Contract Documents and Technical Specifications

Digester Biosolids Tank Hatch Rehab

Little Traverse Bay Bands of Odawa Indians

7500 Odawa Circle

Harbor Springs, Michigan 49740

October 8, 2024

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*Must be submitted with BID

ADVERTISEMENT FOR BIDS

LITTLE TRAVERSE BAY BANDS OF ODAWA INDIANS
HARBOR SPRINGS, MICHIGAN
DIGESTER BIOSOLIDS TANK HATCH REHAB

General Notice

Little Traverse Bay Bands of Odawa Indians (Owner) is requesting Bids for the construction of the following Project:

Digester Biosolids Tank Hatch Rehab

Bids for the construction of the Project will be received at the Little Traverse Bay Bands of Odawa Indians Headquarters, Attention: Mandy Szocinski located at 7500 Odawa Cir, Harbor Springs, MI 49740, until Tuesday October 29, 2024 at 2:00 pm local time. At that time the Bids received will be privately opened and read.

The Project includes the following Work:

Cleaning and inspection of digester and biosolids tank.

Removing concrete and salvaging existing hatches for reuse. Installing new concrete curbing and reinstalling existing hatches.

Work will occur in June 2025

Bids are requested for the following Contract: Digester Biosolids Tank Hatch Rehab

Obtaining the Bidding Documents

Information and Bidding Documents for the Project can be found at the following designated website:

https://ltbbodawa-nsn.gov

Bidding Documents may be downloaded from the designated website. Prospective Bidders are required to register with Daugherty A. Johnson DJohnson@LTBBODAWA-NSN.GOV as a plan holder. The designated website will be updated periodically with addenda, lists of registered plan holders, reports, and other information relevant to submitting a Bid for the Project. All official notifications, addenda, and other Bidding Documents will be offered only through the designated website. The Owner will not be responsible for Bidding Documents, including addenda, if any, obtained from sources other than the designated website.

Pre-bid Conference

A pre-bid conference for the Project will not be held but prospective bidders are encouraged to visit the site. Contact Daugherty A. Johnson DJohnson@LTBBODAWA-NSN.GOV to arrange a site visit.

This Advertisement is issued by:

Owner: **Little Traverse Bay Bands of Odawa**
By: **Mandy Szocinski**
Title: **Lead Purchasing Technician**
Date: **October 8, 2024**

Little Traverse Bay Bands of Odawa Indians - Digester Biosolids Tank Hatch Rehab - Bid Schedule

Item No.	Description	Unit	Estimated Quantity	Unit Price	Total Price
1	Mobilization	LS	1		
2	Digester 1 and Biosolids Tank Cleaning	LS	1		
3	Digester 2 Tank Cleaning	LS	1		
4	2x2 Hatch	EA	2		
5	3x3 Hatch	EA	5		
6	4x4 Hatch	EA	4		
7	4x6 Hatch	EA	2		
8	6x6 Hatch	EA	4		
9	7x9 Hatch	EA	2		
				TOTAL	

INDEPENDENT CONTRACTING AGREEMENT

Parties

1. The Little Traverse Bay Bands of Odawa Indians (hereafter "LTBB") is a federally recognized Indian Tribe.

2. _____, (hereafter "Contractor") is an independent contractor.

SERVICES AND PAYMENT

3. **Scope.** Contractor shall provide the following services for the LTBB Digester Biosolids Tank Hatch Repairs Project located at 1760 Lears Road, Petoskey, MI, according to the specifications attached, the LTBB Executive Director and in accordance with state and tribal building, mechanical, and health codes.

   The Contractor's scope of work shall consist of the following:
   - Contractor shall work with the LTBB Executive Director, Department of Public Works (DPW) staff, wastewater treatment plant operators, and project Engineers to coordinate and gain access to the Digester Biosolids Tanks.
   - Work will begin after LTBB removes existing sludge in late May 2025. Contractor shall be substantially complete with work within 90 days and final completion of the project within 105 days of solids removal.
   - Contractor shall complete the work in two phases as specified in summary of work and in coordination with WWTP operations.
   - Contractor shall clean and inspect both digesters and biosolids storage tanks.
   - Contractor shall remove existing concrete and hatches; hatches shall be salvaged for reuse. Contractor shall install new concrete curbing and reinstall salvaged hatches.

   The Contractor's fee for this portion $_____ includes all expenses required for completing the contract objectives.

   Any changes to the scope of work for this contract shall require prior written approval of LTBB Accounting Contracts Personnel for payment to be honored.

4. **Payment.** LTBB will pay the Contractor up to a total of and not to exceed **$_____.** The Contractor shall submit invoices to LTBB Accounting Office, Attention Contracts Personnel, 7500 Odawa Circle, Harbor Springs, Michigan 49740.

5. **Term.** This Agreement shall begin on _____ and shall terminate on _____unless terminated earlier under paragraph 6. In the event that the project is incomplete at the expiration date, LTBB shall have the option of extending this agreement or terminating this agreement and adjusting any final payment to the percentage that the job is complete as determined by LTBB Accounting Contracts Personnel.

6. **Termination.**

   A. **Voluntary**. Either party may terminate this contract on fourteen (14) days written notice to the other Party for any reason at which time all fees will be adjusted on a prorated basis as determined by LTBB Accounting Contracts Personnel.
   B. **Involuntary**. LTBB may terminate this contract immediately and without prior notice if the Contractor engages in any conduct that threatens the health, safety, or welfare of the Tribe or its citizens, or the Contractor engages in any conduct which violates Tribal law and/or applicable Federal or State laws.

7. **Assignment.** No assignment of the obligations of this contract, whether in whole or in part, may be made without the consent, previously obtained, of LTBB. No assignment or encumbrance of any interest in the compensation to be paid under this contract, whether in whole or in part, may be made without the approval of LTBB. In the event an assignment of the obligations under this contract or of any interest in the compensation to be paid under this contract is made in violation of this paragraph, the contract may be terminated at the option of LTBB.

8. **Independent Contractor.** The Parties understand and agree that this Agreement is for independent contracting services. LTBB provides no benefits to Contractor including, by way of example only, unemployment insurance, health insurance, worker's compensation insurance or any type of paid leave. Contractor is responsible for payment of all liability insurance, and applicable federal, state, and local income taxes.

9. **Additional Contractual Requirements.** The Parties understand that LTBB has enacted a statute, WOS 2012-008, the Sex Offender Registration and Notification Statute, to fulfill the obligations of sex offender registration and notification. All contractors, including their employees, subcontractors and their employees that are sex offenders that are mandated to register are required to update their registry with the LTBB Law Enforcement when working on sites under the jurisdiction of LTBB.

10. **Debarred or Excluded**. Parties assure LTBB that Contractor and Subcontractors do not appear on the debarred list. Parties understand that LTBB shall verify that Contractor and Subcontractors are not listed as excluded from receiving Federal contracts, certain subcontracts, and certain Federal financial and nonfinancial assistance and benefits, pursuant to the provisions of 31 U.S.C. 6101, note, E.O. 12549, E.O. 12689, 48 CFR 9.404, and each agency's codification of the Common Rule for Nonprocurement suspension and

debarment. Contractor shall be immediately terminated by LTBB for assigning, whether in whole or in part, any portion of contracted obligation to a subcontractor listed as debarred or excluded.

11. **Insurance.** The Contractor shall carry Worker's Compensation, Employer's Liability, Commercial General and/or Professional Liability Insurance Coverage, as required by law. In the event that the Contractor uses subcontractors for the performance of services required under this proposal, the Contractor shall ensure that said subcontractors carry Worker's Compensation and Employer's Liability Insurance. The Contractor shall be responsible for insuring all its vehicles, equipment, tools and all materials which it may use and/or leave the work site during work process. The Tribe shall not be responsible for any loss or damage to the Contractor's vehicles, equipment, tools and materials. The Contractor shall procure and maintain during the term of the contract Commercial General Liability Insurance on an "occurrence basis" with limits of liability of not less than $1,000,000 per occurrence combined single limit, for Personal injury. Bodily injury and Property Damage Coverage shall include the following extensions: 1.) Contractual Liability; 2.) Products and Completed Operations Coverage; 3.) Independent Contractors Coverage; and 4.) Broad Form General Liability Extensions or equivalent. The Contractor shall maintain Vehicle Liability Coverage, and Michigan No-Fault coverages including all owned, non-owned, and hired vehicles, of not less than $1,000,000 per occurrence combined single limit. The Contractor will provide certificate(s) of insurance coverage prior to start of contract term. If any of the above coverages expire during the term of the contract, the Contractor's insurer shall deliver renewal certification and/or policies to: Little Traverse Bay Bands of Odawa Indians, Attn: Accounting Contracts Personnel, 7500 Odawa Circle, Harbor Springs, Michigan 49740.

12. **Disputes.** The Contractor acknowledges that LTBB is a sovereign government and therefore retains all aspects of sovereignty including immunity from suit. If a dispute arises regarding any portion of this contract, LTBB may choose to waive its sovereign immunity and adjudicate the issue in LTBB Tribal Court. LTBB Tribal Court is the only forum in which LTBB waives its sovereign immunity.

13. **Confidentiality.** Contractor agrees to use any information obtained or accessed from LTBB, only as needed for the performance of his or her scope of work and not to use such information for any other purpose. In addition, the Contractor will not disclose or use any information it may receive or develop as a result of its contacts with LTBB for any purpose other than to perform his or her scope of work. Contractor agrees to maintain in confidence any proprietary information acquired from the Tribe under this Agreement except which becomes available to the public without fault of the Contractor.

14. ***Funding Requirements***. Contractor acknowledges notification that this project is 100% funded through the through the American Rescue Plan Act grant and any special reporting, conditions, terms, project spending deadlines, or requirements that apply by the grantor will be itemized in Section 3- "Scope" of this contract.

LITTLE TRAVERSE BAY BANDS IS REQUIRED, PER THE IRS, TO REPORT QUALIFYING PAYMENTS TO A VENDOR OF $600 OR MORE IN A CALENDAR YEAR TO THE IRS ON FORM 1099.

The undersigned Parties have read, understood all the terms of, and freely enter into this Agreement. This agreement is not fully executed until all parties have signed. This agreement cannot be altered orally. It can only be altered in writing by an Amendment signed by all parties.

Regina Gasco, Tribal Chair	Date
Contractor's Signature	Date
Contractor Printed Name and Title	Full Legal Name of Business Entity

Contracts Office Use Only

All Documents Received _____ Date Received _____

Notes:

Signature: _____ _____

Mandy Szocinski, Contracts Manager — Date

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TECHNICAL SPECIFICATIONS

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SECTION 01 00 10
SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

Work will include:

a. Demolition of Existing Digester Tank hatch curbs and salvaging existing hatches for reuse.
b. Cleaning of interior of digester and solids holding tanks.
c. Resetting existing hatches and new curb to match the original project.

1.02 CONTRACTS

All work will be awarded in one contract.

1.03 ALTERNATES

No alternatives for this work are being requested.

1.04 WORK BY OTHERS

No work by others is anticipated that will affect work under this project.

1.05 FUTURE WORK

No future work is anticipated that will affect work under this project.

1.06 WORK SEQUENCE

Work is to be completed in two phases in order to accommodate the treatment facility operation. The following sequence is provided as the suggested sequence for bidding purposes. The selected contractor can submitted alternative sequencing for review and approval by owner and engineer, but any assumption of approval is at the contractors risk.

Pre-Construction:

The owner shall have solids removed in the existing Digester Tank 1 and Biosolids Tank. Digester 2 has not been in operation so no existing solids will need to be removed. Digester 2 will be put into service.

Phase 1:

Upon completion of sludge removal (by owner), contractor shall perform project tasks (cleaning, inspection, hatch & curb repairs) on Digester Tank 1 and Biosolids Tank. Digester Tank 2 shall remain in service during this period.

Phase 2:

Upon completion of repairs to the Biosolids Tank and Digester Tank 1 both tanks will be placed into service. Digester Tank 2 shall be taken out of service and accumulated solids in Digester shall be pumped into the Biosolids Tank (by Owner). Project Tasks are completed on Digester Tank 2.

1.07 COORDINATION

Coordinate all work with the OWNER to properly schedule sequence and maintain operation.

1.08 AVAILABILITY OF LANDS

All work will take place on property owned or controlled by the OWNER or within the public right-of-way.

1.09 PRE-ORDERED ITEMS

No items have been pre-ordered for this project.

1.10 OWNER FURNISHED ITEMS

No items are to be Owner furnished for this project.

1.11 PROJECT IDENTIFICATION AND SIGNS
Project identification signs are required.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURE

PART 1 GENERAL

1.01 SUMMARY

A. Bid price includes all labor, tools, equipment, materials, transportation, and applicable fees, use tax, and sales tax necessary to complete the work in accordance with the Plans and Specifications.

B. All measurement and payment will be based on completed work, ready for use, performed in strict accordance with the Plans and Specifications.

C. Bid quantities listed in the Bid Schedule have been estimated and are only for the purpose of comparing, on a uniform basis, the Bids offered for the Work. Completed quantities for payment will be based on field measurements.

D. Neither the Owner nor his agents shall be held responsible should any of the estimated quantities be found incorrect.

E. Payment will be made only on items listed in the BID SCHEDULE. All other work not listed in the BID SCHEDULE shall be considered incidental to the performance of the Work.

F. Owner reserves the right to delete any line item or quantity on the BID SCHEDULE.

1.02 APPLICATION FOR PAYMENT

A. Pay period: 30 days.

B. Payment requests shall be submitted on the forms included in the Specifications.

1.03 SUBMITTALS

A. Not used.

1.04 ITEMS OF THE BID FORM

Measurement and Payment for the Pay Items listed on the Bid Schedule shall be as follows:

A. Item No. 1 Mobilization
   1. Payment includes obtaining bond, preparatory work and operation, for the movement of personnel, equipment, supplies, and incidentals to the project site; establishment of a project office and other facilities needed to undertake the Work.
   2. Unit of measure: Lump Sum.

B. Item Nos. 2 and 3 Digester Tank Cleaning
   1. Cleaning and inspection of the existing interior of the digester and solids holding tank in accordance with project documents. Includes all labor, equipment, supplies, disposal, fees to clean interior of tanks in the plans and specifications.
   2. Unit of Measure: Lump Sum for Each Phase of Construction

C. Item Nos. 4 thru 9 Tank Hatch Repairs
   1. Includes all labor, equipment, supplies, and materials to; remove existing hatches and

curb, dispose of concrete and rebar not to be reused, clean existing hatches for reuse and reinstall hatches with new curbing. Payment includes any work required to remove and reinstall conduit that interferes with construction.

2. Unit of Measure: Each hatch size listed in the bid schedule

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 CONSTRUCTION SCHEDULE

A. Preparation:
1. Prepare in the form of a horizontal bar chart, CPM network, or other form previously approved by the Engineer.
2. Provide a separate horizontal bar column or path for each trade or operation.
3. Prepare the schedule in the chronological order of the beginning of each item of work.
4. Allow space for updating.
5. The schedule sheets shall be 11" x 17" unless otherwise approved by the Engineer.

B. Content of schedule:
1. Provide a complete sequence of construction by activity.
2. For Shop Drawings, project data, and samples show the following:
   a. Submittal dates.
   b. Dates review copies will be required.
3. Show product procurement and delivery dates.
4. Show dates for beginning and completion of each element of construction.
5. Show projected percentage of completion for each item of work as of the first day of each month.

C. Updating Schedule:
1. Show all changes occurring since previous submission of the updated schedule.
2. Indicate progress of each activity and show completion dates.
3. Other items required in schedule updates are:
   a. Major changes in scope.
   b. Activities modified since previous updating.
   c. Revised projections due to changes
   d. Other identifiable changes.

D. Submittals:
1. Submit initial schedule within 15 days after receipt of a Notice to Proceed.
2. Submit updated schedules accurately depicting progress to the first day of each month.
3. Progress schedules shall be included with the Contractor’s monthly application for payment

1.02 APPLICATION FOR PAYMENT

A. Preparation:
1. Applications for payment to be submitted in accordance with Article 15 of the General Conditions.
2. Application for payment shall be made on forms provided by or approved by the Engineer.

B. Schedule of Values:
1. Contractor shall submit a schedule of values for all lump sum items in the Bid Schedule.
2. A preliminary schedule of values shall be submitted to the Engineer for review and approval prior to the pre-construction meeting.
3. Schedule of values will be used only as the basis for the Contractor’s application for

payment.

C. Submittals
1. Contractor shall submit electronic copies to the Engineer for review.
2. Application for payment shall be submitted to the Engineer as agreed to at the pre-construction meeting.

1.03 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. General:
1. Provide shop drawings in accordance with Article 7 of the General Conditions.
2. Shop Drawings are to be scaled drawings large enough to show all pertinent features of the item and its method of connection to the Work.
3. Literature from manufacturers that includes data not pertinent to this submittal, shall be clearly marked to indicate which portion of the contents is being submitted for the Engineer's review.
4. Samples shall illustrate materials, equipment, or workmanship and establish standards by which completed work is judged.
5. Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article proposed to be furnished.
6. Manufacturers must submit the certification of compliance with AIS (RUS Bulletin 1726, Exhibit A, Attachment 5) found in the bid documents, with shop drawings.

B. Submittals:
1. Submit the shop drawings electronically via an electronic shared folder set up by Engineer. When not possible to submit drawings electronically, submit the number of copies that the Contractor requires to be returned, plus two copies that will be retained by the Engineer.
2. All submittals are to be accompanied with a transmittal form that will be provided by or approved by the Engineer.
3. Contractor to thoroughly check Shop Drawings for compliance with the Contract Documents and verify field dimensions and construction criteria:
a. Indicate approval by stamping "Approved", with Contractors signature and date on all copies submitted.
b. Shop Drawings submitted without stamped approval of the Contractor will be returned without review.
4. Clearly indicate all deviations in the Shop Drawings from the requirements in the Contract Documents.
5. Make submittals in groups containing all associated items.
6. Provide submittals in advance of scheduled dates of installation to allow time for Engineer review, possible revision, and re-submittal; and for placing orders and securing delivery.
7. Allow 15 working days for Engineer review after receipt of submittal.
8. Cost of delays caused by late submittals shall be the responsibility of the Contractor.

C. Review of submittals:
1. Submittals will be returned marked with Engineer’s review comments.
2. Rejected submittals shall be revised by the Contractor and resubmitted.
3. Engineer's checking of Shop Drawings does not relieve the Contractor of responsibility for errors or omissions.

1.04 OPERATION AND MAINTENANCE MANUALS

A. General:
1. Manuals shall be in durable plastic binders approximately 8½ " x 11" in size with at least

the following:

a. Identification on or readable through, the front cover stating general nature of the manual;
b. Neatly typewritten index near the front of the manual;
c. Complete instructions regarding operation and maintenance of all equipment involved;
d. Complete nomenclature of all replaceable parts, their part numbers, and name and address of nearest vendor of parts;
e. Copies of all guarantees and warranties issued;
f. Copy of the approved Shop Drawing and all data concerning all changes made during construction.

2. Manuals that include manufacturer's catalog pages shall clearly indicate the precise items included in this installation and delete or otherwise clearly indicate all manufacturers' data with which this installation is not concerned.
3. One Electronic Manual on a compact disc or USB thumb drive, clearly labeled, shall be submitted.

B. Submittals:
1. Provide three (2) paper copies and one (1) electronic copy of the manual to the Engineer unless indicated otherwise in pertinent Sections.
2. Submit operation and maintenance manuals prior to initial equipment startup.

PART 2 PRODUCT - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 45 29

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes, testing required by the Owner to determine that materials and methods provided for the Work meet the specified requirements. Testing includes, but is not limited to:
   1. Bituminous pavement.
   2. Concrete.
   3. Soil Gradation.
   4. Welding.
   5. Pressure testing.
   6. Density Testing.

1.02 UNIT PRICES

A. The Contractor will be responsible for providing and paying for all testing procedures as described in the contract unless specified in this section.

B. The Contractor will be responsible for selecting proper testing laboratories subject to Engineer's approval.

C. Inspections and testing performed exclusively for the Contractors convenience will be paid for by the Contractor.

D. The Owner will select the testing laboratories and pay for the following tests/inspections:
   1. Density testing
   2. Density and extraction testing of asphalt
   3. Grading of subbase and aggregate base
   4. Concrete testing

1.03 QUALITY ASSURANCE

A. Testing shall be in accordance with all pertinent codes, regulations, procedures, and requirements of the ASTM and other appropriate agencies.

PART 2 PRODUCTS -Not Used

PART 3 EXECUTION

3.01 PROCEDURE

A. Provide representatives of the testing laboratory with access to the Work at all times.

B. Coordinate the Work with the testing required. Provide a minimum of 24 hours notice to the testing laboratory prior to the need of testing.

C. Furnish all material required for sampling. The testing laboratory will obtain all specimens and samples required for testing. The testing laboratory will be responsible for transporting samples to the laboratory.

D. The testing laboratory will furnish one copy of lab report to the Engineer. The Contractor can request a copy from the Engineer.

END OF SECTION

SECTION 03 01 30

MAINTENANCE OF CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Section Includes:
Cleaning and inspection of select existing cast-in-place concrete.

B. Related Sections:
1. Section 01 20 00 - PRICE AND PAYMENT
2. Section 03 11 00 - CONCRETE FORMING (ACI)

1.02 QUALITY ASSURANCE

A. Codes and standards:
1. U.S. Army Corps of Engineers CRD C48 - "Permeability of Concrete".

1.03 SUBMITTALS

A. General
Make submittals in accordance with Section 01 33 00.

B. Disposal
Any disposal of solids must be performed by a licensed contractor and properly disposed to a licensed facility.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Water: Potable.

B. Cleaning Product:
1. Acid Etching as necessary.

PART 3 - EXECUTION

3.01 CLEANING

A. Surface Preparation:
1. Remove any excess sludge remaining from the bottom of the basin.
2. Thoroughly clean surface of tank using water blasting, lightly sand-blasted or acid etched as necessary to provide a clean absorbent surface.
3. Acid etching shall only be used if other cleaning methods are unsuccessful.
4. Notify Engineer once surface preparation is complete and prior to inspection.

3.02 INSPECTION

A. General inspection of the interior and exterior conditions of the tanks including, but not limited to:
   a. Visible concrete damage and deterioration
   b. General condition of visible portions of inlet and outlet piping, valves and appurtenances etc.
   c. General description of sludge, debris and other material collected from cleaning operation.
B. Exterior and interior access systems and hatches;
C. High quality video and photos of the tank cleaning and inspection operations upon project completion.
D. A detailed report summarizing the cleaning and inspection methodology, assumptions, findings and recommendations.

END OF SECTION

SECTION 03 11 00

CONCRETE FORMING (ACI)

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
Construction and removal of all cast-in-place concrete forms.

B. Related Sections:
1. Section 01 20 00 – PRICE AND PAYMENT PROCEDURE
2. Section 03 20 00 - CONCRETE REINFORCING
3. Section 03 15 00 - CONCRETE ACCESSORIES
4. Section 03 30 00 - CAST-IN-PLACE CONCRETE

1.02 QUALITY ASSURANCE

A. Codes and standards:
Perform all work in accordance with ACI 301 and ACI 347 of the American Concrete Institute (ACI) unless otherwise indicated on the Plans or in this Section.

B. Design:
The design, engineering and construction of formwork shall be the responsibility of the Contractor.

C. Notifications:
Notify the Engineer at least 24 hours in advance of placing concrete.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Formwork facing materials:
1. "As cast, smooth form finish" on all surfaces except footings as described in ACI 301-84, 10.2.2 Smooth Form Finish.
    a. Clean plywood, tempered concrete-form-grade hardboard, metal, plastic, paper, or other approved material.
    b. Supports capable of preventing excess deflection (See Table 4.3.1 for tolerances)
    c. Completely removable materials.
2. Obtain approval on quality of form face from Engineer prior to installing.
3. Clean, reasonably straight earth cuts, which meet the required tolerances, may be used to form footings with approval of the Engineer.

B. Form accessories:
1. Partially or fully embedded
    a. Commercially manufactured
2. Do not use non-fabricated wire.

C. Form ties:
1. Exposed concrete work:
    a. Single rod ties equipped with tightly fitted washers at the midpoint.
    b. Assembly should provide cone-shaped depressions at the form/concrete surface

interface at least one inch diameter and 1 ½ inches deep to permit filling and patching.

2. Manufacturers:
   a. Dayton Sure-Grip
   b. Superior Concrete Accessories
   c. Williams Form Engineering Corporation
   d. or equal.

D. Form release agent:
1. Chemically neutral agent that will effectively prevent absorption of moisture and prevent bond with the concrete.
   a. "Magic Kote" 43000 by Symons; or approved equal.
2. Non-toxic release agent for forms used on the interior surfaces of storage tanks designed to hold potable water supplies.
   a. Amoco White Mineral Oil No. 31-USP, or equal.
3. Submit the name and sufficient documentation of the proposed form coating agent material to the Engineer for review.

PART 3 - EXECUTION

3.01 FORM CONSTRUCTION

A. General:
1. Provide all required materials in sufficient quantities so as not to delay the work.
2. Use forms rigid enough to maintain specified tolerances.
3. Design forms for the loads, lateral pressure, and allowable stresses outlined in ACI 347, Design of “Recommended Practice for Concrete Formwork” and in accordance with local building codes.

B. Formwork Facing
1. Arrange in an orderly and symmetrical manner
2. Keep the number of seams to a practical minimum

C. Form Ties
1. Construct to prevent appreciable spalling at the faces during removal of the end or end fasteners.
2. Terminate embedded ties at least twice the minimum dimension of the tie and never less than 3/4 inches from the formed face.
3. Exposed Concrete
   a. Do not leave any metal within 1-1/2 inches of the surface for concrete exposed to water, weather, freeze/thaw and similar exposures.
4. Provide positive pressure at all joints to preclude mortar/grout leakage.

D. Forms
1. Install forms sufficiently tight to prevent loss of mortar from the concrete.
2. Permanently exposed surfaces
   a. Provide 1" chamfer strips in the corners of forms.
   b. Interior corners on such surfaces and the edges of formed joints will not require beveling.
   c. Exposed surfaces include surfaces exposed to view or water.
3. Provide positive means of adjustment (wedge or jacks) of shores and struts.
   a. Take up all settlement during the concrete placing operation.
   b. Securely brace forms against lateral deflections.
   c. Camber the formwork to compensate for anticipated deflection.
4. Temporary openings

a. Provide at the base of columns and wall forms for observation.
b. Where necessary to facilitate cleaning and observation.

5. Hold forms against the hardened concrete to maintain a true surface and to prevent offsets or loss of mortar at the construction joint.
6. Construct wood forms for wall openings to facilitate loosening and counteract swelling of the forms.
7. Adjust wedges if necessary to align forms.
8. Anchor formwork to prevent upward or lateral movement .
9. Runways
   a. Place directly on the formwork or structural member
   b. Do not rest on the reinforcing steel.
10. Form surfaces:
    a. Cover with an approved coating material in accordance with the manufacturer's recommendations.
    b. Do not allow coating to come in contact with reinforcing steel or hardened concrete.
11. Coordinate work with other trades.

E. Tolerances:
1. Construct formwork in conformance with the tolerance limits listed in Table 4.3.1 (ACI 301).

TABLE 4.3.1 - TOLERANCES FOR FORMED SURFACES

1. Variation from plumb:	
A. In the lines and surfaces of columns, piers, walls, and in arises:	
In 10 ft of length	1/4 in.
Maximum for the entire length	1 in.
B. For exposed corner columns, control-joint grooves, and other conspicuous lines:	
In any 20 ft length	1/4 in.
Maximum for the entire length	½ in.
2. Variation from the level or from the grades specified in the contract documents:	
A. In slab soffits, ceilings, beam soffits and in arises, measured before removal of supporting shores	
In any 10 ft of length	1/4 in.
In any bay or in any 20 ft length	3/8 in.
Maximum for the entire length	3/4 in.
B. In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:	
In any bay or in 20 ft length	1/4 in.
Maximum for the entire length	½ in.
3. Variation of the linear building lines from established position in plan and related position of columns, walls, and partitions:	
In any bay	½ in.
In any 20 ft of length	½ in.
Maximum for the entire length	1 in.
4. Variation in the sizes and location of sleeves, floor openings, and wall openings	+1/4 in.

5. Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls:	
Minus	1/4 in.
Plus	½ in.
6. Footings*	
A. Variations in dimensions in plan:	
Minus	½ in.
Plus	2 in.
B. Misplacement or eccentricity:	
2 percent of the footing width in the direction of misplacement but not more than	2 in.
C. Thickness:	
Decrease in specified thickness	5 percent
Increase in specified thickness	No limit
7. Variation in steps:	
A. In a flight of stairs:	
Rise	±1/8 in.
Tread	±1/4 in.
B. In consecutive steps:	
Rise	±1/16 in.
Tread	±1/8 in.

*Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items.

2. Maximum deflection of forms:
   a. 1/240 of span or 1/4 inch, whichever is less.
3. Establish and maintain control points and benchmarks to check tolerances until final completion.

F. Inserts, embedded parts, and openings:
1. Coordinate the location of inserts, embedded parts, openings, and recesses with the respective trades.
2. 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.
3. Use setting drawings, diagrams, instructions and directions provided by suppliers of the items.

G. Field quality control:
1. Clean and repair surfaces of forms to be re-used in the work.
2. Do not use "patched" forms for exposed concrete surfaces.
3 Inform Engineer 24 hours to placing concrete to allow for formwork inspection.

3.02 REMOVAL OF FORMS AND SUPPORTS

A. Forms not supporting the weight of the concrete:
   1. Remove when the concrete has hardened sufficiently to prevent damage.

B. Forms and shoring used to support the weight of structural members:
   1. Do not remove until the concrete has reached 75 % of the design strength.
   2. See ACI 306 for cold weather applications.

C. If compression cylinder tests are not available, keep forms and supports in place for not less than the following periods of time:

	Where design live load is: Less than dead load:	Greater than dead load:
Building walls		12-24 hr
Sides of beams and girders		12-24 hr
Floor slabs:		
Under 10 ft clear span between supports	4 days	3 days
10 to 20 ft clear span between supports	7 days	4 days
Over 20 ft clear span between supports	10 days	7 days

   a. If high-early-strength concrete is used, or the ambient temperatures remain below 50°F, these periods may be modified at the discretion of the Engineer.

END OF SECTION

SECTION 03 15 00

CONCRETE ACCESSORIES (ACI)

PART 1 GENERAL

1.01 DESCRIPTION:

A. Section Includes:
Furnish and install all concrete accessories

B. Related Sections:
1. Section 01 20 00 - PRICE AND PAYMENT PROCEDURES
2. Section 01 33 00 – SUBMITTAL PROCEDURES
3. Section 03 11 00 - CONCRETE FORMING (ACI)
4. Section 03 20 00 - CONCRETE REINFORCING (ACI)
5. Section 03 30 00 - CAST-IN-PLACE CONCRETE (ACI)

1.02 SUBMITTALS

A. Make submittals in accordance with Section 01300 - SUBMITTALS.

PART 2 PRODUCTS

2.01 MATERIALS:

A. Water stops:
1. Polyvinyl chloride waterstops
   a. 6 inches by 3/8 inches
   b. ribbed or serrated with center bulb (1.2 lbs/ft minimum)
2. Meet or exceed the physical property requirements set forth in the U.S. Corps of Engineers specification CRD-C572-74, or latest revision.
3. Greenstreak 705; Vinylex RB6-38; A. C. Horn Type 5; or equal.

B. Inserts for general trades:
1. Malleable iron, strength as required.
2. Include bolts, nuts, and washers.
3. Heckman Building Products, Hohmann & Barnard, Inc.; or equal.

C. Premolded expansion strips:
1. W.R. Meadows, Inc.; Celotex Corporation; or equal.
2. Asphalt impregnated fiberboard, ASTM D-1751.

D. Expansion joint filler:
1. Neoprene NN2 semi-rigid closed cell
2. Use bond breaker between joint filler and joint sealant.
3. Willaims Products Inc. Everlastic; or equal

E. Construction joint form for building floor slabs on grade:
1. Sixteen gauge, tongue and groove galvanized metal by Superior Concrete Accessories, Inc., Heckman Building Products Company; or equal.

F. Control joint form for building floor slabs on grade:
1. Twenty gauge galvanized steel.
2. Depth: 1/4 the slab thickness or more.
3. Heckman Building Products Company, Superior Concrete Accessories, Inc.; or equal.

G. Concrete stair nosings on cast-in place concrete stairs:

1. Abrasive cast aluminum 4" wide, 6" shorter than tread
2. Wooster type 101 with cast on anchors; or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. As indicated on the Drawings, specified in various other Sections, and as necessary for the proper and complete performance of this Work.

B. Waterstops:
   1. Install according to manufacturer’s recommendations.
   2. Perform all splices in length or at intersections by heat sealing in accordance with manufacturer’s recommendations.
   3. Hold in place with hog rings and wire tie as required.

C. Piping, mechanical and electrical equipment support:
   1. Inserts for hangers
      a. Supplied by the trade whose work is supported
   2. Location
      a. Given to the General Contractor by the various trades.
   3. Installation
      a. By the General Contractor.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING (ACI)

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
The furnishing and installation of all concrete reinforcement.

B. Related Sections:
1. Section 01 20 00 - PRICE AND PAYMENT PROCEDURES
2. Section 01 33 00 – SUBMITTAL PROCEDURES
3. Section 03 11 00 - CONCRETE FORMING
4. Section 03 15 00 - CONCRETE ACCESSORIES
5. Section 03 30 00 - CAST-IN-PLACE CONCRETE

1.02 SUBMITTALS

A. Make all submittals in accordance with Section 01300 – SUBMITTALS.

B. Shop Drawings:
1. Submit Shop Drawings showing the number, size, length, mark, location, and bending diagrams for all reinforcement.
2. Prepare Shop Drawings in accordance with "Manual of Standard Practice for Detailing Reinforced Concrete Structures" of the ACI.

1.03 DELIVERY AND STORAGE

A. Reinforcement shall be stored above the surface of the ground on platforms, skids, or other supports and shall be protected from mechanical injury and surface deterioration caused by exposure to conditions producing rust.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General:
1. All concrete reinforcement and accessories:
   a. New, free from paint, oil, and structural defects.
2. Reinforcement with rust and/or mill scale which meets the applicable ASTM standard is acceptable.

B. Reinforcing bars:
1. ASTM A 615, Grade 60

C. Welded wire fabric:
1. ASTM A 185 Fy = 65,000 PSI
2. Plain, cold drawn, electrically welded fabric

D. Accessories:
1. In conformance with CRSI "Manual of Standard Practice for Reinforced Concrete Construction".

2. Use plastic-tipped chairs and bolsters at exposed underside of concrete.

2.02 FABRICATION

A. General:
1. Fabricate reinforcement accurately to the dimensions indicated on the Drawings and the approved Shop Drawings, in accordance with the tolerance given in ACI 315.
2. Bend hooks in accordance with ACI 350.

PART 3 - EXECUTION

3.01 PLACING

A. Tolerances and clearance:
1. See CRSI "Placing Reinforcing Bars," latest edition.
2. Place bars to the following tolerances:

Clear Distance to Formed Surfaces:	±1/4 inch
Minimum Spacing Between Bars:	±1/4 inch
Top Bars in Slabs and Beams:	
Members 8 in. deep or less:	±1/4 inch
Members More than 8 in. but not over 2 feet deep:	±1/2 inch
Members More than 2 ft deep:	±1 inch
Crosswise of Members: spaced evenly within 2 inches	
Lengthwise of Members:	±2 inches

3. Move bars as necessary to avoid interference with other reinforcing steel or embedded items.
4. Minimum concrete protective covering for reinforcement shall be as follows, unless shown otherwise on the Drawings:
   a. Concrete deposited against the ground: 3 inches
   b. Slabs poured over a mud mat: 2 inches
   c. Top steel in floor slabs exposed to water or wastewater
      i. interior surface: 2 inches
      ii. exterior surface: 2 inches
   d. Formed surfaces exposed to weather or in contact with the ground:
      i. reinforcing bars #6 or larger: 2 inches
      ii. reinforcing bars less than #6: 1-1/2 inches
   e. Interior surfaces: 1-1/2 inches for beams, girders, and columns; 3/4 inches for slabs, wall, and joists with #11 bars or smaller.

B. Installation:
1. Clean reinforcement of materials which adversely affect or reduce the bond. When reinforcement is placed in the work, reinforcement shall be free from dirt, loose rust or scale, mortar, paint, grease, oil, or other nonmetallic coatings that reduce bond. Epoxy coatings of reinforcing steel in accord with standards in this article shall be permitted. Reinforcement shall be free from all injurious defects such as cracks and laminations. Bonded rust, surface seams, surface irregularities, or mill scale will not be cause for rejection, provided minimum dimensions, cross-sectional area, and tensile properties of a hand wire brushed specimen meet the physical requirements for size and grade steel specified.
2. Support and fasten reinforcement to prevent displacement beyond the tolerances of paragraph 3.01A.
3. Supporting concrete blocks may be used on ground.

4. Use metal, plastic or other approved bar chairs and spaces over formwork.
5. Use plastic coated accessories within ½ inch of the formed concrete surface.
6. Over-lapped welded wire fabric:
   a. The overlap measured between the outermost cross wires of each sheet should be 2 inches or greater.
   b. Extend fabric across supporting beams and walls to within 4 inches of concrete edges.
   c. Adequately support the fabric during placing in accordance with paragraph 3.01.B.2 or by laying it on a layer of fresh concrete of the correct depth before placing the upper layer of the slab.
7. Offset vertical bars in columns at least one bar diameter at lapped splices.
8. Furnish template for all column dowels to insure proper placement.
9. Splices not shown in the Contract Documents must be approved by the Engineer.
10. Do not bend reinforcement embedded in hardened concrete.
11. Splice in conformance to "Reinforcing Bar Splices" latest edition by the Concrete Reinforcing Steel Institute and the "Building Code Requirements for Reinforced Concrete (ACI 350).
12. Circular ring tension steel laps: 40 bar diameters or greater
13. Place principal (moment-carrying) reinforcement in wall and slabs in the layer closest to the forms.
14. Place temperature steel at right angles to and in contact with the principal steel.

3.02 FIELD QUALITY CONTROL

A. Notify Engineer at least 24 hours prior to placement of concrete and when reinforcing is in place.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE (ACI)

PART 1 - GENERAL

1.01 DESCRIPTION

A. Section Includes:
Furnish, place, and finish all cast-in-place concrete and accessories.

B. Related Sections:
1. Section 01 20 00 – PRICE AND PAYMENT PROCEDURE
2. Section 01 33 00 - SUBMITTALS
3. Section 01 45 29 – TESTING AND LABORATORY SERVICES
4. Section 03 11 00 - CONCRETE FORMING (ACI)
5. Section 03 20 00 - CONCRETE REINFORCING (ACI)
6. Section 03 15 00 - CONCRETE ACCESSORIES (ACI)

1.02 QUALITY ASSURANCE

A. Codes and standards:
1. ACI 301 - "Specifications for Structural Concrete for Buildings"
2. ACI 350R - "Concrete Sanitary Engineering Structures"
3. ASTM C 94 - "Standard Specifications for Ready-Mixed Concrete".
4. ACI 318 - "Building Code Requirements for Reinforced Concrete”.

B. Tests:
1. Performed in accordance with Section 01400 – QUALITY CONTROL SERVICES and this Section.
2. Slump tests
   a. Per ASTM C 143 and C 172.
   b. Frequency:
      Once per truck
3. Compression cylinder tests
   a. Make and cure specimens per ASTM C 31
   b. Four specimens per test.
   c. Frequency: Once per day or every 50 yd3 for each strength or type
4. Air-entraining test
   a. In accordance with ASTM C 231
   b. Frequency
      Each truckload.
5. Acceptance and evaluation
   a. Based on ACI 301 "Specifications for Structural Concrete for Buildings”.
   b. Hardened Concrete Testing
      i. May be required by Owner or Engineer
      ii. Per ASTM C 42 or ASTM C-31
      iii. In accordance with the ACI "Building Code for Reinforced Concrete" (ACI - 318).

1.03 SUBMITTALS

A. General
Make submittals in accordance with Section 01300 - SUBMITTALS.

B. Mix designs:
1. ACI 211.1 - “Recommended Practice for Selecting Proportions for Normal and

Heavyweight Concrete”
2. Furnish mix design(s) with test report(s) by an independent testing laboratory for each mix.
3. Furnish the following material content per cubic yard of each class of concrete furnished:
   a. Dry weight of cement.
   b. Saturated surface and dried weights of fine and coarse aggregates.
   c. Quantities, type, and name of admixtures.
   d. Weight of water.
4. Provide product information on all components of mix design

C. Test reports:
1. Provide at 7 days and 28 days test reports in accordance with Section 01400 – QUALITY CONTROL SERVICES.
2. Immediately notify the Engineer if any test specimen fails to meet the required specification tolerances.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement:
1. Portland cement
2. ASTM, C150
3. Type I

B. High early cement:
1. Portland cement
2. ASTM C150
3. Type III

C. Aggregates:
1. Fine and coarse aggregates
   a. Conform to ASTM C 33.
2. Coarse aggregate
   a. 1 inch maximum.
3. Limit coarse aggregate as follows:
   a. Soft particles: 2.0%.
   b. Chert as a soft impurity (defined in Table 3 of ASTM C 33): 1.0%.
   c. Total of soft particles and chert as a soft impurity: 2.0%.
   d. Flat and elongated particles, long dimension more than five times short dimension: 15.0%.

D. Flyash: ASTM C 618

E. Water: Potable.

F. Admixtures:
1. Air entrainment: ASTM C260
2. Water reducing agents: ASTM C494
3. Retarding agent at Contractor's option: ASTM C494
4. Accelerating agent at Contractor's option: ASTM C494
5. No admixture shall contain calcium chloride.

G. Membrane curing compounds:
1. Moisture retention properties: ASTM C309.

2. Material compatible with application of other surface materials.

H. Base plate and equipment grout:
1. ASTM C1107, “Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink)”.
2. CRD-C 621, “Corps of Engineers Specification for Nonshrink Grout.”

I. Epoxy bonding agent:
Concressive 1001-LPL, Adhesive Engineering Company; or equal.

J Skid resistant topping:
1. Furnish where called for on the plans
2. Install in accordance with manufacturer’s recommendation
3. Euclid Chemical Company, Cleveland, OH; Sonneborn Building Products, Minneapolis; or equal

2.02 CONCRETE MIX

A. Proportioning:
1. In accordance with ACI 211.1 - "Standard Practice for Selecting Proportions for Normal, Heavy Weight and Mass Concrete"
2. Selected and documented in accordance with ACI-318 - "Building Code Requirements for Reinforced Concrete"
3. Provide mix design, test records, calculations and other documentation to Engineer in accordance with the General Conditions Article 6.

B. Specified compressive strength (f'c): 4000 psi.

C. Maximum water-cement ratio by weight:
1. 0.45 without superplasticizers
2. 0.40 with superplasticizers.
3. 0.39 structures in contact with wastewater

D. Cement factor
Based upon required strength with W/C ratio per ACI 211.1.

E. Air entrained concrete
1. Total air content:
a. 6% +- 1% for all concrete exposed to freezing and thawing, including all wastewater and potable water containment vessels.
b. 3% +- 1% for all other concrete.

F. Slump limits (Before Plasticizers)

	Max.	Min.
1. Reinforced foundation walls and footings	3"	1"
2. Unreinforced footings, caissons and substructure walls	3"	1"
3. Reinforced slabs, beams and walls	4"	1"
	Max.	Min.
4. Building columns	4"	1"
5. Pavements	3"	1"
6. Sidewalks, driveways and slabs on ground	4"	2"

2.03 PRODUCTION AND MIXING

A. Production:
1. Ready mixed concrete
Batched, mixed, and transported in accordance with ASTM C 94.
2. Use only transit mixed concrete from NRMCA certified mixing plants or plant approved by the Engineer.

3. Ready-mix delivery tickets:
   Furnish with each batch of concrete before unloading at the site with the following information:
   a. Name of ready-mix batch plant.
   b. Serial number of ticket.
   c. Date and truck number.
   d. Name of Contractor.
   e. Job name and location.
   f. Specific class or designation of concrete.
   g. Amount of concrete (cubic yards).
   h. Time loaded or of first mixing of cement and aggregates.
   I. Type, name and amount of admixture.
   j. Type, brand and amount of cement.
   k. Total water content by producer (or W/C ratio).
   l. Maximum size of aggregate.
   m. Weights of fine and coarse aggregates.

B. Mixing:
1. Add water at the job site only if the total amount of water is equal to or less than that specified by the concrete mix design and slump remains within allowable limits.
2. Mix 30 additional revolutions of the drum if water is added to mixed concrete at the job site.
3. Completely discharge the concrete within 1-1/2 hours after introduction of mixing water to the cement or 1 hour after arriving at the site, whichever is sooner.
4. If the ambient air temperature exceeds 85□F, the time may be reduced by the Engineer as required.
5. Do not retemper concrete that has partially set.

C. Adjustments for weather conditions:
1. Cold weather:

Minimum Ambient Air Temperature °F	Minimum Concrete Temperature °F
30 to 45	60
15 to 30	65
below 15	no concreting permitted

Do not mix cement with water or aggregates above 100 °F.
2. Hot weather (ambient temperature 90 °F. or above)
   a. Conform to "Recommended Practice for Hot Weather Concreting" ACI 305R.
   b. An approved set retarder will be permitted under hot weather conditions

PART 3 - EXECUTION

3.01 PLACING

A. Pre-placement inspection:
1. Inspect and complete:
   a. Formwork installation
   b. Reinforcing Steel
   c. Embedded or cast-in items
2. Notify and cooperate with other Contractors and trades
3. Notify Engineer at least 24 hours in advance of pouring

4. Thoroughly wet wood forms immediately before placing concrete as required where form coating is not used.
5. Clean all mixing and transporting equipment
6. Remove all debris, water, and ice before placing concrete.

B. Handling:
Prevent separation or loss of ingredients while transporting concrete.

C. Method and rate:
1. Place all concrete in accordance with:
   a. ACI 304R - “Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete”
   b. ACI 304.2R - “Placing Concrete by Pumping Method”
2. Place in a manner to avoid segregation.
3. Place concrete continuously until the panel or section is complete.
4. Do not deposit fresh concrete on hardened concrete, without a properly prepared cold joint.
5. Place horizontal layers with a maximum thickness of 18 inches.
6. Place concrete in columns, deep beams, and walls with an elephant trunk or tremie to avoid segregation for vertical drops exceeding 3 feet.
7. Placing floors and slabs:
   Place evenly over the entire area.
8. Protect new concrete from rain until it has hardened sufficiently to prevent damage.

D. Compaction:
1. Mechanically vibrate as concrete is places for a sufficient duration to accomplish thorough compaction and complete embedment of reinforcement and fixtures.
2. Do not vibrate long enough to cause segregation of mix.
3. Vibrators: Comply with ACI 309 - “Standard Practice for Consolidation of Concrete”
4. Do not use vibrators to transport concrete inside of forms.
5. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine.
6. Do not insert vibrators into lower layers of concrete that have begun to set.
7. Make at least two vibrators, all in good working condition, available for use during all pouring operations.
8. For large pours in excess of 50 cubic yards, three vibrators shall be available.

3.02 PROTECTION AND CURING

A. General:
1. Prevent the concrete surface temperature from falling below 50□F
2. Prevent loss of moisture from the surface:
   a. Normal portland cement: 7 days.
   b. High-early-strength portland cement: 3 days.

B. Curing:
1. Treat all beams, columns, slabs, and walls with a liquid membrane-forming curing compound as specified under Materials immediately after finishing or removing forms.
2. Apply in strict compliance with manufacturer's instructions.
3. Use alternate methods of curing such as ponding, continuous sprinkling, etc only with the prior approval of the Engineer.

C. Protection:
1. Protect all freshly placed concrete from damage due to low temperatures when the mean daily temperature is below 40`F (4.5`C) in accordance with ACI 306R.

3.03 JOINTS AND EMBEDDED ITEMS

A. Construction joints:
   1. Joints not shown in the Contract Documents must be approved by the Engineer
   2. Continue all reinforcement across joints
   3. Provide longitudinal keys at least 1-1/2 inches deep:
      a. In all joints in walls
      b. Between walls and slabs or footings
   4. Before placing adjoining concrete:
      a. Thoroughly clean the joint surface
      b. Remove all laitance
   5. Roughen the concrete surface in an approved manner to obtain bond
   6. Refer to standard structural details for construction joint details.

B. Control joints:
   Construct control joints as outlined in Section 3.03A and as detailed on plans.

C. Expansion joints:
   1. Do not extend reinforcement or other embedded metal items bonded to the concrete (except dowels in floors, bonded on only one side of joints) continuously through any expansion joint.
   2. Premolded expansion joint filler
      a. Intersections of walls and slabs on grade unless otherwise shown
         i. "Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)" (ASTM D 994)
      b. Slabs on grade where slab to slab is jointed.
         i. "Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)" (ASTM D 1751)

D. Waterstops:
   1. At joints as called for on the construction plans.
   2. See Section 03 15 00

E. Other embedded items:
   1. Placement of all embedded pipe, conduit and other fixtures is the responsibility of the Contractor.
   2. Conform to ACI 318.
   3. Place all sleeves, inserts, anchors, and embedded items required for adjoining work or for its support prior to concreting.
   4. Position and support expansion joint material, waterstops, and other embedded items against displacement.
   5. prevent the entry of concrete into sleeves, inserts, and anchor slots.

3.04 SURFACE TREATMENT

A. Patching:
   1. Patch all poor joints, voids, honeycomb, defective areas and tie holes immediately after stripping forms.
   2. Remove all laitance and foreign materials from areas to be patched by means of sandblasting.
   3. Patch material
      a. Mortar with the same proportions as the concrete to be patched
      b. Omit coarse aggregate.
   4. Bond patch material to concrete with a two-component liquid epoxy bonding agent in accordance with manufacturer's instructions and recommendations.
   5. Use an epoxy adhesive for bonding plastic concrete to hardened concrete in conformance with “Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive" - ACI 503.2, except as modified by the requirements of this project specification.

B. Wall finishes:
   1. Remove all fins.
   2. Repair all damaged areas, including those discolored, spalled, cracked or non-uniform in texture to the satisfaction of the Engineer.
   3. Concrete surfaces exposed to view
      a. Finish exterior walls down to a point one foot below finished grade
      b. Finish interior surfaces of tanks to a point one foot below the water line
   4. After repairing defects, apply an Engineer approved waterproof coating in accordance with manufacturer's recommendations.

C. Troweling floors:
   1. Trowel finish all floors.
   2. After screeding and as soon as concrete has set sufficiently:
      a. Float surface
      b. Steel trowel surface
      c. Provide smooth, hard, dense finish free from trowel marks, blemishes, and irregularities.
   3. Finish platforms, walks, drives, and steps to a broom surface.
   4. Leave a 2-inch border around panels in sidewalks and platforms.
   5. Power float slab areas which receive a topping or grout base and tile.

D. Membrane curing and sealer compounds:
   1. Apply curing compounds immediately after stripping forms.
   2. Apply compound per manufacturer's recommendations and in accordance with ASTM C 309.

E. Skid resistant topping:
   Apply in accordance with manufacturer's recommendations.

3.05 SPECIFIC ITEMS OF CONSTRUCTION

A. Liquid containing concrete tank and channel walls:
   1. Install waterstops in all joints below maximum water level.
   2. Immediately remove All seepage through cracks in walls by epoxy injection.

B. Expansion strips:
   1. Where indicated on the Drawings
   2. At intersections of building floor slabs and vertical surfaces
   3. Around columns

C. Slab Toppings:
   1. Toppings are required where indicated on the Drawings.
   2. Immediately before pouring topping, wet down surface of rough slab.
   3. Where topping is poured over precast-prestressed concrete members, set screeds to give indicated slab thickness at center of span.

E. Stairs and platforms:
   Place abrasive nosings on all concrete stairs.

F. Base plate and equipment grouting:
   1. Add only water and use mechanical mixer for minimum of three minutes.
   2. Protect from freezing.
   3. Cure in accordance with manufacturer's recommendation.

G. Miscellaneous items:
   1. Perform all concrete work for mechanical and electrical trades including but not limited to vaults, valve and meter pits, light pole bases, and machine bases.
   2. Accessories such as manhole rings, ladder rings, pulling eyes, anchor bolts, etc., may be furnished by other trade but installed by the Contractor.

H. Chamfer:
   Chamfer all exposed concrete edges 1" x 1" unless otherwise indicated on the Drawings.

I. Grout:
   "Grout" as called for on the Drawings and used as a topping slab or shaped fill for water flow shall be a 3000 psi or greater concrete mix. Sections requiring less than 2" thick shall have a maximum aggregate size of 3/8 inch.

3.06 HYDROSTATIC LEAK TESTS FOR CAST-IN-PLACE CONCRETE TANKS

A. General:
   Cast-in-place concrete structures which are designed to normally be filled with liquid will be subjected to a hydrostatic leak test.

B. Test procedure:
   1. Conduct the test before the tank is backfilled to allow visual observation of the floor slab - outer wall construction joint.
   2. Fill each tank to its design liquid depth for a minimum period of 24 hours.
   3. No visible leakage shall be allowed.
   4. Any measurable loss of water over the 24-hour period shall be grounds for rejecting the test as unsatisfactory.
   5. Empty, repair and retest the tank if the test fails.
   6. All labor, equipment, and water required for testing each tank are the responsibility of the Contractor.

END OF SECTION

APPENDIX A

DIGESTER BIOSOLIDS TANK HATCH REHAB

FOR

LITTLE TRAVERSE BAY BANDS OF ODAWA INDIANS

EMMET COUNTY, MICHIGAN

VICINITY MAP
NOT TO SCALE

OWNER

LITTLE TRAVERSE BAY BANDS OF ODAWA INDIANS
7500 Odawa Cir. Harbor Springs, Michigan, 49740
231.242.1400

ENGINEER

GOSLING CZUBAK ENGINEERING SCIENCES, INC.
1280 BUSINESS PARK DRIVE
TRAVERSE CITY, MICHIGAN, 49686-8607
231.946.9191 - 800.968.1062
www.goslingczubak.com info@goslingczubak.com

UTILITY CONTACTS

NAME OF OWNER	TYPE OF UTILITY
LITTLE TRAVERSE BAY BANDS OF ODAWA INDIANS 7500 ODAWA CIRCLE HARBOR SPRINGS, MI 49740 231.242.1420 DAUGHERTY A. JOHNSON	SEWER SYSTEM
DTE ENERGY 313.235.5111 CONTACT: BARBARA SAUNDERS	GAS
CONSUMER'S ENERGY 530 W WILLOW ST LANSING, MI 48906 517.374.2002 CONTACT: KURT GOLDING	ELECTRIC
CHARTER COMMUNICATIONS 1392 TRADE CENTRE DR TRAVERSE CITY, MI 49696 810.247.3899 CONTACT: PATRICK DELISI	CABLE TV
AT&T 54 N MILL ST, 4TH FLOOR PONTIAC, MI 48342 517.515.4794 CONTACT: HEATHER VALLEE-KNOBLAUCH	TELEPHONE
CENTURYLINK 203 W 9TH ST LORAIN, OH 44052 440.244.8415 CONTACT: BOBBY WALTERS	INTERNET
CHERRYLAND ELECTRIC COOP. 5930 US 31 S GRAWN, MI 49637 231.486.9239 CONTACT: JASON RICE	ELECTRIC

LOCATION MAP
NOT TO SCALE

SHEET LIST	
SHEET NUMBER	SHEET TITLE
1	COVER
2	SITE PLAN
3	DIGESTER AND BIOSOLIDS ROOF PLAN
4	DIGESTER AND BIOSOLIDS TANK SECTIONS

811 Know what's **below.** **Call** before you dig.

ORIGINAL SHEET SIZE IS 22x34 - HALF SCALE SHEET IS 11x17

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DIGESTER BIOSOLIDS TANK HATCH REHAB

Issue Date	10/08/2024
Project No.	240217
Sheet	1

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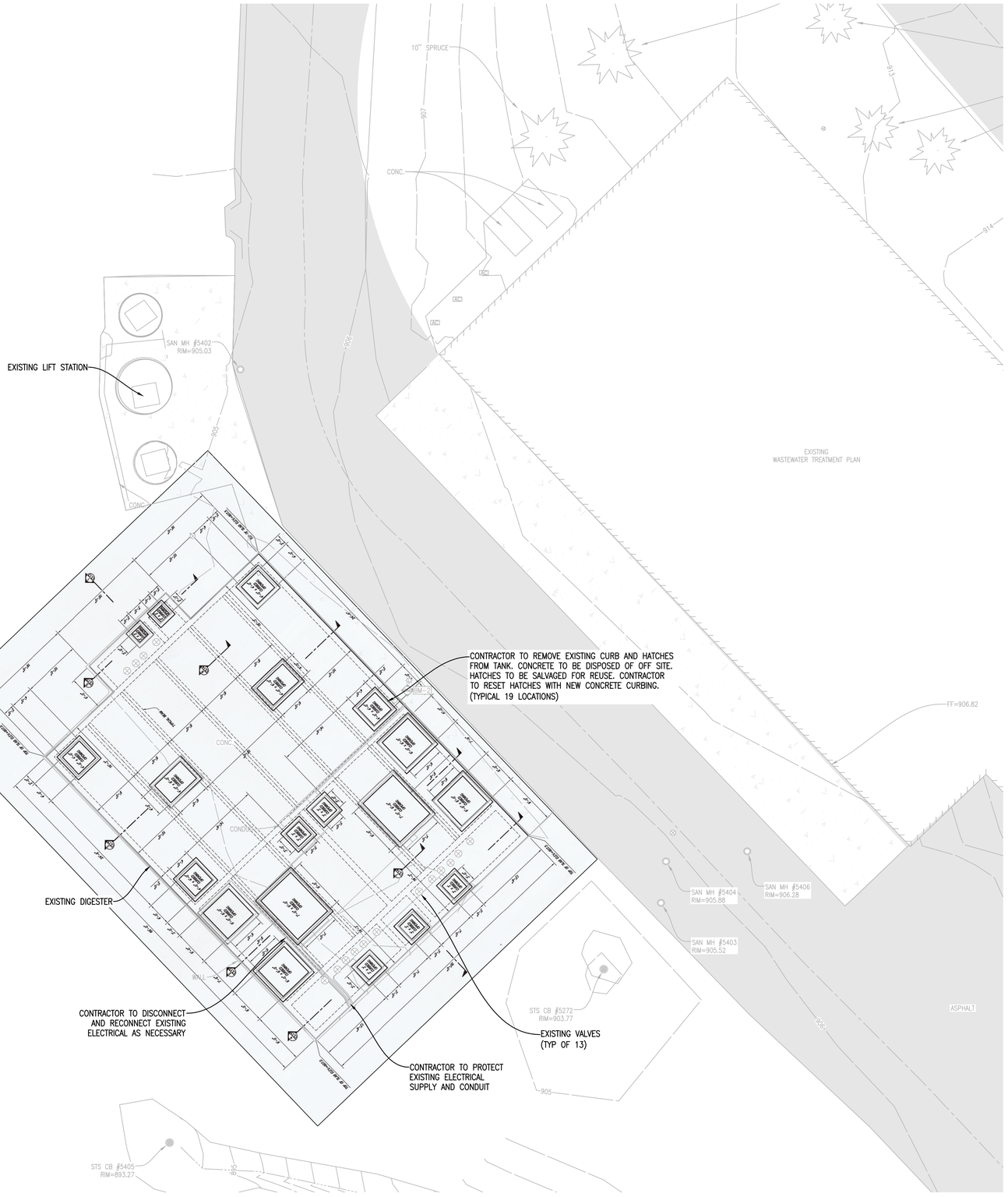
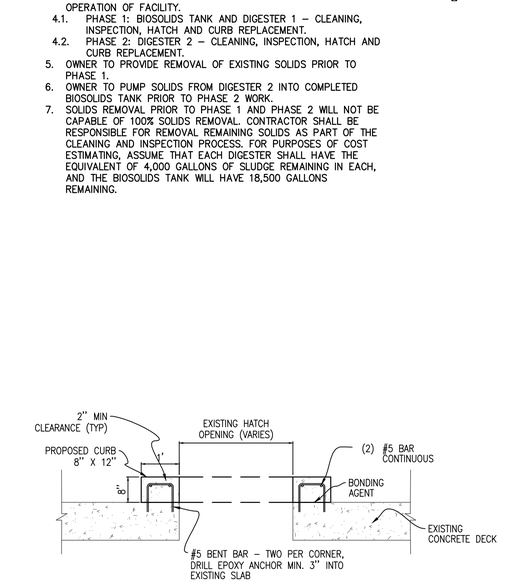
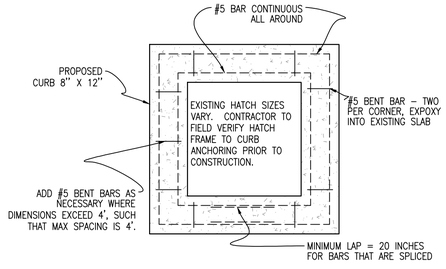


NOTES

1. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BIDDING.
2. CONTRACTOR TO COORDINATE ALL WORK WITH OWNER AND ENGINEER.
3. ALL ELECTRICAL WORK TO BE PROTECTED OR DISCONNECTED/RECONNECTED AS NECESSARY TO COMPLETE NEW CURBING.
4. PROJECT WORK TO BE PHASED TO ALLOW FOR CONTINUED OPERATION OF FACILITY.
   - 4.1. PHASE 1: BIOSOLIDS TANK AND DIGESTER 1 – CLEANING, INSPECTION, HATCH AND CURB REPLACEMENT.
   - 4.2. PHASE 2: DIGESTER 2 – CLEANING, INSPECTION, HATCH AND CURB REPLACEMENT.
5. OWNER TO PROVIDE REMOVAL OF EXISTING SOLIDS PRIOR TO PHASE 1.
6. OWNER TO PUMP SOLIDS FROM DIGESTER 2 INTO COMPLETED BIOSOLIDS TANK PRIOR TO PHASE 2 WORK.
7. SOLIDS REMOVAL PRIOR TO PHASE 1 AND PHASE 2 WILL NOT BE CAPABLE OF 100% SOLIDS REMOVAL. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL REMAINING SOLIDS AS PART OF THE CLEANING AND INSPECTION PROCESS. FOR PURPOSES OF COST ESTIMATING, ASSUME THAT EACH DIGESTER SHALL HAVE THE EQUIVALENT OF 4,000 GALLONS OF SLUDGE REMAINING IN EACH, AND THE BIOSOLIDS TANK WILL HAVE 18,500 GALLONS REMAINING.



PROPOSED HATCH CURB DETAIL PROFILE
NOT TO SCALE



PROPOSED HATCH CURB DETAIL PLAN
NOT TO SCALE

DIGESTER NE CORNER FACING NW

DIGESTER NE CORNER FACING SW

DIGESTER N CENTER FACING SW

811 Know what's below. Call before you dig.

THE LOCATION OF THE EXISTING UTILITIES, AS SHOWN ON THIS PLAN, ARE APPROXIMATE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ACTUAL LOCATION AND DEPTH OF ALL EXISTING UTILITIES. THE OWNER AND THE SURVEYOR SHALL NOT BE RESPONSIBLE FOR ANY OMISSION OR VARIATION FROM THE LOCATION SHOWN. THE CONTRACTOR SHALL NOTIFY "MISS DIG" AT 1 (800) 482-7171 OR 811 THREE (3) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.

SCALE 1" = 10'
0' 10' 20'

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No.	Date	Revision	By

SITE PLAN
DIGESTER AND BIOSOLIDS TANK REHAB
LITTLE TRAVERSE BAY BANDS

Date Issued:	10/08/2024
Date Surveyed:	8/20/2024
Designed By:	GLW
Drawn By:	GLW
Checked By:	GLW
Scale:	AS NOTED

Original sheet size is 22x34

Location:
SECTION 12
T 34 N, R 06 W
RESORT TOWNSHIP
EMMET COUNTY, MI

Project Number: 240217

Sheet: 2

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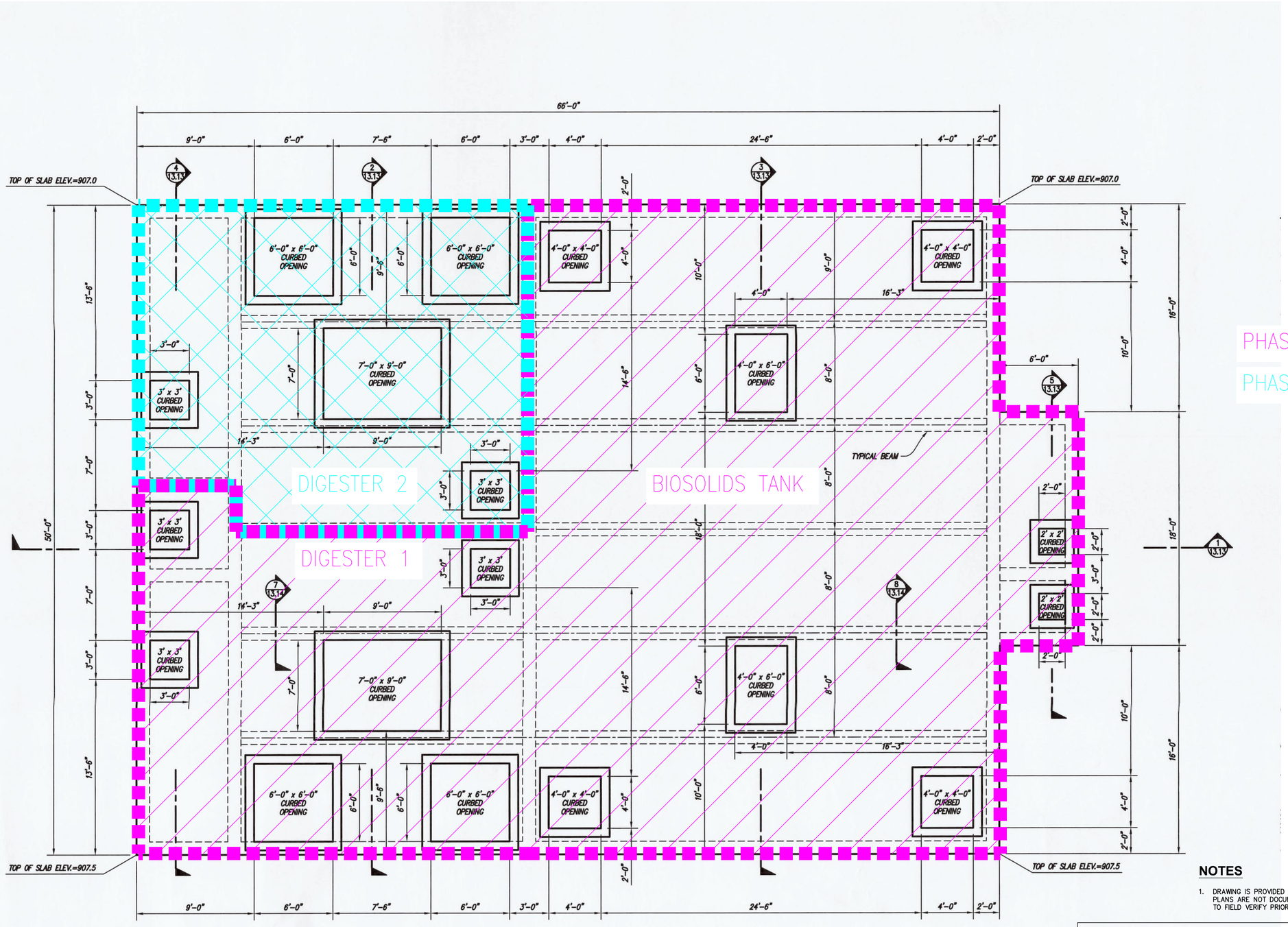

PLAN OF TOP SLAB
SCALE: 1/4" = 1'-0"

NOTES

1. DRAWING IS PROVIDED FROM ORIGINAL CONSTRUCTION PLANS. PLANS ARE NOT DOCUMENTED RECORD DRAWINGS. CONTRACTOR TO FIELD VERIFY PRIOR TO BIDDING.

FOR REFERENCE ONLY

SCALE 1" = 4'
0' 4' 8'

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No.	Date	Revision	By

DIGESTER AND BIOSOLIDS ROOF PLAN
DIGESTER AND BIOSOLIDS TANK REHAB
LITTLE TRAVERSE BAY BANDS

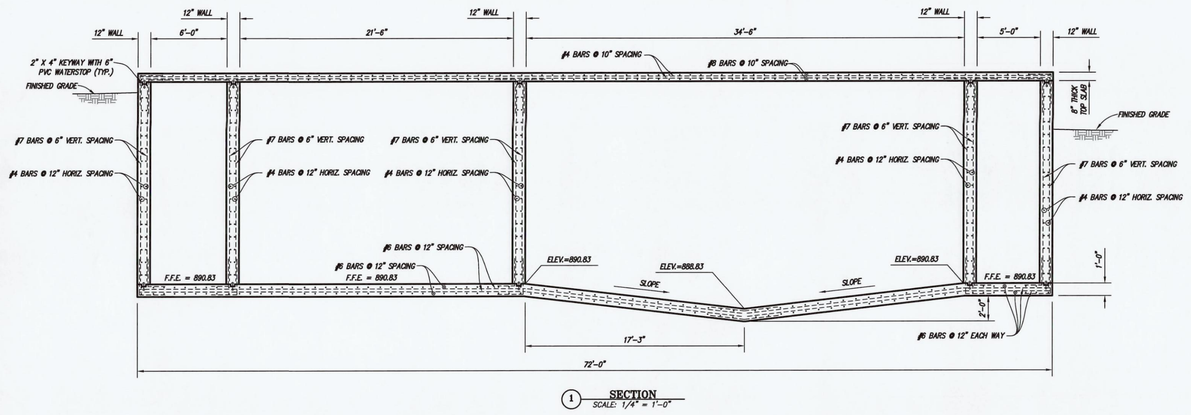
Date Issued:	10/08/2024
Date Surveyed:	8/20/2024
Designed By:	GLW
Drawn By:	GLW
Checked By:	GLW
Scale:	AS NOTED

Original sheet size is 22x34

Location:
SECTION 12
T 34 N, R 06 W
RESORT TOWNSHIP
EMMET COUNTY, MI

Project Number:
240217

Sheet:
3

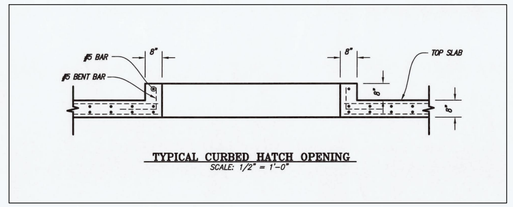


1 SECTION
SCALE: 1/4" = 1'-0"

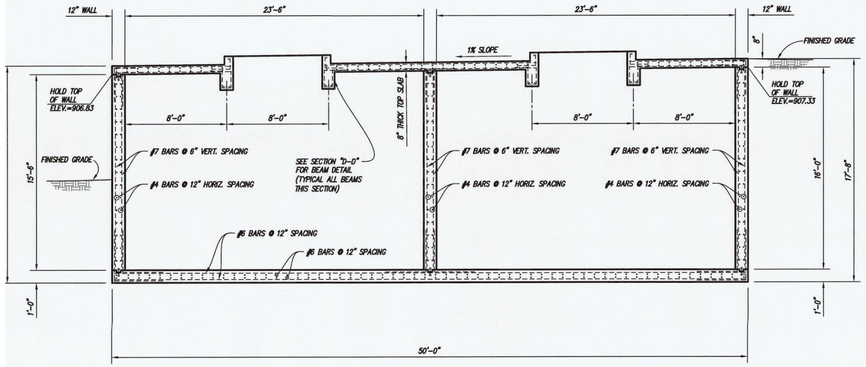
GENERAL NOTES

1. REQUIRED LAP LENGTHS:

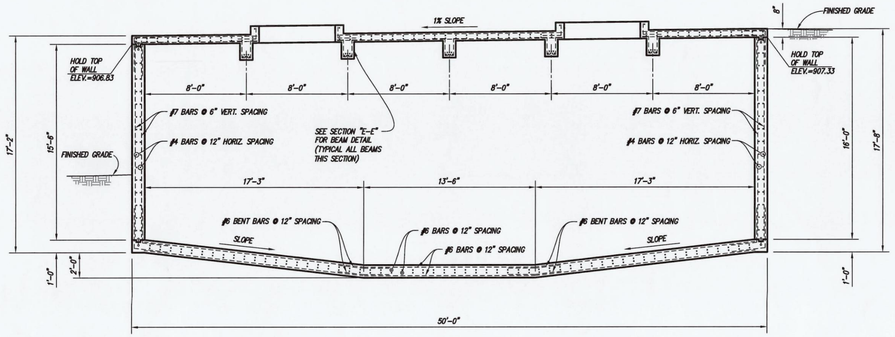
#4 BARS = 37 INCHES
#5 BARS = 43 INCHES
#7 BARS = 50 INCHES
#8 BARS = 74 INCHES
#9 BARS = 84 INCHES



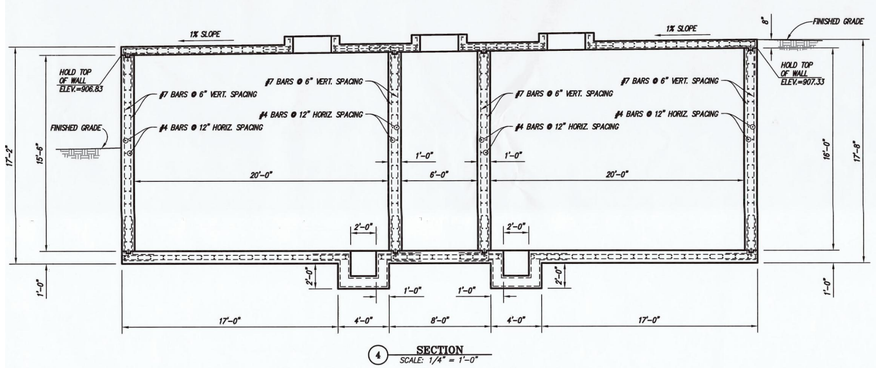
TYPICAL CURBED HATCH OPENING
SCALE: 1/2" = 1'-0"



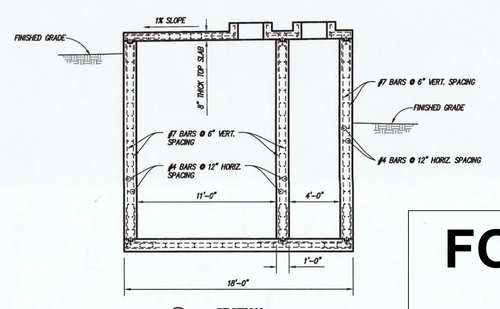
2 SECTION
SCALE: 1/4" = 1'-0"



3 SECTION
SCALE: 1/4" = 1'-0"



4 SECTION
SCALE: 1/4" = 1'-0"



5 SECTION
SCALE: 1/4" = 1'-0"

NOTES

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2. EXISTING HATCHES ARE SCHEDULED TO BE REUSED. CONTRACTOR TO REMOVE EXISTING CURB AND HATCHES.
3. HATCHES TO BE REUSED AND NEW CURB TO MATCH EXISTING CURB DETAIL.

FOR REFERENCE ONLY
NOT TO SCALE

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DIGESTER AND BIOSOLIDS TANK REHAB
LITTLE TRAVERSE BAY BANDS

Date Issued:	10/08/2024
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EMMET COUNTY, MI

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Sheet: 4

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