size and positioning to

accommodate straight, vertical removal of the pumps shown on the drawings. The access hatch shall allow visual inspections, limited maintenance and level system adjustment while safety grate is left in place. The safety grate shall be orange or bright in color to promote a visual awareness of the hazard. The material of the access cover bars, angles and extrusions shall be 6061-T6. The diamond deck plate shall be constructed of 5086 aluminum. Each unit shall be equipped with a 316 stainless steel hold open arm and shall lock in 90 degree position. The aluminum lift handle shall be recessed and the slam lock assembly will be fitted to the deck plate. A special key for the slam lock will be provided.

3.06 PAINTING AND CORROSION PROTECTION

- A. Preparation of surfaces to be painted and all painting shall be done in the shop before shipment of the station assembly so that field painting will be limited to coating damaged or abraded areas.
- B. All pumps, motors, the control cabinet, explosion proof junction box and controls and other machines or equipment shall be painted as specified herein and as required by the manufacturer.
- C. All structural steel surfaces shall be factory blasted with steel grit, in an environmentally controlled booth, to remove rust, mill scale, weld slag, etc. All weld spatter and surface roughness shall be removed by grinding. Surface preparation shall comply with SSPC-SP6 specifications. Sandblasting is specifically prohibited.
- D. Immediately following cleaning, a single 8 mil dry film thickness coating of a supplier approved self-priming epoxy shall be factory applied to the base. After curing, a 2-3 mil DFT top coating of a moisture-cured Aliphatic Polyurethane protective finish, for abrasion resistance and weather protection, shall be applied to the top of the base and as a finish coating for all other structural, pump and piping assemblies. The bottom of the station base, exposed to the wet well, shall be further coated with an additional 6-8 mil coating of an epoxy coating for chemical and abrasion resistance. These coatings shall be as formulated by the Supplier specifically for this type of application and service. A FRP coating or 304 SS baseplate are also acceptable to the coating described above.
- E. Stainless steel, aluminum and other corrosion-resistant surfaces shall not be coated. Carbon steel surfaces not otherwise protected shall be coated with a suitable non-hardening rust preventative compound. Auxiliary components such as the electrical enclosure, ventilating blower and vacuum pumps shall be furnished with the original manufacturer's coating.
- F. Finish coating shall be accomplished prior to shipment of the station from the factory and shall comply fully with the intent of these specifications. A touch-up kit shall be provided by the pump station manufacturer for repair of any mars or scratches occurring during shipping and installation. This kit shall contain detailed instructions for use.

- G. All painted surfaces damaged during shipment or installation shall be repainted using the same or equivalent materials as used in the original application.
- H. Exposed surfaces of copper tubing, including fittings, and valves, inside the station shall have a natural finish obtained by cleaning and burnishing with "00" steel wool and applying a coat of clear lacquer or shall be painted with epoxy.

3.07 RECORD (AS-BUILT) DRAWINGS

The contractor shall provide to the Engineer an as-built sketch or other suitable description of all changes made during construction, including wiring revisions, piping revisions, actual manhole locations and depths, installed pipe slopes and lengths, elevations, and other pertinent information. Information shall be clearly legible and shall be as accurate as possible. Final record drawings will be prepared by the Engineer based on information provided by the contractor and are subject to any inaccuracies received from the contractor.

3.08 EXISTING EQUIPMENT

All existing equipment on-site is to remain the property of the Owner and shall not be damaged, modified, or relocated without the Owners written permission.

3.09 EMERGENCY POWER

The Contractor shall provide connection to the existing automatic transfer switch and generator system and provide all necessary wiring, conduit and appurtenances. Contractor to field verify conditions and coordinate work with pump supplier and generator manufacturer to ensure compatibility.

3.10 REACTION ANCHORAGE AND BLOCKING

All piping exposed in interior locations and subject to internal pressure in which mechanical or similar type joints are installed shall be blocked, anchored, or harnessed to preclude separation of joints. All steel clamps, rods, bolts, and other metal accessories used in reaction anchorages or joint harnesses shall be painted with two coats (in addition to a prime coat) of a paint acceptable to the Engineer.

3.11 JOINT LEAKAGE

All joints shall be watertight and free from leaks. Each leak which is discovered within one year after final acceptance of the work by the Owner shall be repaired by and at the expense of the Contractor.

END OF SECTION

SECTION 40 71 69

FLOW PROCESS MEASUREMENT DEVICES

PART 1 GENERAL

1.01. SUMMARY

- A. The work in this section consists of providing, furnishing, installing level measurement devices at locations shown on the drawings with all labor, equipment, materials, supervision, and incidentals necessary for complete and properly functioning measurement and recording.

1.02. RELATED SECTIONS

- A. The following sections shall be considered with the flow process measurement devices:
 - 1. Section 26 00 00 Electrical, and all related sections.

1.03. SUBMITTALS

- A. Submit for approval 3 copies of the following:
 - 1. Product literature.
 - 2. Complete description of devices.
 - 3. Dimensions and required clearances.
 - 4. Weights.
 - 5. Performance characteristics.
 - 6. Layout drawing for all equipment showing installation details and exploded diagrams.
 - 7. A list of all deviations from drawings and specifications.
 - 8. Affidavits of compliance with referenced standards and codes.
 - 9. Manufacturers' Warranty.
- B. Maintenance and Operating Instructions: A digital copy and two hard copies of each manufacturer's maintenance and operating instructions manual shall be provided for all equipment at the time of delivery. Any revisions during start-up or operating instructions shall be made in each of the final copies of the Operation and Maintenance Manuals prior to final payment being made to the Contractor.

1.04. QUALITY ASSURANCE

- A. Manufacturers' Qualifications: All equipment furnished under this section shall be furnished by a single supplier who shall assume complete responsibility for the design and performance of the equipment.
- B. Reference Standards: Comply with all applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - 1. National Electrical Code (NEC)
 - 2. National Electrical Manufacturers Association (NEMA)
 - 3. American Society of Testing and Materials (ASTM)

- C. Compatibility: It shall be the responsibility of the Manufacturer of the equipment specified in this Section to ensure that all equipment is properly interfaced for the correct operation and performance of the flow measurement equipment.

PART 2 PRODUCTS

2.01. DESIGN CONDITIONS

- A. General: Provide transducers for measuring fluid levels in each sludge storage structure proposed and as indicated by construction drawings.
- B. Design Criteria: Measure, totalize, store data of and summarize fluid levels with output to facility SCADA.

2.02. TRANSDUCERS

- A. Compatible ultrasonic transducer systems shall be provided for each proposed sludge storage basin and as indicated by the construction drawings. The ultrasonic transducer shall be as manufactured by MJK, ISCO, Foxboro, Inc., Great Lakes/STI, or approved equal. Remote digital, programmable readout flow meter panels shall be placed in field verified locations. Transducer signal shall be 4-20 mA. The units shall store history readings for extended periods and be accompanied by any software or programming necessary to access/sort/chart information at a desktop computer to be located in the control building and by facility SCADA.. All equipment shall be provided per the manufacture's recommendation. Wiring shall be provided as required by the manufacturer for proper operation and to send flow information to the control building and the SCADA system. Conduit and appurtenances shall not interfere with operation or communication. All transducer/flow meters shall provide an output signal to the PLC for remote display and analysis of data. It is the responsibility of the Contractor to coordinate with the system integrator. Sun shields or other devices shall be provided for viewing the outdoor panel display as necessary.
- B. Metering Accuracy: The measuring and metering equipment furnished shall be guaranteed to fall within the following:

Level	Error of a level measuring system shall be within one percent of the measured range
Flow	Agreement of the measuring system with the flowhead curves of the differential procedures shall be within one percent over a 5 to 1 range for control and 8 to 1 range for instrumentation.

PART 3 EXECUTION

3.01. GENERAL

- A. Installation: Refer to and follow manufacturer's recommendations. Programming shall be per or by the supplier and provided for both remote units and the City's receiving computer.
- B. Supplier shall provide a digital and two hard copies of operation and maintenance information for all products.
- C. A minimum of four hours of field set-up and training shall be provided to City staff at time agreeable to them.

END OF SECTION

SECTION 40 91 23

FLOW PROCESS MEASUREMENT DEVICES

PART 1 GENERAL

1.01. SUMMARY

- A. The work in this section consists of providing, furnishing, installing, an electromagnetic flow meter at the location shown on the drawings, and all labor, equipment, materials, supervision, and incidentals necessary for complete and properly functioning flow measurement and recording system.

1.02. RELATED SECTIONS

- A. The following sections shall be considered with the flow process measurement devices:
 - 1. Section 26 00 00 Electrical, and all related sections.

1.03. SUBMITTALS

- A. Submit for approval 3 copies of the following:
 - 1. Product literature.
 - 2. Complete description.
 - 3. Dimensions and required clearances.
 - 4. Weights.
 - 5. Performance characteristics.
 - 6. Layout drawing for all equipment showing installation details and exploded diagrams.
 - 7. A list of all deviations from drawings and specifications.
 - 8. Affidavits of compliance with referenced standards and codes.
 - 9. Manufacturers' Warranty.
- B. Maintenance and Operating Instructions: Three (3) copies of each manufacturer's maintenance and operating instructions manual shall be provided with the equipment at the time of delivery. Any revisions during start-up or operating instructions shall be made in each of the three (3) final copies of the Operation and Maintenance Manuals prior to final payment being made to the Contractor.

1.04. QUALITY ASSURANCE

- A. Manufacturers' Qualifications: All equipment furnished under this section shall be furnished by a single manufacturer who shall assume complete responsibility for the design and performance of the equipment.
- B. Reference Standards: Comply with all applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - 1. National Electrical Code (NEC)
 - 2. National Electrical Manufacturers Association (NEMA)
 - 3. American Society of Testing and Materials (ASTM)
 - 4. Applicable portions of ANSI/AWWA Standards

5. Applicable portions of NSF/ANSI Standard 61, Annex G

- C. Compatibility: It shall be the responsibility of the Manufacturer of the equipment specified in this Section to ensure that all equipment is properly interfaced for the correct operation and performance of the flow measurement equipment.

PART 2 PRODUCTS

2.01. MANUFACTURERS

- A. Electromagnetic flow meter shall be Badger Model M-4000, or approved equal.

PART 3 EXECUTION

3.01. DETAILS OF CONSTRUCTION:

- A. General
1. All equipment shall be the end product of one system manufacturer. The manufacturer shall be responsible for the complete system including all items covered herein.
- B. Metering Tube
1. Shall be constructed of 316 stainless steel, and rated for a maximum allowable non-shock pressure and temperature for steel pipe flanges, according to ANSI B16.5. Metering Tube shall be constructed as follows:
 2. Size as noted on the drawings or specified herein.
 3. End connections shall be ANSI B16, Class 150, 316 stainless steel flanges.
 4. Insulating liner material of the metering tube (detector) shall be made of a hard rubber elastomer and NSF-listed in conformance with manufacturer's recommendation for the intended service.
 5. The metering tube (detector) shall include two self-cleaning measuring electrodes. The electrode material shall type 316 stainless steel.
 6. The metering tube (detector) shall include a third "empty pipe detection" electrode located in the upper portion of the inside diameter of the flow tube in order to detect an empty pipe condition when the flow tube is running partially empty.
 - a. The metering tube (detector) housing shall be constructed of carbon steel, welded at all joints, and rated to meet NEMA 4 (IP66) ratings.
 - b. The metering tube (detector) shall be provided with a pair type 316 stainless steel grounding rings, top and end flanges. Reinforcing ribs shall be located a maximum of 12" center to center.
- C. Signal Amplifier
1. The signal amplifier shall be microprocessor based, and shall energize the detector coils with a digitally controlled pulsed DC. The excitation frequency shall be program selectable for the following: 1Hz, 3.75Hz, 7.5Hz, or 15Hz. The amplifier shall be constructed to the following requirements:
 2. The signal amplifier electrical power requirement shall be 85-265VAC, 45-65Hz. The power consumption shall not exceed 20W.
 3. The signal amplifier shall have an ambient temperature rating of -4°F to 122°F [-20°C to 50°C].

4. The signal amplifier shall include non-volatile memory capable of storing all programmable data and accumulated totalizer values in the event of a power interruption.
5. Automatic zero stability, low flow cut-off, empty pipe detection and bi-directional flow measurement shall be inherent capabilities of the signal amplifier.
6. All signal amplifier outputs shall be galvanically isolated to 500 volts.
7. The signal amplifier and remote junction enclosures shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X (IP66) ratings.

D. Inputs / Outputs

1. The signal amplifier shall provide a total of four digital outputs, one analog output and one digital input. Inputs / outputs shall be as follows:
 - a. One digital input, program selectable from the following: Remote reset and positive return to zero.
 - b. Up to two open collector digital outputs, program selectable from the following: Forward pulse, reverse pulse, AMR pulse, flow set point, empty pipe alarm, flow direction, preset output, and error alarm.
 - c. Up to two AC solid-state relay outputs, program selectable from the following: Frequency output, flow set point, empty pipe alarm, flow direction, preset amount and error alarm.
 - d. 5 One analog output programmable and scalable from the following: 0-10mA, 0-20mA, or 4-20mA. Voltage sourced and isolated. Max. loop resistance = 750 ohms.

E. Control and Programming

1. The signal amplifier shall be programmed via three function buttons. The programming functions shall be available in a user-friendly, menu driven software through the four-line LCD interface. The signal amplifier shall accommodate the following languages: English, German, Czech, French or Spanish.
2. Programmable parameters of the amplifier include, but are not limited to: calibration factors, totalizer resets, unit of measure, analog and pulse output scaling, flow-alarm functions, language selection, low-flow cutoff, noise dampening factor and excitation frequency selection.
3. The signal amplifier shall have a programming option allowing entry of a selected numeric password value for tamper protection.

F. System Performance

1. The metering system shall operate over a flow range of 0.10 to 39.4 ft/s [0.03 to 12.0 m/s].
2. The metering system shall perform to an accuracy ± 0.25 percent of rate for velocities greater than 1.64 ft/s [0.50 m/s], ± 0.004 ft/s [± 0.001 mm/s] for velocities less than 1.64 ft/s [0.50 m/s].
3. The metering system shall be capable of measuring the volumetric flow rate of liquids having an electrical conductivity as low as 5.0 micromhos per centimeter.
4. The system measuring repeatability shall be $<0.10\%$ of full scale.

G. Indication

1. The signal amplifier shall include a four-line, 16-character, backlit LCD interface to display the following values:
 - a. Flow rate in selectable rate units
 - b. Forward totalizer in selectable volume units
 - c. Reverse totalizer in selectable volume units
 - d. Net totalizer in selectable volume units
 - e. Error and/or alarm messages
 - f. Output Status

H.

3.02. INSTALLATION:

A. Installation

1. Refer to and follow manufacturer's recommendations.

B. Calibration

1. Each meter shall be hydraulically calibrated in an ISO 9000-certified testing facility, which utilizes a computerized gravimetric testing method with a measuring uncertainty of 0.1%.
2. Each meter shall be provided with a calibration certificate indicating the measured error (percent deviation) at three different flows, respectively equivalent to 25%, 50% and 75% of the nominal flow rate for each size.

END OF SECTION

SECTION 40 91 23

FLOW PROCESS MEASUREMENT DEVICES

PART 1 GENERAL

1.01. SUMMARY

The work in this section consists of providing, furnishing, installing, electromagnetic flow meters compatible with project flow at the location(s) shown on the drawings, and all labor, equipment, materials, supervision, and incidentals necessary for complete and properly functioning flow measurement and recording system. A local display is to be provided with output to applicable data systems. All work to be coordinated between contractor and supplier.

1.02. RELATED SECTIONS

The following sections shall be considered with the flow process measurement devices: Section 26 00 00 Electrical, and all related sections.

1.03. SUBMITTALS

- A. Submit for approval 3 copies of the following:
 - 1. Product literature.
 - 2. Complete description.
 - 3. Dimensions and required clearances.
 - 4. Weights.
 - 5. Performance characteristics.
 - 6. Layout drawings for equipment with installation details and clear diagrams.
 - 7. A list of all deviations from drawings and specifications.
 - 8. Affidavits of compliance with referenced standards and codes.
 - 9. Manufacturers' warranty.
- B. Maintenance and Operating Instructions: One digital and three (3) hard copies of each manufacturer's maintenance and operating instructions manual shall be provided with the equipment at the time of delivery. Any revisions during start-up or operating instructions shall be made in each of the final copies of the Operation and Maintenance Manuals prior to final payment being made to the Contractor.

1.04. QUALITY ASSURANCE

- A. Manufacturers' Qualifications: All equipment furnished under this section shall be furnished by a single manufacturer who shall assume complete responsibility for the design and performance of the equipment.
- B. Reference Standards: Comply with all applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - 1. National Electrical Code (NEC)
 - 2. National Electrical Manufacturers Association (NEMA)
 - 3. American Society of Testing and Materials (ASTM)
 - 4. Applicable portions of ANSI/AWWA Standards
 - 5. Applicable portions of NSF/ANSI Standard 61. Annex G

Compatibility: It shall be the responsibility of the Manufacturer of the equipment specified in this Section to ensure that all equipment is properly interfaced for the correct operation and performance of the flow measurement equipment.

PART 2 PRODUCTS

2.01. MANUFACTURERS

Electromagnetic flow meter shall be by Badger, McCrometer, Rosemount, or approved equal.

PART 3 EXECUTION

3.01. DETAILS OF CONSTRUCTION:

A. General

1. All equipment shall be the end product of one system manufacturer. The manufacturer shall be responsible for the complete system including all items covered herein.

B. Metering Tube

1. Shall be constructed of 316 stainless steel, and rated for a maximum allowable non-shock pressure and temperature for steel pipe flanges, according to ANSI B16.5. Metering Tube shall be constructed as follows:
2. Size as noted on the drawings or specified herein.
3. End connections shall be ANSI B16, Class 150, 316 stainless steel flanges.
4. Insulating liner material of the metering tube (detector) shall be made of a hard rubber elastomer and NSF-listed in conformance with manufacturer's recommendation for the intended service.
5. The metering tube (detector) shall include two self-cleaning measuring electrodes. The electrode material shall type 316 stainless steel.
6. The metering tube (detector) shall include a third "empty pipe detection" electrode located in the upper portion of the inside diameter of the flow tube in order to detect an empty pipe condition when the flow tube is running partially empty.
 - a. The metering tube (detector) housing shall be constructed of carbon steel, welded at all joints, and rated to meet NEMA 4 (IP66) ratings.
 - b. The metering tube (detector) shall be provided with a pair type 316 stainless steel grounding rings, top and end flanges. Reinforcing ribs shall be located a maximum of 12" center to center.

C. Signal Amplifier

1. The signal amplifier shall be microprocessor based, and shall energize the detector coils with a digitally controlled pulsed DC. The excitation frequency shall be program selectable for the following: 1Hz, 3.75Hz, 7.5Hz, or 15Hz. The amplifier shall be constructed to the following requirements:
2. The signal amplifier electrical power requirement shall be 85-265VAC, 45-65Hz. The power consumption shall not exceed 20W.
3. The signal amplifier shall have an ambient temperature rating of -4°F to 122°F [-20°C to 50°C].
4. The signal amplifier shall include non-volatile memory capable of storing all programmable data and accumulated totalizer values in the event of a power interruption.

5. Automatic zero stability, low flow cut-off, empty pipe detection and bi-directional flow measurement shall be inherent capabilities of the signal amplifier.
 6. All signal amplifier outputs shall be galvanically isolated to 500 volts.
 7. The signal amplifier and remote junction enclosures shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X (IP66) ratings.
- D. Inputs / Outputs
1. The signal amplifier shall provide a total of four digital outputs, one analog output and one digital input. Inputs / outputs shall be as follows:
 - a. One digital input, program selectable from the following: Remote reset and positive return to zero.
 - b. Up to two open collector digital outputs, program selectable from the following: Forward pulse, reverse pulse, AMR pulse, flow set point, empty pipe alarm, flow direction, preset output, and error alarm.
 - c. Up to two AC solid-state relay outputs, program selectable from the following: Frequency output, flow set point, empty pipe alarm, flow direction, preset amount and error alarm.
 - d. 5 One analog output programmable and scalable from the following: 0-10mA, 0-20mA, or 4-20mA. Voltage sourced and isolated. Max. loop resistance = 750 ohms.
- E. Control and Programming
1. The signal amplifier shall be programmed via three function buttons. The programming functions shall be available in a user-friendly, menu driven software through the four-line LCD interface. The signal amplifier shall accommodate the following languages: English, German, Czech, French or Spanish.
 2. Programmable parameters of the amplifier include, but are not limited to: calibration factors, totalizer resets, unit of measure, analog and pulse output scaling, flow-alarm functions, language selection, low-flow cutoff, noise dampening factor and excitation frequency selection.
 3. The signal amplifier shall have a programming option allowing entry of a selected numeric password value for tamper protection.
- F. System Performance
1. The metering system shall operate over a flow range of 0.10 to 39.4 ft/s [0.03 to 12.0 m/s].
 2. The metering system shall perform to an accuracy ± 0.25 percent of rate for velocities greater than 1.64 ft/s [0.50 m/s], ± 0.004 ft/s [± 0.001 mm/s] for velocities less than 1.64 ft/s [0.50 m/s].
 3. The metering system shall be capable of measuring the volumetric flow rate of liquids having an electrical conductivity as low as 5.0 micromhos per centimeter.
 4. The system measuring repeatability shall be $<0.10\%$ of full scale.
- G. Indication
1. The signal amplifier shall include a four-line, 16-character, backlit LCD interface to display the following values:

- a. Flow rate in selectable rate units
- b. Forward totalizer in selectable volume units
- c. Reverse totalizer in selectable volume units
- d. Net totalizer in selectable volume units
- e. Error and/or alarm messages
- f. Output Status

3.02. INSTALLATION:

- A. Installation
 - 1. Refer to and follow manufacturer's recommendations.
 - 2. Field verify locations and requirements.
 - 3. Adjust as needed to facilitate proper performance.
 - 4. Coordinate work with other supplier's and contractor's to allow for data transfer and use by facility SCADA or other applicable systems.
- B. Calibration
 - 1. Each meter shall be hydraulically calibrated in an ISO 9000-certified testing facility, which utilizes a computerized gravimetric testing method with a measuring uncertainty of 0.1%.
 - 2. Each meter shall be provided with a calibration certificate indicating the measured error (percent deviation) at three different flows, respectively equivalent to 25%, 50% and 75% of the nominal flow rate for each size.

END OF SECTION

AERATION BLOWERS

PART 1 - GENERAL

1.01 ROTARY SCREW POSITIVE DISPLACEMENT AIR BLOWERS

- A. The Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified and required to furnish, install, test and place in satisfactory operation 3 Rotary Screw blower unit(s) complete and operational.
- B. All equipment specified in this section shall be designed and furnished by the Screw Blower Manufacturer who shall be responsible for the compatibility of all included equipment.
- C. Blower supplier shall coordinate work with the aeration system provider and other related suppliers.
- D. Deliveries shall be coordinated with the Contractor. Prior to delivery of any equipment the manufacturer shall submit recommended storage requirements to the Engineer and Owner.
- E. Installation shall be coordinated and per applicable supplier guidelines for application.

1.02 MANUFACTURERS

- A. The blower equipment shall be as manufactured by Inovair, Atlas Copco or approved equal.
- B. The air blower/motor assemblies, all accessories and controls shall be supplied by a single manufacturer who is fully experienced, reputable, and qualified in the supply of the equipment to be furnished. The manufacturer of the blower shall be well represented in North America & must have its own local service organization to ensure good overall service support during start-up and later when the blowers are in service.
- C. The blower manufacturer's machining and assembly shops must be ISO 9001 certified to assure conformance to the highest quality standards of the industry.
- D. All factory authorized spare parts shall be available from at least one location within the USA.
- E. The manufacturer of the blower shall be well represented in Missouri and must have its own local service organization to ensure good overall service support during start-up and later when the blowers are in service.
- F. The listing of any manufacturers name shall not imply tacit approval. The selected manufacturer shall be required to meet the specification.
- G. Blower layout and design is based on Atlas Copco. This representation is only a result of managing design effort rather than produce a detailed design for each potential blower configuration.
- H. If equipment from another manufacturer is furnished, the Contractor is responsible for coordinating with the proposed blower manufacturer and the requirements of this design to result in a complete and functional installation at no additional cost to the owner.
- I. Contractor shall install the blower package and external equipment supplied by the blower manufacturer and shall provide and install all external piping, pipe supports, wiring, conduit, and accessories not provided by the blower manufacturer for a complete and functional blower system.

AERATION BLOWERS

1.03 TESTING

A. Mechanical and Functional Test

1. Each blower shall be mechanically tested as a whole package following production.
2. Manufacturer standard checks shall be performed, and measurements shall be within limits set for the product line by the manufacturer.
3. A functional control check shall be performed on the control panel & all integral instruments.
4. Mechanical and Functional tests shall be conducted using the job motor, job base frame and job controls system. Any exceptions required must be outlined in detail at the time of quotation.
5. Any measurement exceeding the standard limits or failure of functionality shall result in the manufacturers immediate repair or replacement of unit until it passes all checks and test.
6. Shipment of the unit for field repair shall not be allowed

B. Performance Test & Design Requirements

1. Simplified Factory Performance Test
 - a. Each blower shall be tested in accordance with CAGI/ ISO 1217, Annex C (2009 – 4th Edition) using the latest edition. Performance shall provide kW input to the package and a volumetric flow measurement at rated flow and pressure. This shall be compared to the documented performance for the blower's exact model to assess a passing or failing performance per ISO 1217 guidelines.
 - b. The design condition requirements are measured at the package discharge to ensure the output value does not include the inherent and additional internal flow and pressure losses of components in the package as common with inlet measurements
 - c. Each blower shall be furnished for continuous stable operation at typical design area use points at both the minimum and maximum ambient conditions.
2. Test results of the blower package shall be supplied along with the Instruction / Operation & Spare parts manuals.
3. Performance Tests shall be conducted using the job motor, job base frame and job controls system. Any exceptions required must be outlined in detail at the time of quotation.
4. Blowers of a design requiring synchronization of air flow (operating in parallel) shall not be acceptable, that is, the blowers shall be able to operate in a cascade, or parallel mode, based upon the vendor's recommendation for the application.

1.04 SUBMITTALS / OPERATION & MAINTENANCE MANUALS

- A.** Submittals during construction and the operation and maintenance manuals shall be made in accordance with the General Requirements. In addition, provide this information in the following format:
1. Blower outline drawings showing the dimensions and weight of the blower package, including connection locations, sizes and any piping load limits. Also show center of gravity and maintenance sizes along with maintenance

SECTION 46 11 31

AERATION BLOWERS

- removal distances. Also include notes regarding customer's piping, lifting etc.
2. As these screw blowers do not require any special foundations or anchoring, the need for a special mounting platform / slab is not foreseen, however if the manufacturer does have any special requirement, these must be clearly stated with details of the static forces acting on foundation and static pad loadings etc.
 3. Process and instrumentation diagrams, showing Legend, Lube Oil Schematic, Process Schematic, Instrumentation with alarms and shutdowns, setpoints and interlocks shown using logic blocks.
 4. Electrical schematic designed to show a complete loop of each circuit with termination points included, three wire diagram of the power distribution system, diagram for instrumentation etc.
 5. Wiring diagram designed to show the detailed electrical arrangement drawings for electrical equipment furnished.
 6. If the manufacturer is supplying any loose accessory equipment, then outline drawings of the loose shipped accessories shall be provided.
 7. Operations and Maintenance manual as per the manufacturer's format shall be provided but these manuals shall include
 - a. Preface – Safety Precautions, receiving and storage, warranty, limit of liability, standard preventative maintenance agreements, and revisions. General Blower Description
 - b. Installation
 - c. Lubrication System
 - d. Control System
 - e. Operation
 - f. Maintenance
 - g. Recommended Spare Parts
 - h. Drawings
 - i. Component Literature
 - j. Additional Specifications and Procedures
 8. Blower & Motor Tests – Submit the general schedule, test setup and preparation, mechanical test run, performance test run with test conditions, documentation, acceptance criteria for test run, oil system parameters, visual inspection, and final documentation.
 9. Unloading, Handling, Storage & Maintenance Requirements
 10. Surface Preparation & Shop Paint Specifications

1.05 TOOLS AND SPARE PARTS

- A. It is not foreseen any need for special tools / appliances necessary to disassemble, service, repair and adjust the screw blowers; however, if the manufacturer does recommend special tools and appurtenances, these shall be provided with the machines.
- B. Manufacturer shall provide applicable Spare parts to cover 2 years of recommended maintenance for operation at 8000hrs/year per machine provided:
 1. Process Air Filters
 2. Cooling Air Filters
 3. Electrical Cabinet Filters
 4. Check Valve Repair kit

SECTION 46 11 31

AERATION BLOWERS

5. Drive Coupling or Belts
 6. Main power supply fuses
 7. Sufficient oil for required oil change(s) at harshest design conditions.
- C. All spare parts shall be suitably packaged and clearly identified with indelible markings on the containers. Tools and spare parts shall be clearly marked.
- D. Parts availability shall be guaranteed from the manufacturer for 10 years after purchase.

1.06 WARRANTY

- A. The blower manufacturer shall guarantee in writing the unit package free of defects in material workmanship for a period of at least 1 year from start-up or 18 months from the date of equipment delivery, whichever comes first.
- B. Motor warranty – 24 months from start-up or 30 months from shipping.
- C. Extended Compression Element Warranty – 60 months from start-up or 66 months from shipping.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All components shall be new and both workmanship and materials shall be of the very best quality and shall conform to all applicable sections of these specifications. Components specified shall be understood to establish minimum requirements only, and do not relieve the Contractor of responsibility for providing a properly functioning system.
- B. Blowers Shall be:
1. Variable speed electric motor driven
 2. Installed outdoors
 3. Directly driven through Gear reduction
 4. Fully enclosed with sound reducing enclosure
 5. Pre-wired with controller and integral VFD.
 6. Pre-piped within enclosure
 7. Capable of operations ambient conditions between -4°F thru 122°F (ZS5/6)

2.02 BLOWER SCOPE

- A. The screw blowers shall be air-cooled, single-stage, variable speed drive electric motor-driven and must deliver 100% oil-free, pulsation-free air. The blower shall match the air demand by continuously changing the speed of the drive motor to ensure the air net pressure is maintained.
- B. The blower enclosure shall include:
1. Base Frame & Acoustic Enclosure
 2. Air inlet filter

AERATION BLOWERS

3. Sound Attenuation Baffles
4. Blower element
5. Compensator
6. Start-up & Blow off valve that is mechanically and electronically controlled
7. Check valve
8. Pulsation damper
9. Oil system
10. Drive motor with integrated gear box
11. Integrated onboard Variable Speed Drive (VSD)
12. Integrated onboard Microprocessor based blower controller
13. Onboard Instrumentation

2.03 BASE FRAME & ACOUSTIC ENCLOSURE

- A. The "Oil Free" blower shall be mounted on a sturdy industrial grade steel base frame with forklift slots allowing the unit to be placed on any level floor capable of taking the weight of the unit, no foundation or fixation should be required.
- B. The complete assembled blower / gearbox / motor unit should be mounted with vibration dampers in a 6 sided sheet metal acoustic enclosure which incorporates air baffling to reduce the sound level under 82dB(A). Sound levels to be measured according to A-weighted emission sound pressure level at the work station (LpWSAd). Measured according to ISO 2151: 2008 using ISO 9614-2 (sound intensity scanning method). The added correction factor (+/- 3 dB(A)) is the total uncertainty value (KpAd) conform with the test code.
- C. If the blower is outdoors, the enclosure shall prevent precipitation from entering the enclosure and be comparable to IP54 or Nema 3R standards.
- D. If the ambient temperature is below freezing the blower enclosure shall include heaters to allow the blower to function normally during startup and operation.
- E. All service points to the blower should be easily accessible via the use of large door panels that should be easily mounted / dismantled. Also, the acoustic enclosure door panels shall be self aligning & suspended from the roof panel or hinged on structural supports.
- F. The enclosure shall be strengthened with proper support structure to eliminate any damage during transport or during operation.
- G. The blower layout must respect the following principles:
 1. Unit ventilation inlet path and process air inlet path shall be strictly separated. Both will be at the unit backside. Both channels shall have a dedicated grating enabling a ducted channel for one, both or none of the airflows, depending on the installation.
 2. Process air outlet shall be at the backside of the unit, at the lower side.
 3. Unit ventilation outlet shall be at the roof top, enabling a ducted channel if preferred.

AERATION BLOWERS

2.04 PROCESS AIR INLET FILTER

- A. The air inlet filter shall be mounted within the acoustic enclosure with easy separate access. The filter shall be dry Paper filter with high filtration efficiency
 - 1. SAE Coarse – 0.999
 - 2. SAE Fine – 0.995
- B. The filter shall be designed to provide a very large surface area, larger than 200 ft² to ensure low pressure drop ($\Delta p = 0.15 - 0.30$ PSI) across the inlet filter in clean condition.
- C. The filter shall be designed for 8000hr life before change is required.
- D. Panel filters shall not be acceptable
- E. The filter shall not be washable as washable filters deteriorate with each cleaning causing micro tears which can lead to premature filter failure, leading to unit failure.

2.05 BLOWER ELEMENT

- A. The blower compression element shall comprise of two helicoidal rotors, one with four lobes and the other with six flutes turning into each other. The compression shall take place within the blower element between the rotors and the rotor and casing.
- B. The rotors shall be made of cast iron, grade GGG40 or equivalent, machined, coated & baked to ensure high compression efficiency and eliminate any possibility of corrosion.
- C. The casing shall be finned and made of cast iron grade GG20 or equivalent.
- D. The intermeshing timing gears shall ensure the two rotors do not touch each other and maintain the requisite clearance between the rotors & ensure wear and tear is eliminated and no lubrication is required in the compression space. The timing gears shall be of spur type, Quality DIN Class 5 or equivalent & made of alloy steel, case hardened.
- E. Carbon air seals shall be installed on the blower compression element shaft to prevent air escaping along the rotor shaft, while a separate tin bronze threaded visco-seal shall be used to stop oil escaping from the rotor bearings into the compression chamber. The sealing set-up shall ensure guaranteed 100% oil-free and pulsation-free air.

2.06 COMPENSATOR

- A. A compensator shall be installed at the blower element inlet and discharge to ensure vibrations from the element are not transmitted to the rest of the blower package.
- B. The compensator must be rated to handle at least 300°F at 25psig

2.07 COMBINATION START-UP & BLOW OFF VALVE

AERATION BLOWERS

- A. Shall be integral to the unit enclosure
- B. When the blower is turned off, the valve shall remain open to ensure the blower restarts in an unloaded condition. Once the blower is started and starts generating air, the valve shall close and allow air to flow through to the process. In the case the system pressure reaches the blow-off point, the valve shall open & release some air to reduce the pressure.
- C. The opening & closing of the valve shall be via a solenoid that is operated both mechanically and electrically to maximize redundancy, accuracy, and repeatability.
 - 1. Mechanical actuation shall be controlled by the air pressure and set springs for startup and overpressure
 - 2. Electronic actuation shall be controlled by the blower controller based on inputs from the integral pressure transducer and operator-based pressure setpoint.

2.08 CHECK VALVE

- A. The check valve shall be
 - 1. Swing type with FKM / Viton seat.
 - 2. Able to withstand temperatures of +350°F.
 - 3. Manufacturer standard integrated with the blower package and mounted internal to the blower enclosure.

2.09 PULSATION DAMPER / DISCHARGE SILENCER

- A. A carbon steel Pulsation damper shall be in built & connected to the air discharge from the blower compression element.
- B. The maximum working pressure of this pulsation damper shall be minimum 18 PSIG. It shall also be capable of withstanding temperatures from +15 to +320°F.
- C. The noise absorption material shall be stainless steel wool & average sound attenuation shall be minimum 30Db(A).

2.10 OIL SYSTEM

- A. The bearings & gears in the blower element and gearbox shall be lubricated and cooled with oil which is at a temperature at ambient plus maximum 68 deg F.
- B. The blower shall have a complete oil system comprising of the following:
 - 1. Oil sump
 - 2. Oil Breather
 - 3. Shaft Driven Oil Pump
 - 4. Air cooled oil cooler
 - 5. Oil filter
 - 6. Instrumentation (Pressure & Temperature sensors)
- C. Oil is circulated by pump from the oil reservoir through oil cooler, oil filter and oil manifold to the blower element and gear box.

SECTION 46 11 31

AERATION BLOWERS

- D. A by-pass valve shall open if the oil pressure rises above a set value.

2.11 DRIVE MOTOR WITH INTEGRATED GEAR BOX

1. Each blower shall be provided with a horizontal, variable speed inverter duty motor. Motor shall be VSD+ Ultra-Premium Efficient / IE5 Oil cooled (TEWC/TEOC IP66) permanent magnet motor with oil lubricated bearings for 2-4 times standard bearing life or approved equivalent.
- B. The motor shall be designed in accordance with prevailing IEC / NEMA standards. The motor shall have a minimum 1.15 service factor.
- C. Only WEG or Siemens motors shall be supplied with the blowers. If permanent magnet synchronous motors are acceptable, the motor manufacturer shall be the same as the blower manufacturer.
- D. Motors shall be of high efficiency design. Efficiencies shall be determined in accordance with IEC/NEMA Standard. Nominal and guaranteed efficiencies shall be included on motor nameplates in compliance with IEC/NEMA Standard.
- E. Motors shall have factory installed fail-safe winding protection in each phase. Winding temperature sensors shall be connected to the blower controller for monitoring and alarm.
- F. The motor and the gear box shall be mounted with machined precision fit flanges as to not require alignment.
- G. Bearings shall be from SKF or equivalent & selected for worst case conditions, i.e. maximum peak torque transmission, maximum temperature, and vibration levels. Bearing design life shall exceed 5 years using the Advanced Lifetime method with worst case conditions.
- H. The gears shall be high precision gears (DIN3961 - class 6 / AGMA 12) and material quality certified according to ISO6336-S-ML to optimize the performance of the transmission and the transmission losses reduced as much as possible.

2.12 VARIABLE SPEED DRIVE

- A. The variable speed drive (VSD) shall be integrated into the blower package & installed on the same base frame as the blower assembly.
- B. The variable speed drive (VSD) shall be manufactured by the same supplier as the blower and/or motor. Other acceptable manufacturers shall be limited to the standard package design based on compatibility:
1. DanFoss
 2. Yaskawa
 3. Approved Equal
- C. The VSD drives shall incorporate the latest generation of power transistors (IGBT's). The drives shall be based on Sophisticated Vector Control technology & shall have optimized torque control throughout its speed range.
- D. For units up to 250HP, the VSD drive shall have standard temperature rating of 0°F -122°F and allow derating up to 140°F.
- E. The VSD shall comply with the latest applicable standards of ANSI, NEMA, IEEE,

AERATION BLOWERS

and National Electric Code.

2.13 MICROPROCESSOR BASED BLOWER CONTROLLER

- A. The blower shall be controlled by an electronic microprocessor controller which:
 - 1. Controls the operation of the blower
 - 2. Controls the motor speed (Variable Speed Drive)
 - 3. Reduces power consumption by stopping blower when not required
 - 4. Warns the operator in case of an abnormal operating condition
 - 5. Protects the blower
 - 6. Monitors components subject to service
 - 7. Automatically restarts the blower after voltage failure
- B. The controller shall match the blower air delivery to the air consumption keeping the net pressure fluctuations very low. The controller shall continuously vary the motor speed to maintain the air net pressure as close as possible to the programmed pressure set point.
- C. If the air consumption decreases, the controller shall decrease the motor speed as well to reduce power consumption & vice versa.
- D. If the motor is running at minimum speed and the net pressure rises to a programmed value the solenoid valve installed on the start-up / blow-off valve shall be de-energized and air released to atmosphere thereby unloading the blower.
- E. If the blower in auto remains running unloaded uninterruptedly for 150 seconds, the controller shall stop the motor.
- F. The controller shall protect the blower & shutdown the blower whenever one of the measurements exceeds the programmed shutdown level. This shall be indicated on the HMI screen and a visual alarm shall be generated.
- G. The controller shall also warn the operator based on pre-programmed service warning, a number of service operations grouped as Level A, B, C, etc shall be made available & if a time interval is exceeded, a message shall appear on the HMI screen to warn the operator to carry out the service actions belonging to that level.
- H. The control panel shall also have an Emergency stop button so that in the event of an emergency, this button could be used to stop the blower immediately.
- I. The Control panel shall have a provision to call up the following counters:
 - 1. The running hours
 - 2. The number of motor starts
- J. The Control panel shall also have a provision to program:
 - 1. Time-based start/stop commands for the blower
 - 2. Time-based change-over commands for the net pressure band

SECTION 46 11 31

AERATION BLOWERS

2.14 ONBOARD INSTRUMENTATION

- A. Onboard instrumentation (Pressure & temperature transducers) as a minimum shall be available to deliver the following parameters:
 - 1. Blower outlet pressure (warning) bar(e) or psig
 - 2. Blower outlet pressure (shut-down) bar(e) / psig
 - 3. Oil pressure (shut-down warning level) bar(e) / psig
 - 4. Oil pressure (shut-down level) bar(e) / psig
 - 5. Blower element outlet temperature (shut-down warning level) deg C / deg F
 - 6. Blower element outlet temperature (shut-down level) deg C / deg F
 - 7. Oil temperature (shut-down warning level) deg C / deg F
 - 8. Oil temperature (shut-down level) deg C / deg F

2.15 FIELD ACCESSORIES (INSTALLED BY CONTRACTOR)

- A. Discharge Isolation Valve
 - 1. Provide each blower with a lugged or wafer-type, butterfly valve.
 - 2. Valve shall be suitable for temperatures up to 300°F
 - 3. Valves shall be Lever operated
 - 4. Valve shall be the same size as the blower discharge
 - 5. Valve shall be installed with at least half of its diameter of free space on each side of the valve.
- B. Discharge Expansion Joint
 - 1. Provide each blower with a rubber flanged EPDM expansion joint to isolate the blower package from the discharge piping.
 - 2. Connectors shall have 125/150# flange connections to process piping and be rated for 300°F.
 - 3. Expansion joint shall be installed on the blower package discharge
 - 4. Expansion joint shall not require or use retaining rods
 - 5. Expansion joint shall be the same size as the blower discharge
- B. Fused Disconnect
 - 1. Provide each blower with a standalone pad lockable fused disconnect to protect the blowers' main power supply near the blower.
 - 2. Enclosure shall be Nema 12, 1, or 3R for outdoor installation.
 - 3. Fuses shall be provided in accordance with the manufacturer's recommendations

PART 3 - INSTALLATION

3.01 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. All equipment shall be skid mounted or crated to protect against damage during shipment. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.
- B. Finished surfaces of all exposed flanges shall be protected by fiberboard blank flanges strongly and securely bolted.
- C. Shipment shall be made after approval from the Engineer in writing. Shipment is

SECTION 46 11 31

AERATION BLOWERS

not to be made until the manufacturer coordinates shipment to the jobsite with the contractor, assuring that the equipment will be properly received and stored.

- D. Upon receipt, store equipment in strict accordance with the manufacturer's instructions, connect and energize motor space heaters and any other protective devices, as required.

3.02 SURFACE PREPARATION AND SHOP PAINTING

- A. All major surfaces shall be prepared & painted as per the manufacturers standard paint system. The canopy shall be zinc coated steel electrostatically powder coated with a polyester powder enamel forming a high-grade rough structure painted surface. The standard coating shall have a finished Layer thickness as per EN ISO 2178 shall be 80 - 120µm and shall withstand atmospheric corrosive category C3 as defined by ISO 12944.
- B. Machined surfaces, flange faces & threaded holes are to be masked to protect from paint.
- C. Unpainted steel surfaces are to be protected with rust preventive suitable for 4 weeks outdoor storage.

3.03 INSTALLATION

- A. The blower package, all aeration instrumentation, and appurtenances shall be installed in accordance with the instructions of the manufacturer's installation and operation manual, and other submitted documentation. All piping shall be supported so as to preclude the possibility of exerting undue forces and movements on the blower flanges.
- B. Each blower skid unit shall be mounted on a flat and level concrete pad +/- 1° in accordance with the recommendations of the blower manufacturer.
- C. The Contractor shall furnish the required piping, pipe supports, flange gaskets, bolts, nuts, wiring, circuits & circuit protection for initial operation in accordance with the manufacturer's recommendations.
- D. Furnish a certificate stating that the installation of the equipment is satisfactory, that the equipment is ready for operation and that the operating personnel have been suitably instructed in the operation and care of each unit.

3.04 START-UP AND TRAINING

- A. The Equipment Manufacturer shall furnish an experienced service representative to inspect the final installation of the equipment. The services of the representative shall be provided for a minimum of one (1), eight-hour (8-hr.) day for each unit. If there are difficulties in operation of the equipment due to the manufacturer's fabrication, additional service shall be provided at no extra cost to the Owner.

SECTION 46 11 31

AERATION BLOWERS

1. Provide, as a minimum, the following field services:
 - a. Verify proper connection of piping and installation of accessories.
 - b. Check leveling of blower base to be within 0.1" per foot
 - c. Confirm proper wiring of electrical power and any instruments / field wired items.
 2. A minimum one (1) hour field functional test shall demonstrate that, under all conditions of operation, each unit:
 - a. Has not been damaged by transportation or installation.
 - b. Has been properly installed.
 - c. Have no mechanical defects.
 - d. Has fully functional instrumentation and all are properly calibrated and set.
 - e. Will start, run and stop in the prescribed manner.
 - f. Has the proper shutdown sequence of standard stop, and emergency stop.
 - g. Is free of objectionable vibration and noise.
 3. Field acceptance testing shall be conducted after the installation of all equipment has been completed and the equipment operated for a sufficient period to make all desirable corrections and adjustments. The Contractor shall schedule testing with the full knowledge and consent of the Owner, and shall not adversely affect the operation of plant facilities.
- B. A factory representative, who has complete knowledge of proper operation and maintenance, shall be provided for one (1), eight (8) hour day, if necessary, to instruct representatives of the Owner and Engineer on proper operation and maintenance, including start-up and shut-down procedures, proper lubrication practices and troubleshooting of all equipment. This shall be done during the installation and startup of the blower units.

SECTION 46 51 33

SLUDGE AERATION CONTROL

PART 1 PROCESS PERFORMANCE – FINE BUBBLE SLUDGE AERATION

1.1 GENERAL

A complete control system is to be provided that is compatible with sludge aeration system components. The system is to provide for the aeration of sludge in three basins utilizing DO input with options for timer and manual operation selectable. Local panels and disconnects to be provided with output to the facility SCADA system. System supplier is responsible for provision of system and coordination with the contractor to provide for proper operation with needed appurtenances in consideration of specific project application. The aeration and mixing system shall be supplied by a qualified company that is regularly engaged in the manufacture and fabrication of aeration and mixing wastewater treatment systems. The following specification is provided for guidance and is based on the OSCAR™ system by Sanitaire. Equivalent systems may be submitted for approval and include deviations, but exceptions shall be noted and subject approval. No additional payment shall be made to accommodate modifications from the system generally described by the construction plans and specifications and the supplier and Contractor shall coordinate work and pricing prior to bidding and during construction.

1.2 FUNCTIONAL REQUIREMENTS

- A. The manufacturer of the aeration and mixing system shall be completely responsible for the proper design of their system, including but not limited to; diffused aeration equipment, and mixers. All equipment shall perform as specified and the completed installation shall operate in accordance with the requirements of the plans and specifications.
- B. The aeration system for the basins shall be capable of providing mixing such that when operated under the specified design conditions it shall suspend all biological floc and mixed liquor suspended solids throughout the liquid mass in each basin. The aeration system shall further be capable of maintaining complete aerobic conditions and suspension of all biological floc and suspended solids throughout the liquid mass in each basin.

The supplied system shall be based on three zones per the dimensions indicated on the plans and with an assumed water level of 14'.

1.3 CONTROL PANEL

- A. Scope of Work
 - The aeration equipment supplier shall furnish a control panel that shall include a Graphic Operator Interface, Programmable Logic Controller, Control Switches, and Pilot lights.
- B. Panel Enclosure
 - 1. The control panel enclosure shall be a heavy duty NEMA 4X enclosure compatible with outdoor mounting, with a flange mounted disconnect. The panel shall be fully braced. The

doors shall be heavy duty 3-point latching doors with a padlocking handle. The master circuit breaker disconnect shall be interlocked with the doors.

2. Control power shall be provided by a transformer if three-phase power is required. In addition, a voltage filter and surge protective device shall be used for PLC and HMI power supply. The voltage filter will combine active tracking technology with UL listed surge protection against the full spectrum of voltage transients and surges. It must continuously track the input AC line power and respond instantly upon detecting extraneous high frequency noise and high voltage transients. The device must be UL1449 and UL1283 listed.
3. Surge suppressers shall be used with all relays and contactors. All control voltage branch feeders shall be protected by circuit breakers or fuses.
4. Control relays shall be industrial plug-in type, rated at 7 to 10 amps.
5. Motor starters shall be UL Listed as a self-protected control device type of combination starter [rated at 42,000 AIC].
6. Terminal blocks shall be high-density type, rated for 600 VAC, 30 amp minimum. Ten percent spare terminals shall be provided. All devices shall be clearly marked and identified on the inside of the panel. All terminals and wires shall be clearly tagged in accordance with the schematic and wiring diagrams.
7. Pilot lights shall be industrial Monolithic style, 22mm devices, or equal. A "Hand-Off-Auto" switch will be provided for each motor. Selector switches shall be industrial, NEMA 4/13, 30mm, water/oil tight devices. The Auto position will allow automatic PLC operation while the Hand position will allow the operator to bypass the PLC when operating equipment.

C. Programmable Logic Controller (PLC)

1. The Programmable Logic Controller (PLC) shall have a built in Ethernet port for network communications.
2. Acceptable Manufacturers: Allen Bradley CompactLogix or approved equal.

D. Human Machine Interface (HMI)

1. A Graphic Operator Interface Terminal (HMI) shall be mounted on the front of the panel for control of the system and shall provide graphic display of the process parameters and equipment status on a color display. The HMI shall also allow for entry of setpoint changes for system control. The display shall be a minimum of a 15.5" widescreen touchscreen, aspect ratio 16:9. The display shall be connected to a DIN rail mounted industrial computer.
2. Minimum HMI functions shall include:
 - a. Graphical display of all status information available for each device in the biological treatment system in the form of a pop-up window for quick and easy access.
 - b. Display all smart sensor status information available from the sensors.
 - c. Electronic O&M Manuals for all hardware provided by the SBR manufacturer shall reside on the HMI and be quickly obtained by pushing a button.
 - d. Alarm screen that allows the operator to select an alarm and push a button to display troubleshooting tips for that alarm.
 - e. Easy navigation set up with control mode select buttons for each basin along the left and HMI screen navigation buttons along the top.
 - f. Maintenance dashboard screen with quick read gauges of maintenance life span for all biological treatment devices requiring maintenance.

- g. Historical trend screen displays 10 days of key process variables, logged once per minute, including, where applicable, each basin's DO, Temp, DO Setpoint, Level, Clock, Waste pump running and air valve opened signals.
 - h. HMI software shall provide a minimum of one (1) secure client, one (1) web client and one (1) SMA client license for operation staff use.
- 3. Include industrial wifi radio to enable operations staff to connect to HMI clients via wifi using a laptop or other portable electronic device from anywhere on the plant grounds.
- E. Remote connection
 - 1. A webport with a built in four-port Ethernet switch shall be provided to allow direct access for online technical support via a standard internet connection.
 - 2. A customer account shall be set up by the supplier to allow operations staff access to view the plant HMI via the client licenses using a computer or other portable electronic device for the duration of the supplier's warranty period. Starting at the expiration of the warranty period an annual fee shall be assessed by the biological treatment supplier to maintain the customer account/access.
- F. Biological Process Control Logic
 - 1. The operator shall be able to enable or disable any of the process control logic functions at any time through the HMI. When a control logic function is disabled, the equipment may be operated manually through operator inputted setpoints.
 - 2. Blower Control: The control system will interface with the blowers to provide the proper amount of air required for the system.
 - 3. Dissolved Oxygen Control: The control system will control the airflow to provide only the amount of air required to maintain the dissolved oxygen setpoint.
 - 4. Most Open Valve Control: The control system will promote low system pressure by adjusting the air main pressure setpoint while ensuring adequate air supply to the process.
- G. A UL listed active tracking filter shall be provided to protect the PLC and HMI power feeds from high-frequency noise and low-energy transients. It shall be designed for a single phase input voltage of 120/240VAC operating at 47 to 63 Hz. The unit shall reduce normal mode transients to plus or minus 2 volts, provide surge capacity of 45,000 amps and protect in all modes (Line to neutral, line to ground and neutral to ground).
- H. Acceptable Manufacturers
 - 1. Xylem Inc. Sanitaire Products
 - 2. Approved Equal

1.4 POWER EQUIPMENT

- A. Panel Mounted Power Equipment
 - 1. Scope of Work: The aeration equipment supplier to furnish the following Motor Starters and/or Variable Frequency Drives (VFDs) for the motors associated with the mechanical equipment described as follows:

Equipment	Type	Count	Size	Power Supply
Aeration Blowers	VFD	3	100 HP	480V/3 Φ
**Coord. With Related Suppliers				

2. Equipment

- Motor starters shall be UL Listed as a self-protected control device type of combination starter [rated at 42,000 AIC].
- VFD package shall incorporate internal common mode cores. No additional external cores are required to keep common mode noise from disrupting sensitive electronics.
- VFD package shall incorporate an Integral dynamic brake
- VFD package shall incorporate an internal EMC filter to meet environmental standards without requiring additional panel space.
- Three control modes available for VFD: Vector Control with FORCE Technology, Sensorless Vector and V/Hz control.
- Selectable bypass of the VFDs shall be provided to allow operator to hard start blowers in "hand" mode or as approved by engineer.

3. Acceptable Manufacturers

- Rockwell Automation or approved equal

B. Variable Frequency Drives (VFD)

- Scope of Work: The aeration equipment supplier shall furnish compatible VFDs for the motors associated with the aeration system. mechanical equipment described below:

2. Equipment

- Nema 4 enclosure (or included with other control panels)
- VFD package shall incorporate internal common mode cores. No additional external cores are required to keep common mode noise from disrupting sensitive electronics.
- VFD package shall incorporate an Integral dynamic breaker.
- VFD package shall incorporate an internal EMC filter to meet environmental standards without requiring additional panel space.
- Three control modes available: Vector Control with FORCE Technology, Sensorless Vector and V/Hz control.
- VFD's shall allow for easy operator input and adjustment.

3. Acceptable Manufacturers

- Rockwell Automation or approved equal n

C. CONTROLLER

- Scope of Work: The aeration equipment supplier to furnish a compatible controller for the aeration equipment. all motors associated with the mechanical equipment described as follows:

Equipment	Type	Count	Size	Power Supply
Aeration Blowers	VFD	3	100 HP	480V/3 Φ

2. Equipment

- a. The controller shall be Allen Bradley 2100, or equal. The unit shall have main lugs and bus system, which shall be tin plated copper and shall be fully braced for 42,000A RMS AIC with continuous horizontal and vertical bus bracing. The bus shall be rated for a minimum of 600 amps. Molded polycarbonate isolating material will separate the main bus from the unit starters and wire way. The enclosure will have a NEMA 1 rating.
- b. Motor starter disconnecting devices shall be magnetic type circuit protectors (HMCP) and rated for 100,000A RMS. Motor starters shall be NEMA rated, shall incorporate overload protection, surge suppressers, and disconnecting terminal blocks. Starters for motors 50 hp and above shall be solid state reduced voltage type. Control wiring shall be 16AWG, MTW copper and color coded by voltage. The controller shall have a full length copper ground bus.

3. Acceptable Manufacturers

- a. Rockwell Automation or approved equal.

1.5 INSTRUMENTATION AND PROCESS CONTROL

A. Scope of Work

1. The Aeration equipment supplier to furnish, configure and commission the instrumentation for the biological process. In addition, the Aeration equipment supplier shall furnish the control algorithms detailed below to control the process with the supplied instrumentation. The following online instrumentation shall be provided:

	Location
Air Flow Meter	Aeration Tank Drop Leg
Air Pressure Transmitter	Aeration Header
Terminal/Controller	Transferable
DO	Aerated Zones

B. Air Flow Meter

1. Scope of Supply: The aeration equipment supplier to furnish insertion mass air flow meters for monitoring and feedback of airflow to the aeration basins.
2. Installation: The air flow meter shall be mounted such that there is a section of straight pipe a minimum of 10 pipe diameters before the flow element and a minimum of 20 pipe diameters after the flow element. The air flow meter shall be mounted downstream of the air control valve.
3. Construction – Flow Element
 - a. Connection Type: Male NPT Stainless Steel
 - b. Type: Insertion Thermal Dispersion
 - c. Body Material: 316 Stainless Steel with Adjustable Teflon Ferrule
 - d. Sensor Material: Hastelloy C

- e. Temperature Range: 4 to 37 Degree C
 - f. Accuracy: +/- 1.0% of upper range value
 - g. Pressure Range: 0 to 15 PSIG
4. Construction – Transmitter
- a. Casing: NEMA 4X Cast Aluminum, Epoxy Coated
 - b. Mounting: Remote
 - c. Output: 4-20 mA
 - d. Display Type: LCD (rate) in engineering units (scfm)
5. Acceptable Manufacturers: FCI ST50 Series

C. Air Pressure Transmitters

1. Scope of Supply: The aeration equipment supplier to furnish compatible insertion air pressure transmitters for monitoring and feedback of air pressure in the air header.
2. Type: Force balance or electro-mechanical, two-wire, indicating with a remote diaphragm
3. Function: Measure a pressure (either absolute, gauge, differential or vacuum) and produce an analog output signal directly proportional to that pressure.
4. Performance Specifications:
 - a. Range: As shown in table
 - b. Accuracy: +0.5 percent of the calibrated range
 - c. Deadband: +0.075 percent of span maximum
 - d. Rangeability: 100:1
 - e. Temperature Range: 0 - 300°F
 - f. Output: 4-20mA DC
5. Required Features:
 - a. Positive over-range protection of at least 1.25 times the maximum span limit
 - b. Electronic zero and span adjustments
 - c. Temperature compensation
 - d. Static pressure compensation
 - e. Adjustable internal dampening
 - f. Field wiring Reversal: Accidental reversal of field wiring shall not damage transmitter
 - g. Built-in electrical surge and RFI protection. Also provide an integral transient protection terminal block which meets IEEE standard 587 category B and IEEE standard 472.
 - h. Weatherproof and splash proof NEMA 4X enclosure.
 - i. 3/4-inch NPT electrical conduit connection
 - j. Designed to operate on power from receiver or other remote power supply at 24VDC
 - k. Integral output digital LCD signal indicator
 - l. 1/2-inch NPT process connection
6. Materials: Use transmitters constructed of the following materials. Materials shall be suitable for mounting on the blower discharge pipe which will have a temperature of up to 350 degrees F.
 - a. Measuring element: Type 316 or 430 Stainless Steel
 - b. Flanges: Type 316 or 430 Stainless Steel

- c. Bolts and mounting brackets: type 316 Stainless Steel
- d. Gaskets: Teflon
- e. Base and Cover: Die cast low copper aluminum with epoxy-based finish

7. Acceptable Manufacturers

- a. ABB Series 2600T
- b. Endress+Hauser Cerabar
- c. Rosemount, Inc., Model 3051C with valve manifold
- d. Approved Equal

D. Terminal/Controller

1. The analyzer shall be a digital multi-channel, multi-parameter system capable of controlling up to 20 sensors, in any combination, for the determination of water and wastewater parameters.
 - a. The controller must be configurable to include the following measurements: COD, TOC, DOC, SAC, BOD, pH, ORP, NH₄-N, NO₃-N, PO₄-P, Conductivity, DO, Turbidity, TSS, Temperature and Sludge Level Monitor.
 - b. The controller shall receive 4 to 20 mA signals from third party instruments.
 - c. Communication between controller and sensor shall be digital, allowing cable runs up to 3,000 feet without further amplification.
 - d. The system will provide up to 20 programmable analog outputs (max. load 500 ohms) and 20 programmable alarm relays (rated to 5A at 250VAC). System shall also be capable of Ethernet/IP and Profibus IP communication.
 - e. 90VAC-264VAC power required.
 - f. Enclosure is NEMA-4X rated.
 - g. Entire system including the sensors shall have built in lightning and surge protection.
 - h. Ambient operating temperature -20°C to +55°C.
 - i. System diagnostics shall be standard.
 - j. System shall also have a USB interface port, data storage capability, and 3 levels of security.
 - k. System must have integrated lightening and overvoltage protection.
 - l. Backup controller function to increase reliability.
2. The terminal controller shall be YSI/WTW model 2020 IQ Sensor Net.
3. All instruments associated with the biological system must be connected to the terminal/controller communication network back to the Control Panel.
4. Universal Mounting Kits with all necessary hardware shall be provided for each sensor.
5. A sunshield and mounting bracket shall be provided for the system display/controller and each local component to be mounted outside.

E. Dissolved Oxygen Controller

1. Each aerated zone in each lane shall be equipped with a dissolved oxygen probe.
 - a. Communication to controller shall be digital.
 - b. Connection to IQ Sensor Net shall be through two wire shielded cable.
 - c. The sensor shall be calibration free using intelligent membrane technology.
 - d. Membranes shall last up to two years with replacement membranes containing calibration data chip.

- e. Sensor shall use soft green fluorescent light with calibrated optics and equal path reference system.
 - f. Sensor shall have a measuring range of 0-20.00 mg/l.
 - g. Sensor shall integrated temperature measurement and compensation.
 - h. Temperature operating range of -5° C to + 50° C and measuring range of -5° C to + 50° C.
 - i. System accuracy shall be $\pm 0.05 \text{ mg/l} < 1.00 \text{ mg/l}$, $\pm 0.1 \text{ mg/l} > 1.00 \text{ mg/l}$.
 - j. Sensor shall include self-diagnostics.
2. The DO sensor shall be a YSI/WTW model FDO 700 IQ.
 3. The dissolved oxygen signal shall be displayed at the main control panel display unit and be an input to the PLC. The PLC, using a control algorithm will output a 4-20ma signal to control the air flow out of the blower. The control system will control the airflow to provide only the amount of air required to maintain the dissolved oxygen setpoint.
 4. Bypass of the DO controller shall be selectable to allow for manual and timer operation.

F. Submittal Information

1. Manufacturer's Data

The following information shall be submitted as required by this specification:

- a. Complete description of equipment being proposed in sufficient detail to permit a thorough comparison with this specification
 - b. Equipment layout including dimensions and installation requirements
 - c. Electrical schematics and control summary
 - d. Documentation on cleaning and maintenance requirements of the equipment
 - e. Manufacturers literature including cut sheets on all components.
2. Pre-Submittal Drawings: Submit drawings showing assembly, installation details, accessories and control enclosures.
 3. Deviations And Exceptions: The supplier shall submit a statement listing any exceptions or deviations taken to this specification or system design drawings.

PART 2 SERVICE, INSTALLATION AND PERFORMANCE

2.1 BIOLOGICAL PROCESS PERFORMANCE GUARANTEE

- A. Supplier shall provide a Process Performance Guarantee to the Owner, guaranteeing the biological process shall meet effluent wastewater quality, as determined during the Performance Test.
- B. The full Process Performance Guarantee language and details of the Performance Test; defining conditions of guarantee, responsibilities, testing protocol, sampling, and analysis shall be provided with the Equipment Submittal.
- C. The supplier shall guarantee that the biological process shall meet effluent wastewater quality, as determined during the Performance Test equal to or less than the effluent quality as defined in paragraph 2.03 Effluent Quality Requirements.
- D. The influent wastewater to the biological process shall be defined by paragraph 2.02 Influent Wastewater Characteristics. The influent BOD₅, TSS, TKN, and TP loadings are defined by the Maximum Month Flow and the respective concentrations as outlined in paragraph 2.02.
- E. The supplier shall provide a Process Performance Guarantee for the biological system defined by paragraph 2.04 Process Design.

2.2 SHOP OXYGEN TRANSFER TEST

- A. Conduct a performance test to demonstrate capability of the aeration equipment to meet the specified oxygen transfer requirements.
- B. Base all tests on the following criteria:
 - 1. Two design conditions that the consultant engineer selects at each diffuser density will be tested. In the case of more than three densities on a project, the Engineer will define zones to be tested after award of the project.
 - 2. A minimum of 3 test runs for each specified design condition to be run in complete accordance with ASCE Clean Water Test Procedure (2006 or latest edition)
 - 3. Conduct tests in a full scale aeration test tank (minimum of 300 sq. ft.) at the specified submergence and water depth with a diffuser density equivalent to the specified tank configuration. Diffuser density is defined as the ratio of the total tank surface area to the total active diffuser surface area.
 - 4. Conduct shop test with air rate and mass rate of oxygen transfer directly proportional to the ratio of the shop test tank volume and the design tank volume.
 - 5. Plot of standard condition pounds of oxygen transferred per day per 1000 cubic feet of tank volume versus standard condition cubic feet of air per minute per 1000 cubic feet of tank volume. (lbs-O₂/day/1000 cubic feet-tank) vs. (SCFM/1000 cubic feet-tank)
 - a. Standard conditions of oxygen transfer are defined as 68o F, 1 atmosphere ambient pressure, clean water.
 - b. Standard air is defined as 68 °F, 1 atmosphere, 36% R.H., containing 23% oxygen by weight.
- C. Certify and stamp all tests by a Professional Engineer.
- D. Include all costs for testing (exclusive of witnesses' expenses) in the equipment price. All tests may be witnessed at Owner/Engineer option. Cost of travel and living expenses for Owner/Engineer to be paid by the Owner.
- E. Submit all test data from oxygen transfer tests for approval by the Engineer prior to manufacturing equipment.

2.3 CERTIFIED OXYGEN TRANSFER PERFORMANCE CURVE(S)

- A. Submit certified oxygen transfer performance curves to demonstrate capability of the aeration equipment to meet the specified oxygen transfer requirements.
- B. Base oxygen transfer curves on the following criteria:
 - 1. A minimum of 3 tests for each specified condition in complete accordance with ASCE Clean Water Test Procedure (2006 or latest edition)
 - 2. Tests conducted in a full scale aeration test tank (minimum of 300 sq. ft.) at the specified submergence and water depth with a diffuser density equivalent to the specified tank configuration. Diffuser density is defined as the ratio of the total tank surface area to the total active diffuser surface area.
 - 3. Tests conducted with air rate and mass rate of oxygen transfer directly proportional to the ratio of the shop test tank volume and the design tank volume.
 - 4. Plot of standard condition pounds of oxygen transferred per day per 1000 cubic feet of tank volume versus standard condition cubic feet of air per minute per 1000 cubic feet of tank volume (lbs-O₂/day/1000 cubic feet-tank) vs. (SCFM/1000 cubic feet-tank)
 - a. Standard conditions of oxygen transfer are defined as 68 °F, 1 atmosphere ambient pressure, clean water.

- b. Standard air is defined as 68 °F, 1 atmosphere, 36% R.H., containing 23% oxygen by weight.
- 5. Plot of standard condition kilograms of oxygen transferred per day per cubic meter of tank volume versus standard condition cubic meters of air per hour per cubic meter of tank volume (kg-O₂/day/cubic meter-tank) vs. (m³/hr cubic meter-tank)
 - a. Standard conditions of oxygen transfer are defined as 20 °C, 1 atmosphere ambient pressure, clean water.
 - b. Standard air is defined as 0 °C, 1 atmosphere, 0% R.H., containing 23% oxygen by weight.
- C. Certify and stamp all curves by a Professional Engineer.
- D. Submit curves for all specified conditions for approval by the Engineer prior to manufacturing aeration equipment.

2.4 MIXER THRUST AND POWER TESTING

- A. A mixer thrust and power test should be performed according the ISO 21630-2007. Manufacturer shall also perform the following inspections and tests on each mixer before shipment from the factory:
 - 1. Motor insulation test for detection of insulation defects
 - 2. Tightness test of the assembled mixer using a vacuum method
 - 3. Dry-run test to establish mechanical integrity and correct rotation.

2.5 OPERATION AND MAINTENANCE MANUAL

- A. Three (3) paper copies with an electronic copy of the Operation & Maintenance Manuals shall be furnished during start-up. These manuals shall include maintenance instructions for all equipment provided.
- B. Operation & Maintenance Manual shall include a Functional Design Specification (description of control software logic) and Operational Description (description of process).

2.6 FIELD SERVICES, START-UP AND TRAINING

- A. The services of the field representative shall include minimum of one (1) day, exclusive of travel time, completed in (2) travel trips. The services provided include verification of proper equipment installation and training of the owner's personnel. The Owner shall notify the manufacturer a minimum of ten working days prior to the time that the field services are desired.
- B. The Owner shall notify aeration equipment provider when the installation has been completed. A representative of the supplier shall inspect the installation. The Owner shall be advised in writing of any corrections or adjustments that are required for the equipment installation. After the installation has been completed to the supplier's satisfaction, a letter of certification that all equipment is installed in accordance with its instructions and that the equipment is ready for operation shall be furnished.
- C. The field person shall do a functional check of each item furnished and start-up of the process. During this time, the field representative will provide operation training, which shall include familiarization with the biological process controls, its requirement and review of the Operation and Maintenance Manuals.
- D. A process engineer licensed as a professional engineer shall complete operator process training onsite, including review of the controls description, a discussion of the process control features, and recommendations for process setpoints.

2.7 DIFFUSER CLEANING SERVICES

- A. Provide one site visit for in-situ maintenance of diffused aeration equipment per year of operation for a period of 5 years. The site visit and service shall consist of:
 - 1. In-situ cleaning of one tank.
 - 2. Transportation of personnel and cleaning system equipment to and from job site
 - 3. Equipment for modification of tanks to allow for dosing of cleaning liquid into air distributors
 - 4. Post-visit field service report

2.8 MANUALS:

- A. The mixer manufacturer shall provide 3 copies of a detailed manual that shall include specific instructions for receiving and handling, assembly, mooring, wiring, installation, repair and service, storage, troubleshooting, detailed exploded drawings of the unit, and a full parts list.
- B. In addition, the manual shall contain complete detailed instructions on the balancing procedure to be used for rebalancing to the propeller after it has been in service for an extended period of time. These instructions shall include a general procedural description, a detailed explanation of preparing the unit for balancing procedure for propellers.
- C. These manuals shall be submitted for review, along with other general submittal information, including detailed drawings, brochures, cut-sheets, motor data sheets, etc., as part of the approval process

2.9 PREVENTATIVE MAINTENANCE SERVICES

- A. Provide preventative maintenance services for the first year of operation after the warranty period is completed
- B. Onsite services
 - 1. Provide one site visit during the first year of operation after the warranty period is completed
 - 2. Site visits shall consist of one day onsite and be coordinated between the owner and supplier a minimum of ten working days prior to the time that the field services are desired.
 - 3. Site visits shall include the following services:
 - a. Visual check of bubble patterns in each basin/grid
 - b. Retrieve and assess on-site pressure monitoring readings [if pressure monitoring system supplied]
 - c. Inspect manual purge system in each basin/grid
 - d. Examine supplied pipework and associated joints – perform leak and level testing [customer must drain basin(s) for this step to be completed]
 - e. Perform laboratory or field testing of diffuser dynamic wet pressure [customer must drain basin(s) for this step to be completed]
 - 4. Upon completion of the onsite inspection a complete written report shall be provided detailing assessments and recommendations
- C. Onsite services
 - 1. Provide one site visit during the first year of operation after the warranty period is completed

2. Site visits shall consist of one day onsite and be coordinated between the owner and supplier a minimum of ten working days prior to the time that the field services are desired.
3. Site visits shall be completed by a qualified biological process engineer experienced in activated sludge processes.
4. Site visits shall include the following services:
 - a. Visual check of bubble patterns in each basin/grid
 - b. Retrieve and assess on-site pressure monitoring readings [if pressure monitoring system supplied]
 - c. Inspect manual purge system in each basin/grid
 - d. Examine supplied pipework and associated joints – perform leak and level testing [customer must drain basin(s) for this step to be completed]
 - e. Perform laboratory or field testing of diffuser dynamic wet pressure [customer must drain basin(s) for this step to be completed]
 - f. Inspection and assessment of supplied instrumentation
 - g. Refresher process training
 - h. Review of biological process operating data and effluent requirements
5. Upon completion of the onsite inspection a complete written report shall be provided detailing energy and process assessments and recommendations

D. Remote services

1. Provide remote access via modem for PLC/SCADA troubleshooting or programming changes
2. Provide a loaner pre-programmed PLC processor overnight in the case of PLC hardware failure
3. Provide remote process support and troubleshooting including review of operating data and control strategies
4. Provide electrical and mechanical phone support 24 hours per day, 7 days per week

PART 3 APPENDIX A

**Threshold Concentrations of Pollutants that are Inhibitory
To Biological Treatment Processes**

Pollutant	Non-Nitrifying Process (mg/L)	Nitrifying Process (mg/L)
Aluminum	26	---
Ammonia	480	480
Arsenic	0.1	0.34
Barium	1.0	1.0
Boron	100	100
Cadmium	100	100
Calcium	2500	2500
Chromium (Hexavalent)	10	0.25
Chromium (Trivalent)	50	50
Copper	1.0	0.5
Cyanide	5	0.34
Iron	1000	1000
Lead	0.1	0.5
Manganese	10	10
Magnesium	50	50
Mercury	5.0	5.0
Nickel	2.5	0.25
Phenol	200	10
Cresol	---	16
2-4 Dinitrophenol	---	150
Silver	5	5
Sulfate	500	500
Zinc	10	10

Source: Wastewater Treatment Plant Design, MOP No. 8. Other sources may be referenced.

Note: This listing is partial and additional compounds and values may be applicable.

EFFECTIVE DATE: _____

TERMINATION DATE: _____

CONTRACT NUMBER: _____

CONSTRUCTION CONTRACT FOR WEST REGIONAL LIFT STATION IMPROVEMENTS

THIS CONSTRUCTION CONTRACT FOR SLUDGE STORAGE IMPROVEMENTS ("Contract") is made and entered into upon its execution by the City of Nixa, Missouri, a Constitutional Charter City organized under the laws of the State of Missouri ("City") and _____, a _____ ("Contractor").

WHEREAS the City, after conducting a construction bid solicitation process, referenced as Sludge Storage Improvements, desires to engage Contractor to perform wastewater improvements; and

WHEREAS Contractor submitted a bid; and

WHEREAS the City desires to engage Contractor to perform such work under the terms and conditions of this Contract; and

WHEREAS the Contractor desires to perform such work under the terms and conditions of this Contract.

NOW, THEREFORE, for the considerations herein expressed, it is mutually agreed by and between the City and the Contractor as follows:

1. Manner and Time for Completion.

1.1. The Contractor agrees to perform and undertake the work described herein.

1.2. The Contractor shall perform said work in accordance with the standard of care, skill, and expertise ordinarily used by members of the Contractor's profession in the performance of similar work.

1.3. The work is described in Exhibit A, which is attached hereto and incorporated herein by this reference ("Services").

1.4. The rates for the Services provided by the Contractor are established in Exhibit B, which is attached hereto and incorporated herein by this reference.

1.5. Contractor shall furnish all supervision, labor, tools, equipment, materials, and supplies necessary to perform the Services at Contractor's own expense in accordance with the contract documents, any applicable City ordinances, and any applicable state or federal laws **within 485** calendar days from the date Contractor is ordered to proceed, which order shall be issued by the City, within 30 days after the date of execution of this Contract. If such order is not issued within 30 days after execution of this Contract, then this Contract shall terminate.

2. Addition to Services. The City may add to the Services or delete therefrom services, provided that the total cost of such work does not exceed the total cost authorized herein. The Contractor shall undertake such changed activities only upon the written direction of the City. All such directives and changes shall be in written form and shall be accepted and countersigned by the Contractor.

3. Payment.

3.1. Progress Payments.

3.1.1. Provided that Contractor performs the Services in the manner set forth herein, the City shall pay the Contractor in accordance with the provisions of this Contract, which shall constitute full and complete compensation for the Contractor's work. Such compensation shall be paid in progress payments subject to receipt of a requisition for payment and a statement of the work provided by the Contractor for the period covered by the requisition.

3.1.2. The Contractor is responsible for ensuring that the requisition is received by the City no more than 6 months after completion of the work embraced within said requisition. The City shall have no obligation to pay any requisition which is received by the City more than 6 months after the completion of any work embraced within said requisition.

3.1.3. Such requisition shall include an acknowledgement signed by both the City and the Contractor that the Contractor has fully performed the work to be paid for in such progress payments in conformance with the Contract.

3.1.4. If applicable, the City shall provide notice to the Contractor of any payment amount withheld and the reason for such withheld payment.

3.1.5. The acceptance of any payment under this Contract expressly constitutes a release by the Contractor and its subcontractors from any and all claims which were made or could have been made by the Contractor and its subcontractors against the City which may arise out of or are related to this Contract prior to the date of payment by City.

3.1.6. Requisitions shall be submitted to the City via the AccountsPayable@nixa.com email address, or in writing to the address of the City provided below.

3.1.7. Subject to the provisions of Paragraph 3, the City shall pay the Contractor within 30 days of receipt by the City of the requisition.

3.2. Retainage. City shall withhold 5% from each progress payment as retainage to ensure performance and completion of the Contract. Retainage amounts shall be paid as part of City's Final Payment to Contractor.

3.3. Payment Conditioned on Acceptable Performance. No payment shall be made by City unless the Contractor's performance for work which it seeks payment was completed in compliance with the provisions of this Contract. No partial payment to the Contractor shall operate as approval of acceptance of all work completed by Contractor prior to the date of payment.

3.4. Availability of Funds. The total potential compensation to be paid to the Contractor over the entire term of this Contract, including all renewals, is estimated to be **[Insert Total Multi-Year Contract Value]** and shall in no event exceed this amount.

Notwithstanding the total contract value, the parties expressly agree that the City's obligation to make payments under this Contract is contingent upon the annual appropriation of funds by the

City Council. For the current fiscal year ending December 31, **2026**, the City's obligation is limited to the sum of **[Insert Current Fiscal Year Appropriated Amount]**. The Director of Finance's certification applies only to this amount for the current fiscal year.

In the event the City Council fails to appropriate funds for the performance of this Contract in any future fiscal year, this Contract shall automatically terminate, effective at the end of the last fiscal year for which funds were appropriated. The City shall provide the Contractor written notice of such non-appropriation at the earliest opportunity. Such termination shall be without penalty or expense to the City, and the City shall have no further liability or obligation to the Contractor except for payment for services satisfactorily performed and expenses reasonably incurred prior to the effective date of termination.

3.5. Final Completion and Final Payment.

3.5.1. Final Completion is the point at which all work under this Contract has been completed by the Contractor in strict compliance with the terms of this Contract and the Contractor is ready to receive its Final Payment. Final Completion will only occur when all of the following conditions, unless waived in writing by the City, have been satisfied:

3.5.1.1. All work is complete and in compliance with this Contract.

3.5.1.2. Contractor has submitted to the City a Final Payment Application for all funds remaining due under the Contract.

3.5.1.3. Contractor has completed all of its obligations under this Contract, including, without limitation, provided all manufacturer's warranties or any other warranties which are part of the project, provided any manuals for the operation and maintenance of equipment and systems which are part of the project, provided any as-builts or other drawings, any documentation transferring to City ownership of all equipment and materials which are part of the project, and any other close-out requirements reasonably required by the City.

3.5.1.4. Contractor has delivered to the City a final claim statement setting forth in detail all claims of any kind pending against the City or any indemnitee connected with or arising out of this Contract that are pending but not yet resolved. Any claim not specified by the Contractor, whether on behalf of itself or its subcontractors, shall be deemed waived.

3.5.2. Unless otherwise provided in Paragraph 3.5, the manner in which a Final Payment is made shall be governed by the provisions of Paragraph 3.1.

3.5.3. The Contractor shall notify the City, in writing, when it considers Final Completion has been achieved. After receiving such notice, the City shall, within a reasonable time thereafter, schedule an inspection of the work to determine if Final Completion has been achieved. If the City determines that Final Completion has not been achieved, the City shall promptly provide the Contractor with a list of items to be completed or corrected to enable City to certify that Final Completion has been achieved. The Contractor shall promptly perform such work and notify the City upon completion so another inspection can be scheduled. If the City determines that Final Completion has been achieved, the City shall promptly notify the Contractor that all requirements have been met.

3.5.4. The acceptance of Final Payment under this Contract expressly constitutes a release of the City by the Contractor and its subcontractors from any and all claims which were made or could have been made by the Contractor and its subcontractors against the City which may arise out of or are related to this Contract.

3.6. Additional Payment Terms.

3.6.1. Payment to Contractor shall be by check or by electronic funds transfer, at the sole discretion of the City. Payment shall be provided to the Contractor at the address or the account number provided by the Contractor.

3.6.2. Contractor shall, as a condition precedent to any payments made as part of this Contract, sign up and comply with the requirements of the City's payment verification vendor, currently **PaymentWorks**. The Contractor agrees to reasonably cooperate with the City's payment verification vendor's requests for information.

3.7. Liquidated Damages. The parties mutually and expressly agree that time of completion of work by the Contractor is of the essence due to the fact that additional sewer capacity is needed. Should Contractor, or in the case of default, the surety, fail to substantially complete the work within the time specified in this Contract, or within such extra time as may be allowed, Contractor (or surety) shall be liable to the City in the amount of **\$500** per day for each and every calendar day that the performance of this Contract remains uncompleted after the time allowed for substantial completion, as liquidated damages, and not as a penalty, it being stipulated that actual damages to the City and the public arising from Contractor's failure to timely complete the work would be difficult, if not impossible, to ascertain. The amount assessed as liquidated damages may be withheld from any funds otherwise due to Contractor from the City. The Services are not considered complete until final acceptance by the City.

4. Exchange of Data and Cooperation. All information, data, and reports in the City's possession and necessary for the carrying out of the Services, shall be furnished to the Contractor without charge, and the parties shall reasonably cooperate with each other in every possible way in the carrying out of the Services.

5. Personnel. The Contractor represents that Contractor shall secure at Contractor's own expense all personnel required to perform the Services. Such personnel shall not be considered employees of the City. All the Services required hereunder shall be performed by the Contractor or under Contractor's direct supervision and all personnel engaged in the work shall be fully qualified and shall be authorized under state and local law to perform such Services. None of the Services covered by this contract shall be subcontracted without the prior written approval of the City.

6. Term. This Contract shall commence upon its full execution by the Parties and shall continue until the completion and acceptance by the City of the Services, unless sooner terminated pursuant to Paragraph 7.

7. Termination.

7.1. Termination for breach. Failure of Contractor to fulfill Contractor's obligations under this Contract in a timely and satisfactory manner in accordance with the terms of this Contract shall constitute a breach of the Contract, and the City shall thereupon have the right to immediately terminate the Contract. The City shall give written notice of termination to the Contractor. In the event of any litigation arising from breach of this Contract, the City shall be entitled to recover

from the Contractor all reasonable costs incurred for such litigation, including staff time, court costs, attorney fees, and all other related expenses incurred in such litigation.

7.2. Termination for Convenience. The City shall have the right at any time upon 90 days written notice to the other to terminate and cancel this Contract, without cause, for convenience. In such event final payment to the Contractor shall be limited to services provided by the Contractor as of the effective date of said termination.

8. City's Right to Proceed. In the event this Contract is terminated, the City may take over the work and prosecute the same to completion, by contract or otherwise, and Contractor and its sureties shall be liable to the City for any costs over the amount of this Contract thereby occasioned by the City. In any such case, the City may take possession of, and utilize in completing the work, such materials, appliances and structures as may be on the work site and are necessary for completion of the work. The foregoing provisions are in addition to, and not in limitation of, the rights of the City under any other provisions of the contract, city ordinances, and state and federal laws.

9. Confidentiality. Any reports, data, or similar information given to, prepared or assembled by the Contractor under this Contract shall be considered the property of the City and shall not be made available to any individual or organization by the Contractor without prior written approval of the City. The provisions of this Paragraph shall survive the termination or expiration of this Contract.

10. Conflict of Interest. Contractor certifies that no member or officer of its firm or organization is an officer or employee of the City of Nixa, Missouri, or any of its boards or agencies, and further that no officer or employee of the City has any financial interest in this Contract which would violate any applicable federal regulations or the provisions of RSMo. Section 105.450 et seq or the provisions of Nixa City Charter Section 13.1.

11. Assignment. Neither party may assign, transfer, or delegate any or all of its rights or obligations under this Contract, including by operation of law, change of control, or merger, without the prior written consent of the other party. No assignment shall relieve the assigning party of any of its obligations hereunder. Any attempted assignment, transfer, or other conveyance in violation of the foregoing shall be null and void. This Contract shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and permitted assigns.

12. Nondiscrimination. The Contractor agrees in the performance of this contract not to discriminate on the ground or because of race, creed, color, national origin or ancestry, sex, religion, handicap, age, status as a protected veteran or status as a qualified individual with a disability, or political opinion or affiliation, against any employee of Contractor or applicant for employment and shall include a similar provision in all subcontracts let or awarded hereunder. The parties hereby incorporate the requirements of 41 C.F.R. §§ 60-1.4(a)(7), 29 C.F.R. Part 471, Appendix A to Subpart A, 41 C.F.R. § 60-300.5(a) and 41 C.F.R. § 60-741.5(a), if applicable.

12.1. This Contractor and subcontractor shall abide by the requirements of 41 C.F.R. § 60-300.5(a). This regulation prohibits discrimination against qualified protected veterans and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans.

12.2. This Contractor and subcontractor shall abide by the requirements of 41 C.F.R. § 60-741.5(a). This regulation prohibits discrimination against qualified individuals on the basis of disability and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified individuals with disabilities.

13. Occupational License. The Contractor shall obtain and maintain an occupational license or business registration with the City of Nixa, Missouri, if required by city code and any required state or federal requirement. The cost for this occupational license shall be borne by the Contractor.

14. Insurance Requirements.

14.1. Without limiting any of the other obligations or liabilities of the Contractor, Contractor shall at all times during the Term of this Contract, and for a period of three years thereafter, unless waived in writing by the City, at Contractor's sole cost and expense, have at least the following types and amounts of insurance:

14.1.1. Commercial General Liability Insurance with limits no less than \$532,148.00 per person and \$3,547,658.00 in the aggregate, including bodily injury and property damage, which policy shall include contractual liability coverage insuring the activities of Contractor under this Contract;

14.1.2. Worker's Compensation Insurance with statutory coverage as provided for in RSMo. 287.010 et seq.;

14.1.3. Employers Liability Insurance with limits no less than \$532,148.00 per person and \$3,547,658.00 in the aggregate;

14.1.4. Commercial Automobile Liability covering all owned, non-owned, and hired vehicles, with limits no less than \$532,148.00 per person and \$3,547,658.00 in the aggregate; and

14.1.5. Owner's and Contractor's Protective Liability Insurance. To protect the City, its agents, servants, and employees from claims which may arise from the performance of this Contract, with limits of at least \$3,547,658.00 for all claims arising out of a single accident or occurrence and at least \$532,148.00 with respect to injuries and/or death of any one person in a single accident or occurrence. The Owner's and Contractor's Protective Liability Insurance must:

14.1.5.1. Be a separate policy with the named insured being: The City of Nixa, Missouri; and

14.1.5.2. Be with the same insurance company with which the Contractor carries its Commercial General Liability Insurance and Automotive Liability Insurance; and

14.1.5.3. Contain an endorsement that disclaims coverage for any claim barred by the doctrines of sovereign immunity or official immunity, except attorney's fees and other litigation costs incurred in defending a claim. Nothing contained in this policy (or this endorsement thereto) shall constitute any waiver of whatever kind of these defenses or sovereign immunity or official immunity for any monetary amount whatsoever.

14.2. All insurance policies required pursuant to Paragraph 14 shall:

14.2.1. Be issued by insurance companies reasonably accepted by the City, able to

transact business within the State of Missouri, and with an A.M. Best Rating of no less than an A- Rating, Financial Size Category VII.

14.2.2. Provide that such insurance carriers give the City at least 30 days' prior written notice of cancellation or non-renewal, or material reduction in coverage. The Contractor shall be required to provide the City with an identical written notice within the same timeframe. Notwithstanding any provisions to the contrary, the Service Provider shall have new insurance policies in place that meet all requirements of this Paragraph 14 prior to such cancellation, non-renewal, or reduction.

14.2.3. Be endorsed to provide a Waiver of Subrogation in favor of the City and its officials, employees, and agents, on all policies required by this Agreement.

14.2.4. Be endorsed to provide that such insurance is primary insurance and any similar insurance in the name of or for the benefit of the City shall be excess and non-contributory.

14.2.5. Name the City and its officials, employees, and agents, as additional insureds on the Commercial General Liability and Commercial Automobile Liability policies.

14.2.6. All underlying policies required by this Contract (e.g., Commercial General Liability, Automobile Liability, Employer's Liability) must be in place. An Umbrella or Excess Liability policy may be used to satisfy the total limit requirements for the underlying policies. Furthermore, any General Aggregate limit for a Commercial General Liability policy shall apply on a 'per-project' or 'per-location' basis by endorsement.

14.3. Contractor shall provide the City with copies of the certificates of insurance and policy endorsements for all insurance coverage required by this Paragraph 14 at the time of execution of this Contract and shall not do anything to invalidate such insurance.

14.4. Failure of the Contractor to maintain the coverages set out in this Paragraph 14 shall not relieve it of any contractual responsibility or obligation or liability in general or under this Contract.

14.5. This Paragraph 14 shall not be construed in any manner as waiving, restricting, or limiting the liability of the Contractor for any obligations imposed under this Contract (including but not limited to, any provisions requiring a party hereto to indemnify, defend, and hold harmless under this Contract).

14.6. Subcontracts. In case any or all the performance of this Contract is sublet, the Contractor shall require the subcontractor to procure and maintain all insurance required in this Paragraph 14. Contractor shall provide evidence of such insurance from said subcontractor.

14.7. Changes in policy limits. In the event the scope or extent of the City's tort liability as a governmental entity as described in Section 537.600 through 537.650 RSMo. is broadened or increased during the term of this Contract by legislative or judicial action or in the event that the Sovereign Immunity limits for a given calendar year, as published annually on the Missouri Register by the Missouri Department of Insurance are increased during the term of this Contract, the City may require Contractor, upon 10 days written notice, to execute a contract addendum whereby the Contractor agrees to provide, at a price not exceeding Contractor's actual increased premium cost, additional liability insurance coverage as the City may require to protect the City from increased exposure as the result of increase. Any such additional insurance coverage shall

be evidenced by an appropriate Certificate of Insurance and shall take effect within the time set forth in the addendum.

14.8. Survival. The provisions of this Paragraph shall survive the termination or expiration of this Contract.

15. Contractor's responsibility for subcontractors. The Contractor shall be fully responsible to the City for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as Contractor is for the acts and omissions of persons it directly employs. Contractor shall cause appropriate provisions to be inserted in all subcontracts relating to this Contract, to bind all subcontractors to Contractor by all the terms herein set forth, and insofar as applicable to the work of subcontractors and to give Contractor the same power regarding termination of any subcontract as the City may exercise over Contractor under any provisions of this contract. Nothing contained in this contract shall create any contractual relation between the subcontractor and the City.

16. Independent Contractor Clause. This Contract does not create an employee/employer relationship between the parties. It is the parties' intention that the Contractor shall be an independent contractor and not the City's employee for all purposes, including, but not limited to, the application of the Fair Labor Standards Act, minimum wage and overtime payments, Federal Insurance Contribution Act, the Social Security Act, the Federal Unemployment Tax Act, the provisions of the Internal Revenue Code, Missouri revenue and taxation laws, Missouri workers' compensation, and unemployment insurance laws. The Contractor shall retain sole and absolute discretion as to the judgment and manner and means of carrying out the Contractor's activities and responsibilities hereunder. The Contractor agrees that it is a separate and independent enterprise from the public employer, that it has a full opportunity to find other business, that it has made its own investment in its business, and that it will utilize a high level of skill necessary to perform the work. This Contract shall not be construed as creating any joint employment relationship between the Contractor and the City, and the City shall not be liable for any obligation incurred by the Contractor, including but not limited to unpaid minimum wages and/or overtime premiums.

17. Liability and Indemnity.

17.1. In no event shall the City be liable to the Contractor for special, indirect, or consequential damages, except those caused by the City's gross negligence or willful or wanton misconduct arising out of or in any way connected with a breach of this contract. The maximum liability of the City shall be limited to the amount of money to be paid or received by the Contractor under this contract.

17.2. The Contractor shall defend, indemnify and save harmless the City, its elected or appointed officials, agents and employees from and against any and all liability, suits, damages, costs (including attorney fees), losses, outlays and expenses from claims in any manner caused by, or allegedly caused by, or arising out of, or connected with, this contract, or the work or any subcontract thereunder (the Contractor hereby assuming full responsibility for relations with subcontractors), including, but not limited to, claims for personal injuries, death, property damage, or for damages from the award of this contract to Contractor, except to the extent such liability is caused by the sole negligence of the City, its officials, agents and employees.

17.3. The Contractor shall indemnify and hold the City harmless from all wages or overtime compensation due to any employees in rendering services pursuant to this Contract or any subcontract, including payment of reasonable attorneys' fees and costs in the defense of any claim made under the Fair Labor Standards Act, the Missouri Prevailing Wage Law or any other

federal or state law.

17.4. The indemnification obligations of Contractor hereunder shall not be limited by any limitations as to the amount or type of damages, compensation or benefits payable by or for the Contractor, under any federal or state law, to any person asserting the claim against City, its elected or appointed officials, agents, and employees, for which indemnification is sought.

17.5. The indemnification obligations herein shall not negate, abridge or reduce in any way any additional indemnification rights of the City, its elected or appointed officials, agents and employees, which are otherwise available under statute, or in law or equity.

17.6. Contractor affirms that it has had the opportunity to recover the costs of the liability insurance required in this Contract in its contract price.

17.7. The Contractor shall indemnify and hold the City harmless for any penalties, fines, fees or costs, including costs of defense, which are charged or assessed by any federal, state or local agency including, but not limited to, Environmental Protection Agency or Department of Natural Resources.

17.8. The provisions of this Paragraph shall survive the termination or expiration of this Contract.

18. Contract Documents.

18.1. The entire Contract of the parties shall consist of the following documents:

18.1.1. This Contract; and

18.1.2. Scope of Work (Exhibit A); and

18.1.3. Bid Form (Exhibit B); and

18.1.4. Construction Plans for "Sludge Storage Improvements" (Exhibit C); and

18.1.5. City of Nixa Technical Specifications (Exhibit D); and

18.1.6. City of Nixa Technical Specifications Drawings (Exhibit E); and

18.1.7. Supplemental Specifications (Exhibit F).

18.2. The above listed documents are attached hereto and incorporated by their reference herein as though fully set forth herein.

18.3. No modification, amendment, or waiver of any of the provisions of this Contract shall be effective unless in writing specifically referring hereto and signed by both parties.

18.4. In the event of a conflict between terms, the terms of this Contract, exclusive of its Exhibits, Attachments, or Schedules, shall control over the terms of any Exhibit, Attachment, or Schedule.

19. Nonresident or Foreign Contractors. The Contractor shall procure and maintain during the life

of this Contract:

19.1. If the Contractor is a foreign corporation, a certificate of authority to transact business in the State of Missouri from the Secretary of State, unless exempt pursuant to the provisions of Section 351.570 RSMo.

19.2. A certificate from the Missouri Director of Revenue evidencing compliance with the transient employer financial assurance law, unless exempt pursuant to the provisions of Section 285.230 RSMo.

19.3. The Contractor shall utilize a United States based bank at the time of execution of this Contract. The City shall not be responsible for any additional costs incurred in the event that the Contractor utilizes a non-United States based bank.

20. Notices.

20.1. All notices required or permitted hereinunder and required to be in writing may be given by Electronic Mail or by first class mail addressed to City and Contractor at the addresses shown below:

To City:

Name: City of Nixa, Missouri
Address: 715 W. Mt. Vernon St., PO Box 395, Nixa MO 65714
Phone: 417.725.3785
Email:
Attn:
Dept:

To Contractor:

Name:
Address:
Phone:
Email:
Attn:

20.2. The date of delivery of any notice given by mail shall be the date falling on the second full day after the day of its mailing. The date of delivery of notice by Electronic Mail transmission shall be deemed to be the date transmission occurs, except where the transmission is not completed by 5:00 p.m. on a regular business day at the terminal of the receiving party, in which case the date of delivery shall be deemed to fall on the next regular business day for the receiving party.

20.3. Notice of information may be updated by the respective party upon reasonable notice of such change to the other party.

21. Right to Audit. Contractor agrees to furnish sufficient supporting details as may be required by the City to support any charges or invoices submitted to the City for payment under this Contract. Contractor shall make available for the City's inspection all records covering or relating to charges submitted to the City for payment. Contractor shall make appropriate adjustments in the event that

discrepancies are found. The City shall have the right to audit the Contractor's records pertaining to the work/product for a period of three (3) years after final payment. The provisions of this Paragraph shall survive the termination or expiration of this Contract.

22. Compliance with Laws. Contractor agrees to comply with all applicable federal, state and local laws or rules and regulations applicable to the provision of services and products hereunder. Contractor affirmatively states that payment of all local, state, and federal taxes and assessments owed by Contractor is current.

23. City Benefits. The Contractor shall not be entitled to any of the benefits established for the employees of the City nor be covered by the Worker's Compensation Program of the City.

24. No Third-Party Beneficiaries. This Contract is for the sole benefit of the parties hereto and their respective successors and permitted assigns and nothing herein, express or implied, is intended to or shall confer upon any other person any legal or equitable right, benefit, or remedy of any nature whatsoever, under or by reason of this Contract.

25. Jurisdiction. This Contract and every question arising hereunder shall be construed or determined according to the laws of the State of Missouri, without giving effect to any choice or conflict of law provision or rule which would cause the application of the laws of any jurisdiction other than those of the State of Missouri. Should any part of this Contract be litigated, venue shall be proper only in the Courts of Christian County, Missouri. The provisions of this Paragraph shall survive the termination or expiration of this Contract.

26. Waiver of Jury Trial. Each party irrevocably and unconditional waives any right it may have to a trial by a jury in respect to any legal action arising out of or relating to this Contract or the transaction contemplated thereby. The provisions of this Paragraph shall survive the termination or expiration of this Contract.

27. No Waiver of Governmental Immunity. No provision of this Contract is intended, or shall be construed, to be a waiver for any purpose by the City of any applicable state law on municipal liability or governmental immunity. No indemnification provision contained in this Contract under which Customer indemnifies the City shall be construed in any way to limit any other indemnification provision contained in this Contract.

28. Severability. If any term or provision of this Contract is held to be invalid, illegal, or unenforceable, such invalidity, illegality, or unenforceability shall not affect any other term or provision of this Contract or invalidate or render unenforceable such term or provision.

29. Headings. The headings in this Contract are for reference only and shall not affect the interpretation of this Contract.

30. Interpretation. This Contract shall be construed without regard to any presumption or rule requiring construction or interpretation against the party drafting an instrument or causing any instrument to be drafted.

31. Payment for Labor and Materials. The Contractor shall pay for all labor and materials used in the provision of the Services.

32. Performance and Payment Bonds.

32.1. The Contractor shall furnish a Performance Bond and a Labor and Materials Payment Bond with surety approved by the City and on forms approved by the City. Each bond shall be in the amount of **\$INSERT CONTRACT AMOUNT (full amount of contract)** conditioned upon the full and faithful performance of all terms and conditions of this Contract and payment of all labor and material suppliers.

32.2. It is further mutually agreed between the parties that if at any time after the execution of this Contract the City deems the surety or sureties upon such bond(s) to be unsatisfactory, or if, for any reason, such bond(s) ceases to be adequate to cover the performance of the work, the Contractor shall, at its expense, within 5 days after the receipt of notice from the City to do so, furnish an additional bond or bonds, in such form and amount, and with such surety or sureties as shall be satisfactory to the City. In such event no further payment to the Contractor shall be deemed to be due under this Contract until such new or additional security for the faithful performance of the work and the payment of labor and material suppliers shall be furnished in a manner and form satisfactory to the City.

32.3. The corporate surety on any performance or payment bond must be licensed by the State of Missouri and if the required bond exceeds \$25,000.00 must be listed in United States Treasury Circular 570.

33. Prevailing Wage. In compliance with sections 290.210 through 290.340 RSMo, all workers performing work under this Contract shall be paid a wage of no less than the "prevailing hourly rate of wages" for work of a similar character in this locality or the public works contracting minimum wage, whichever is applicable, as set out in the Wage Order. If at any time the Contractor is found to not have paid prevailing wages, the Contractor shall forfeit as a penalty to the City \$100.00 for each calendar day or portion of a calendar day for each worker paid less than the stipulated required rates for any work done under this Contract by the Contractor or by any subcontractor under the Contractor. Notwithstanding the foregoing, if the engineer's estimate of the total project cost or the bid accepted by the City is \$75,000.00 or less, then all labor utilized in the construction of the improvements shall not be required to pay the "prevailing rate of wages" or the public works minimum wage. However, if the project becomes subject to a change order that increases the total project cost to more than \$75,000.00, a "prevailing hourly rate of wages" or the public works contracting minimum wage, whichever is applicable, shall be paid for all labor utilized in the construction of the improvements but only for that portion of the project which exceeds \$75,000.00.

34. Safety Training. Pursuant to Missouri Revised Statute Section 292.675, Contractors and subcontractors who sign a contract to work on public works projects must provide a 10-hour OSHA construction safety program, or similar program approved by the Department of Labor and Industrial Relations, to be completed by their on-site employees within sixty (60) days of beginning work on the construction project. The Contractor shall provide an acceptable notarized affidavit stating that Contractor has verified the completion of a 10-hour construction safety program with respect to the employees working in connection with the contracted services. Contractors and subcontractors in violation of this provision will forfeit to the public body \$2,500.00 plus \$100 a day for each employee who is employed without training. Public bodies and contractors may withhold assessed penalties from the payment due to those Contractors and subcontractors. The penalties shall not begin to accrue until the time periods in the statute have elapsed (60 days after notice to proceed and 20 days to produce documentation for employees found in violation).

35. Affidavit for Contracts Over \$5,000.00. That pursuant to Missouri Revised Statute Sections 285.525 through 285.550, if this contract exceeds the amount of \$5,000.00 and Contractor is associated with a business entity, Contractor shall provide an acceptable notarized affidavit stating that

the associated business entity is enrolled in and participates in a federal work authorization program with respect to the employees working in connection with the contracted services, and that said business entity does not knowingly employ any person who is an unauthorized alien in connection with the contracted services. Additionally, Contractor must provide documentation for said business entity evidencing current enrollment in a federal work authorization program.

36. Compliance with Anti-Discrimination against Israel Act. Pursuant to Section 34.600 RSMo, if this Contract exceeds the amount of \$100,000 for Contractors with ten or more employees, Contractor, by executing this Contract, certifies that the Contractor is not currently engaged in and shall not for the duration of the contract, engage in a boycott of goods or services from the State of Israel; is not currently engaged in and shall not, for the duration of the contract, engage in a boycott of goods or services from companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or is not currently engaged in and shall not for the duration of this contract, engage in a boycott of goods or services from persons or entities doing business in the state of Israel.

[Remainder of page intentionally left blank. Signatures follow on next page.]

IN WITNESS WHEREOF, the parties have set their hands on the day and year herein stated.

CITY

Jimmy Liles, City Administrator

Date: _____

ATTEST:

Rebekka Coffey, City Clerk

Approved as to form:

Nick Woodman, City Attorney

Director of Finance Certification:

I certify that this contract is within the purpose of the appropriation to which it is to be charged. I further certify that for the current fiscal year ending December 31, 2026, there is an unencumbered balance to the credit of such appropriation sufficient to pay the City’s obligation for the current fiscal year, and that the appropriate accounting entries have been made. The City’s obligations in subsequent fiscal years are subject to appropriation by the City Council.

Jennifer Evans, Director of Finance

CONTRACTOR

Authorized Signer

Date: _____

Printed Name

Title

CONTRACTOR VERIFICATION

CITY OF NIXA, MISSOURI
GENERAL TERMS AND CONDITIONS OF COMPETITIVE PROCUREMENT PROCESS

- 1. Authority.** Chapter 2, Article VI, Division 1 of the Nixa City Code, contains the provisions which govern the City's competitive procurement processes. Section 2-172 of the Nixa City Code authorizes the establishment of additional rules and procedures to implement the provisions of Chapter 2, Article VI, Division 1 of the Nixa City Code. These terms and conditions (hereinafter "Terms") are promulgated pursuant to the authority set out herein.
- 2. Scope.** These Terms shall govern and control the competitive procurement process. Once a contract is executed between the City and the awarded Offeror, these Terms shall no longer apply to that specific contractual arrangement. By providing a submittal as part of this solicitation, Offerors agree to be bound by the terms and conditions contained in this document.
- 3. Opening Location and Due Date.** Sealed Submittals will be received at Nixa City Hall, 715 W. Mt. Vernon St., Nixa, MO 65714, until the due date and time specified in the solicitation, local Nixa, Missouri time (Central Time) (hereinafter the "Due Date").
- 4. Opening of Submittals.** Submittals shall be opened at a public opening. Offerors who have submitted a Submittal and the public are allowed to attend the opening. No decision related to an award shall be made at the opening.
- 5. Delivery of Submittals.**
 - 5.1.** Submittals shall be submitted thru the electronic bidding portal. Facsimile, telephone, and email Submittals shall not be accepted by the City. The City will not accept any Submittal received after the Due Date. It is the sole responsibility of the Offeror to ensure timely delivery of their Submittal.
 - 5.2.** Offerors shall comply with all instructions and requirements outlined on the City's electronic bidding website <https://nixa.ionwave.net>. Offerors are solely responsible for ensuring their electronic submittals are complete, properly uploaded, and received by the specified deadline. The City is not responsible for technical difficulties encountered by Offerors during the electronic submission process.
- 6. Prices.** Submittals shall provide unit price, extended total, or both if applicable. Price must be stated in the units of quantity as specified in the City's specifications. The unit price shall control in the event of any discrepancy. Each item must be priced separately, and Offerors shall not attempt to tie any item or items in with any other item or items. All pricing shall be submitted as "Free on Board" ("FOB") for the destination Nixa, Missouri 65714, freight prepaid.
- 7. Taxes.** Federal or State excise, sales, or use taxes should not be included in any prices submitted as part of this Solicitation. The City is tax exempt as a matter of law. A Tax Exemption Certificate may be furnished by the City if required.
- 8. Estimated Quantities.** The estimated quantities indicated in the City's Solicitation represent anticipated requirements only. The City reserves the right to exceed or diminish these estimates.

9. Solicitation Forms, Variances, and Alternates. Solicitation responses shall be submitted on City forms provided as part of the Solicitation. Offerors submitting a Submittal as part of this Solicitation shall indicate any variances from the City's requested specifications, terms, conditions, and the anticipated contract document. Alternate Submittals may be provided as part of a Submittal but will only be considered at the sole discretion of the City.

10. "Or Equal" Interpretation. When a particular manufacturer's name or brand is specified within the Solicitation along with the words "or equal", then the City will consider other brands which are substantially similar. Offerors submitting an alternative shall clearly indicate the product (brand and model number) on which they are providing as an alternative. Additionally, they shall supply a sample or sufficient data in detail to enable an intelligent comparison to be made with the brand or manufacturer specified by the City. Catalog cuts and technical descriptive data shall be provided where applicable.

11. Withdrawal of Submittals. Submittals may be revised, modified, or withdrawn by the Offeror at any time prior to the Due Date. Any such revision, modification, or withdrawal shall be in writing. After Submittals are opened, they shall be irrevocable for a period of sixty (60) days, unless otherwise stated.

12. Clarification and Addenda. Each Offeror submitting a Submittal as part of this Solicitation shall examine all solicitation documents posted by the City and shall judge all matters relating to the adequacy and accuracy of such documents. Any inquiries or suggestions concerning interpretation, clarification, or additional information pertaining to this Solicitation shall be made through the Purchasing Department in writing through email. No oral interpretation shall be made by the City. The issuance of written addenda shall be the only method whereby interpretation, clarification, or additional information is given by the City. It is the responsibility of each Offeror to contact the Purchasing Department to determine if addenda were issued and to make such addenda a part of their Submittal. Any and all addendums shall be posted on the City's electronic bidding web site: (<https://nixa.ionwave.net/HomePage.aspx>). Offerors are responsible for checking this website regularly for any issued addenda.

13. Contract Forms. Any contract resulting from the City's acceptance of a Submittal shall be on forms either supplied by or approved by the City. The City has provided a template contract as part of the City's Solicitation. Any edits, modifications, or exceptions to this template document shall be provided as part of any Submittal.

14. Reserved Rights. The City reserves the right to make such investigations as it deems necessary to determine whether any Submittal is responsive and that the Offeror providing the Submittal is sufficiently responsible or capable of performing any potential contract. The City may require any Offeror to provide current financial statements, verification of availability of equipment and personnel, past performance records, or any other documents which will enable the City to determine whether the Submittal or the Offeror is sufficient.

15. Applicable Law. This competitive procurement process shall be governed by the laws of the State of Missouri.

16. Protest.

16.1. Right to Protest. Any actual Offeror who is aggrieved in connection with the award of a contract as part of this Solicitation may protest the award in accordance with the procedure set forth in this section.

16.2. Grounds for Protest. Protests shall be limited to the following grounds:

16.2.1. *Errors in the Evaluation Process:* The City made a substantial error in the application of the evaluation criteria specified in this Solicitation.

16.2.2. *Non-Responsive or Non-Responsibility:* The City improperly determined a Submittal to be non-responsive or an Offeror to be non-responsible.

16.2.3. *Improper Award:* The award of a contract was not made in accordance with the requirements of this Solicitation or applicable law.

Protests shall be based on clear and convincing evidence of bias, fraud, or misapplication of stated evaluation criteria.

16.3. *Filing a Protest:* To be considered valid, a protest must be submitted in writing and must contain the following:

16.3.1. Identification of the Protestor: The name, mailing address, telephone number, and email address of the Protestor.

16.3.2. Identification of the Solicitation: The title and solicitation number of the procurement.

16.3.3. Detailed Statement of Grounds for Protest: A clear and concise statement of the specific grounds for the protest, including all relevant facts, and supporting documentation. Mere disagreement with the City's decision is not sufficient.

16.3.4. Signature: The signature of the Protestor by an authorized representative of the Protestor.

16.4. *Deadline for Filing:* Protests must be received by the City no later than 7 calendar days after the notice of award of the contract. Protests shall be submitted to the City Administrator.

16.5. *Review of Protest:*

16.5.1. Initial Review: Upon receipt of a timely and properly filed protest, the City Administrator, or designee, shall conduct an initial review to determine if the protest meets the requirements of this section. Protests that do not meet these requirements may be rejected without further consideration, and the Protestor shall be notified accordingly.

16.5.2. Suspension of Procurement Process: Unless the City Administrator makes a written determination that the award of the contract is urgently required without delay for compelling reasons, the procurement process may be suspended pending the resolution of the protest. In the case where the City Administrator determines that he award of the contract is urgently required, then no further action shall be taken on the protest.

16.5.3. Opportunity to Respond: The City Administrator may provide other

interested parties with notice of the protest and an opportunity to respond within a specified timeframe.

16.5.4. Investigation and Decision: The City Administrator shall investigate the protest, which may include a review of relevant documents and meetings with the Protestor and other parties. A written decision on the protest shall be issued within 15 business days after the filing of the protest. The decision shall state the findings of fact, the reasoning of the decisions, and any corrective action to be taken, if any.

16.6. *Limitation of Remedies:* In the event that a protest is determined to be valid, the exclusive and sole remedy available to the Protestor and any other interested party shall be the cancellation of the current Solicitation and the commencement of a new, independent competitive procurement process. The City reserves the right to revise the specifications or requirements in any subsequent solicitation. Under no circumstances shall a successful protest result in the amendment of the original award or the award of the contract to the protesting party under the terms of the protested Solicitation.

16.7. *Finality of Decision:* The written decision of the City Administrator shall be the final administrative determination of the City regarding the protest.

16.8. *Waiver of Objections:* By providing a submittal pursuant to this solicitation, and as consideration for the City's review of the Offeror's submittal, said Offeror shall waive any objections or challenges to the protest process provided for herein. The protest process outlined herein shall be Offerors sole recourse to dispute a contract award made as part of this solicitation.

17. *Quality Guaranty.* If any product delivered does not meet the City's specifications or if the product will not produce the effect that the Offeror represented to the City, the Offeror shall pick up the product from the City at no expense to the City. Additionally, the Offeror shall refund to the City any money which has been paid for same. The Offeror shall be responsible for attorney fees in the event the Offeror defaults and court action is required.

18. *Quality Terms.* The City reserves the right to reject any or all materials if, in its judgment, any item reflects unsatisfactory workmanship, manufacturing, or shipping damages.

19. *Solicitation Tabulation.* Offerors may submit a request for a copy of the tabulation of the Solicitation through the City's purchasing department.

20. *Expenses.* All expenses for responding to the City's Solicitation shall be borne by the Offeror submitting their Submittal.

21. *Anti-Collusion Certification.* The Offeror warrants and represents that their submission is made in good faith and without any agreement, understanding, or arrangement with any other person or entity to submit a fictitious or fraudulent submission, or to refrain from submitting a submission, or to otherwise collude with any other person or entity in any manner whatsoever in connection with this Solicitation. The Offeror further warrants and represents that:

21.1. The prices in this submission have been arrived at independently, without consultation, communication, or agreement for the purpose of restricting competition, as to any matter relating

to such prices with any other Offeror or potential Offeror.

21.2. Unless otherwise required by law, the prices which have been quoted in this submission have not been knowingly disclosed by the Offeror and will not knowingly be disclosed by the Offeror prior to notification of award, directly or indirectly to any other Offeror or to any competitor.

21.3. No attempt has been made or will be made by the Offeror to induce any other person or firm to submit or not to submit a submission for the purpose of restricting competition.

21.4. The Offeror has not offered, conferred, or agreed to confer any pecuniary benefit or other consideration to any official or employee of the City in connection with this Solicitation.

22. Liability and Indemnity. In no event shall the City be liable to the Offeror for any special, indirect, or consequential damages, except those caused by the City's gross negligence or willful or wanton misconduct arising out of or in any way connected with this Solicitation.

The Offeror shall defend, indemnify and save harmless the City, its elected or appointed officials, agents, and employees from and against any and all liability, suits, damages, costs (including attorney fees), losses, outlays, and expenses from claims in any manner caused by, or allegedly caused by, or arising out of, or connected with, this Solicitation, including, but not limited to, claims for personal injuries, death, property damage, or for damages from the award of this contract to Contractor.

23. Information is Public. All documents submitted with any Submittal shall become public documents and subject to RSMo. Chapter 610. By submitting any document to the City in connection with this Solicitation, the Offeror recognizes the public nature of the document and waives any claim against the City and any of its officers and employees relating to the release of any document or information submitted. Each Offeror shall hold the City and its officers and employees harmless from any claims arising from the release of any document or information made available to the City arising from this Solicitation.

24. Authorized Product Representation. The successful Offeror(s) by virtue of submitting the name and specifications of a manufacturer's product will be required to furnish the named manufacturer's product. By virtue of submission of the stated documents, it will be presumed by the City that the Offeror(s) is legally authorized to submit, and the successful Offeror(s) will be legally bound to perform according to the documents.

25. Regulations. Each Offeror is responsible to assure compliance with OSHA, EPA, Federal, State of Missouri, and City rules, regulations, or other requirements, as each may apply.

26. Awards. Awards shall be made pursuant to the applicable provisions of Section 2-173 of the Nixa City Code. Notice of the award of a contract shall be made to all Offerors who submitted a Submittal as part of the Solicitation.

27. Additional Purchases by Other Public Agencies. The awarded Offeror, by submitting a Submittal, agrees to allow other public agencies to engage in cooperative purchasing utilizing the pricing submitted by the Offeror.

28. Cancellation of Solicitation. The City reserves the right to cancel this Solicitation in whole or

in part at any time prior to contract award, without obligation or liability to any Offeror. The reasons for cancellation may include, but are not limited to, insufficient funding, changing requirements, or the determination that it is in the best interest of the City to do so. Notice of cancellation will be provided to all Offerors who submitted a Submittal, if possible.

29. No Guarantee of Award. Submission of a Submittal does not guarantee that the City will award a contract. The City reserves the right to reject any or all Submittals, to waive minor irregularities or informalities in Submittals, and to make an award to the Offeror whose Submittal is deemed to be in the best interest of the City, considering all evaluation factors.

30. Debarment/Suspension. By submitting a Submittal, the Offeror certifies that neither it nor its principals are currently debarred, suspended, or otherwise ineligible from participating in federal, state, or local government procurement activities. The City reserves the right to reject any Submittal from an Offeror that is debarred or suspended.

31. Definitions. The following terms shall have the meaning set forth below when used in this document:

City: Refers to the City of Nixa, Missouri.

Due Date: Refers to the specific closing date and time for the submission of Submittals as indicated in Section 3 of these Terms.

Offeror: Refers to the person or entity submitting a Submittal in response to the City's Solicitation.

Solicitation: Refers to the competitive procurement process referenced in Section 2 of these terms, including all associated documents, specifications, and addenda.

Submittal: Refers to the Offeror's complete response to the City's Solicitation, including all required forms, pricing, and other documentation.

**BUSINESS ENTITY CERTIFICATION, ENROLLMENT DOCUMENTATION,
AND AFFIDAVIT OF WORK AUTHORIZATION**

BUSINESS ENTITY CERTIFICATION:

The bidder/contractor must certify their current business status by completing either Box A or Box B or Box C on this Exhibit.

- BOX A:** To be completed by a non-business entity as defined below.
- BOX B:** To be completed by a business entity who has not yet completed and submitted documentation pertaining to the federal work authorization program as described at http://www.dhs.gov/files/programs/gc_1185221678150.shtm.
- BOX C:** To be completed by a business entity who has current work authorization documentation on file with a Missouri state agency including Division of Purchasing and Materials Management.

Business entity, as defined in section 285.525, RSMo, pertaining to section 285.530, RSMo, is any person or group of persons performing or engaging in any activity, enterprise, profession, or occupation for gain, benefit, advantage, or livelihood. The term “**business entity**” shall include but not be limited to self-employed individuals, partnerships, corporations, contractors, and subcontractors. The term “**business entity**” shall include any business entity that possesses a business permit, license, or tax certificate issued by the state, any business entity that is exempt by law from obtaining such a business permit, and any business entity that is operating unlawfully without such a business permit. The term “**business entity**” shall not include a self-employed individual with no employees or entities utilizing the services of direct sellers as defined in subdivision (17) of subsection 12 of section 288.034, RSMo.

Note: Regarding governmental entities, business entity includes Missouri schools, Missouri universities (other than stated in Box C), out of state agencies, out of state schools, out of state universities, and political subdivisions. A business entity does not include Missouri state agencies and federal government entities.

BOX A – CURRENTLY NOT A BUSINESS ENTITY

I certify that _____ (Company/Individual Name) **DOES NOT CURRENTLY MEET** the definition of a business entity, as defined in section 285.525, RSMo pertaining to section 285.530, RSMo as stated above, because: (check the applicable business status that applies below)

- ☐ I am a self-employed individual with no employees; **OR**
- ☐ The company that I represent employs the services of direct sellers as defined in subdivision (17) of subsection 12 of section 288.034, RSMo.

I certify that I am not an alien unlawfully present in the United States and if _____ (Company/Individual Name) is awarded a contract for the services requested herein under _____ (Bid/SFS/Contract Number) and if the business status changes during the life of the contract to become a business entity as defined in section 285.525, RSMo, pertaining to section 285.530, RSMo, then, prior to the performance of any services as a business entity, _____ (Company/Individual Name) agrees to complete Box B, comply with the requirements stated in Box B and provide the _____ (insert agency name) with all documentation required in Box B of this exhibit.

Authorized Representative's Name (Please Print)

Authorized Representative's Signature

Company Name (if applicable)

Date

(Complete the following if you DO NOT have the E-Verify documentation and a current Affidavit of Work Authorization already on file with the State of Missouri. If completing Box B, do not complete Box C.)

BOX B – CURRENT BUSINESS ENTITY STATUS

I certify that _____ (Business Entity Name) **MEETS** the definition of a business entity as defined in section 285.525, RSMo, pertaining to section 285.530.

Authorized Business Entity Representative's
Name (Please Print)

Authorized Business Entity
Representative's Signature

Business Entity Name

Date

E-Mail Address

As a business entity, the bidder/contractor must perform/provide each of the following. The bidder/contractor should check each to verify completion/submission of all of the following:

- ☐ Enroll and participate in the E-Verify federal work authorization program (Website: http://www.dhs.gov/files/programs/gc_1185221678150.shtm; Phone: 888-464-4218; Email: e-verify@dhs.gov) with respect to the employees hired after enrollment in the program who are proposed to work in connection with the services required herein; AND
- ☐ Provide documentation affirming said company's/individual's enrollment and participation in the E-Verify federal work authorization program. Documentation shall include EITHER the E-Verify Employment Eligibility Verification page listing the bidder's/contractor's name and company ID OR a page from the E-Verify Memorandum of Understanding (MOU) listing the bidder's/contractor's name and the MOU signature page completed and signed, at minimum, by the bidder/contractor and the Department of Homeland Security – Verification Division. If the signature page of the MOU lists the bidder's/contractor's name and company ID, then no additional pages of the MOU must be submitted; AND
- ☐ Submit a completed, notarized Affidavit of Work Authorization provided on the next page of this Exhibit.

AFFIDAVIT OF WORK AUTHORIZATION:

The bidder/contractor who meets the section 285.525, RSMo, definition of a business entity must complete and return the following Affidavit of Work Authorization.

Comes now _____ (Name of Business Entity Authorized Representative) as _____ (Position/Title) first being duly sworn on my oath, affirm _____ (Business Entity Name) is enrolled and will continue to participate in the E-Verify federal work authorization program with respect to employees hired after enrollment in the program who are proposed to work in connection with the services related to contract(s) with the State of Missouri for the duration of the contract(s), if awarded in accordance with subsection 2 of section 285.530, RSMo. I also affirm that _____ (Business Entity Name) does not and will not knowingly employ a person who is an unauthorized alien in connection with the contracted services provided under the contract(s) for the duration of the contract(s), if awarded.

In Affirmation thereof, the facts stated above are true and correct. (The undersigned understands that false statements made in this filing are subject to the penalties provided under section 575.040, RSMo.)

Authorized Representative's Signature

Printed Name

Title

Date

E-Mail Address

E-Verify Company ID Number

Subscribed and sworn to before me this _____ of _____. I am
(DAY) (MONTH, YEAR)
commissioned as a notary public within the County of _____, State of
(NAME OF COUNTY)
_____, and my commission expires on _____.
(NAME OF STATE) (DATE)

Signature of Notary

Date

(Complete the following if you have the E-Verify documentation and a current Affidavit of Work Authorization already on file with the State of Missouri. If completing Box C, do not complete Box B.)

BOX C – AFFIDAVIT ON FILE - CURRENT BUSINESS ENTITY STATUS

I certify that _____ (Business Entity Name) **MEETS** the definition of a business entity as defined in section 285.525, RSMo, pertaining to section 285.530, RSMo, and have enrolled and currently participates in the E-Verify federal work authorization program with respect to the employees hired after enrollment in the program who are proposed to work in connection with the services related to contract(s) with the State of Missouri. We have previously provided documentation to a Missouri state agency or public university that affirms enrollment and participation in the E-Verify federal work authorization program. The documentation that was previously provided included the following.

- ✓ The E-Verify Employment Eligibility Verification page OR a page from the E-Verify Memorandum of Understanding (MOU) listing the bidder's/contractor's name and the MOU signature page completed and signed by the bidder/contractor and the Department of Homeland Security – Verification Division
- ✓ A current, notarized Affidavit of Work Authorization (must be completed, signed, and notarized within the past twelve months).

Name of **Missouri State Agency** or **Public University*** to Which Previous E-Verify Documentation Submitted: _____

(*Public University includes the following five schools under chapter 34, RSMo: Harris-Stowe State University – St. Louis; Missouri Southern State University – Joplin; Missouri Western State University – St. Joseph; Northwest Missouri State University – Maryville; Southeast Missouri State University – Cape Girardeau.)

Date of Previous E-Verify Documentation Submission: _____

Previous **Bid/Contract Number** for Which Previous E-Verify Documentation Submitted: _____

(if known)

Authorized Business Entity Representative's
Name (Please Print)

Authorized Business Entity
Representative's Signature

E-Verify MOU Company ID Number

E-Mail Address

Business Entity Name

Date

FOR STATE USE ONLY

Documentation Verification Completed By:

Buyer

Date

ANTI-DISCRIMINATION AGAINST ISRAEL ACT CERTIFICATION

Statutory Requirement: Section 34.600, RSMo, precludes entering into a contract with a company to acquire products and/or services “unless the contract includes a written certification that the company is not currently engaged in and shall not, for the duration of the contract, engage in a boycott of goods or services from the State of Israel; companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or persons or entities doing business in the State of Israel.”

Exceptions: The statute provides two exceptions for this certification: 1) “contracts with a total potential value of less than one hundred thousand dollars” or 2) “contractors with fewer than ten employees.” Therefore the following certification is required prior to any contract award.

Section 34.600, RSMo, defines the following terms:

Company - any for-profit or not-for-profit organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, limited liability company, or other entity or business association, including all wholly-owned subsidiaries, majority-owned subsidiaries, parent companies, or affiliates of those entities or business associations.

Boycott Israel and Boycott of the State of Israel - engaging in refusals to deal, terminating business activities, or other actions to discriminate against, inflict economic harm, or otherwise limit commercial relations specifically with the State of Israel; companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or persons or entities doing business in the State of Israel, that are all intended to support a boycott of the State of Israel. A company’s statement that it is participating in boycotts of the State of Israel; companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or persons or entities doing business in the State of Israel, or that it has taken the boycott action at the request, in compliance with, or in furtherance of calls for a boycott of the State of Israel; companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or persons or entities doing business in the State of Israel shall be considered to be conclusive evidence that a company is participating in a boycott of the State of Israel; companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or persons or entities doing business in the State of Israel; provided, however that a company that has made no such statement may still be considered to be participating in a boycott of the State of Israel; companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or persons or entities doing business in the State of Israel if other factors warrant such a conclusion.

Certification: The vendor must therefore certify their current status by completing either Box A, Box B, or Box C on the next page of this Exhibit.

- | | |
|---------------|--|
| BOX A: | To be completed by any vendor that <u>does not meet the definition of “company”</u> above, hereinafter referred to as “Non-Company.” |
| BOX B: | To be completed by a vendor that meets the definition of “Company” but has <u>less than ten employees.</u> |
| BOX C: | To be completed by a vendor that <u>meets the definition of “Company”</u> and <u>has ten or more employees.</u> |

BOX A – NON-COMPANY ENTITY

I certify that _____ (Entity Name) currently **DOES NOT MEET** the definition of a company as defined in section 34.600, RSMo, but that if awarded a contract and the entity's business status changes during the life of the contract to become a "company" as defined in section 34.600, RSMo, and the entity has ten or more employees, then, prior to the delivery of any services and/or supplies as a company, the entity agrees to comply with, complete, and return Box C to the Division of Purchasing at that time.

Authorized Representative's Name (Please Print)

Authorized Representative's Signature

Entity Name

Date

BOX B – COMPANY ENTITY WITH LESS THAN TEN EMPLOYEES

I certify that _____ (Company Name) **MEETS** the definition of a company as defined in section 34.600, RSMo, and currently has less than ten employees but that if awarded a contract and if the company increases the number of employees to ten or more during the life of the contract, then said company shall comply with, complete, and return Box C to the Division of Purchasing at that time.

Authorized Representative's Name (Please Print)

Authorized Representative's Signature

Company Name

Date

BOX C – COMPANY ENTITY WITH TEN OR MORE EMPLOYEES

I certify that _____ (Company Name) **MEETS** the definition of a company as defined in section 34.600, RSMo, has ten or more employees, and is not currently engaged in a boycott of goods or services from the State of Israel; companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or persons or entities doing business in the State of Israel as defined in section 34.600, RSMo. I further certify that if the company is awarded a contract for the services and/or supplies requested herein said company shall not engage in a boycott of goods or services from the State of Israel; companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel; or persons or entities doing business in the State of Israel as defined in section 34.600, RSMo, for the duration of the contract.

Authorized Representative's Name (Please Print)

Authorized Representative's Signature

Company Name

Date

OSHA 10 – AFFIDAVIT OF COMPLIANCE

Before me, the undersigned Notary Public in and for the County of _____
State of _____ personally came and appeared _____
(printed name) _____ (position) of _____ (company name)
(a corporation) (a partnership) (a proprietorship), and after being duly sworn, did depose
and say that all provisions and requirements set out in Section 292.675, Missouri Revised
Statutes, pertaining to the 10-hour OSHA construction safety training of workers employed on
public works projects have been fully satisfied and there has been no exception to the full
and complete compliance with said provisions and requirements. The referenced OSHA
training is necessary in carrying out the contract and work with the City of Nixa in Christian
County, Missouri.

Said training of all project workers has been or will be undertaken within 60 days of commencement of construction of the project. The contractor is to provide to the city copies of OSHA certification cards of each project worker.

Signature (person with authority)

Date

STATE OF _____)
) ss
COUNTY OF _____)

On this ____ day of _____, 20____, before me personally appeared _____, to me known to be the person described herein and who executed the forgoing instrument and acknowledged that they executed the same as their free act and deed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal in the county and state aforesaid, the day and year first above written.

Notary Public

My commission expires: _____.



2026 Business License Application

PO Box 395, 715 W. Mt. Vernon
Nixa, MO. 65714
Ph. 417-725-3785 Fax 417-725-6394

New License Fee= \$50.00
Annual Renewal Fee= \$25.00
License # _____
Infill# _____

Application Date _____

BUSINESS INFORMATION

Business Name _____

dba Name _____

Business Physical Address _____

City _____ State _____ Zip Code _____

Mailing Address (if different) _____

City _____ State _____ Zip Code _____

Business Phone _____ Cell Phone _____

FEIN# _____ - _____ Retail Sales Tax# (if conducting sales) _____

Description of Business _____

☐ Sole Proprietor ☐ Partnership ☐ Limited Partnership ☐ Limited Liability Company

GENERAL/OPERATING MANAGER

Name(s) _____ Title _____

Contact # _____ Email Address _____

BUSINESS OWNER

Name(s) _____ Contact # _____

City _____ State _____ Zip Code _____

APPLICANT INFORMATION

Name(s) _____ Title _____

Contact# _____ Email Address _____

Print Name

Signature ***REQUIRED



Department of Compliance Information

PO Box 395, 715 W. Mt. Vernon
Nixa MO 65714
Ph. 417-725-3785 Fax 417-725-6394

Application Date _____ **BUSINESS INFORMATION**

Business Name _____

Physical Address _____

Applicant Name _____ Contact # _____

Is this a Home Occupation? _____ Estimated # of Employees _____ Opening Date _____
(REQUIRED)

Description of Business Practices you are proposing:

OFFICE USE ONLY

Building Department Approval

____ Building permit is currently under review

____ Change of use permit is required

____ Building permit is required with construction plans containing the following information.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

Date: _____

Approved By: _____

Planning and Zoning Approval

____ Current Zoning _____

Proposed use meets Land Development Code requirements.

Proposed use is allowed but subject to the following conditions.

1. _____
2. _____
3. _____

____ Proposed use is not allowed.

Reason: _____

Section: _____

Date: _____

Approved By: _____



911 Emergency Information

PO Box 395, 715 W. Mt. Vernon
Nixa MO 65714
Ph. 417-725-3785 Fax 417-725-6394

Opening Date _____

BUSINESS INFORMATION

Business Name _____

Physical Address _____

City _____ State _____ Zip Code _____

Business Phone# _____

Business Hours- (Weekdays) _____ (Weekends) _____

Alarm _____ Alarm Company Phone# _____

Safety Information: (Please list any hazardous materials and their location in the business of safety issues that May affect first responders.

KEY HOLDERS OUTSIDE OF BUSINESS HOURS

Name _____ Title _____

Contact # _____

Name _____ Title _____

Contact # _____

Name _____ Title _____

Contact # _____

Be sure to list at least one key holder as it is important that the police department be able to contact someone with access to the business in the event of an emergency. If information on list form changes please contact City Hall at 417-725-3785 for a new form. Questions can be directed to the Nixa Police Department by calling 417-725-2510.

NOTE: Information on this form is strictly confidential and will not be released outside of our agency.

BUSINESS LICENSE AFFIDAVIT OF OWNING A BUSINESS AND WORK AUTHORIZATION

State and/or Federal Law provisions regulate the presence of aliens in the United States. I understand that pursuant to 2008 State Statute 285.530 certain public benefits are prohibited by law from the being provided to aliens unlawfully present in the United States and that I do not and will not knowingly employ a person who is an unauthorized alien in connection with the business for which the permit or license has been or is being obtained and assert that the obtaining of the permit or license will not violate the prohibition on providing certain public benefits for aliens unlawfully present in the United States as set forth in State Statute 285.530. Should I become aware, after issuance of the permit or license and during the term of the permit or license that the business is in violation of State Statute 285.530, I will immediately notify the city of the violation and failure to do so may result in denial/revocation/suspension of the permit or license. After notification of the violation is provided to the city, the business shall immediately advise the city of steps being taken to correct the violation. A failure to timely correct the violation may result in denial/revocation/suspension of the permit or license.

I affirm that, I, _____ a citizen of the United States. I also affirm

that my company _____ does not and will not knowingly

employ a person who is an unauthorized alien.

In Affirmation thereof, the facts stated above are true and correct.

Signature

Date