Bid#: 21122
Project: Vernon Hills NCT and Des Plaines River WRF Screening Improvements Project
Subject: Addendum #2
Date: 9/22/21

GENERAL/QUESTIONS:

1) **Please clarify what work is intended to be completed in the two (2) days for replacement of screens?**

   The 2-day durations noted in section 01014 part 2.03.B.1.b and 2.03.B.2.b refer to the estimated length of time that flow will be diverted out of the screening channels for construction activities.
   As stated in section 01014 part 2.03.B, this duration is intended only as a guideline for the CONTRACTOR and is neither a minimum nor a maximum requirement. The CONTRACTOR shall indicate the planned duration of all flow diversions in the construction schedule and coordinate with plant operations staff.

2) **While reviewing the bid documents for NCT and Des Plaines, I have been unable to locate the specification for the Slide Gates noted in the Section 01000 Project Requirements. Can you please help direct me to the appropriate size and detail, or drawing number to review for these gates?**
   Slide gates are not planned to be replaced. Section 01000 has been revised to remove references to slide gates.

3) **NCT – Do screenings have to be bagged?**
   No, the CONTRACTOR must collect screenings in a temporary bin during replacement of the belt conveyor and transport the screenings to the dumpster without spillage. Bags are not required if a movable bin is utilized for this purpose. If bags are utilized, they must be heavy duty and puncture resistant as specified.

4) **NCT – What is the screening volume and size of the existing dumpster?**
   Screening volume is approximately two 4 CY dumpsters per week. The dumpster is 40 cubic yards.

5) **Will channels be cleaned by LCPW prior to start of construction?**

   Operations staff will isolate and drain the channel. Any additional cleaning necessary for the work will be the responsibility of the CONTRACTOR.

6) **DPR – Question: The Table B-1 Base Bid description for item #5 and the project plans make no reference to shaftless spiral conveyors at the Des Plaines River WRF per specification section 11400. However, Table B-3—DPR-WRF Equipment Manufacturers lists this equipment as being included and completed by the bidder. Please advise if a revised bid form will be issued or if we are to write "N/A" in this spot or if equipment will be added to the project scope.**

The shaftless spiral conveyor in specification section 11400 is to replace the existing belt conveyor at the New Century Town WRF. There is no conveyor at the Des Plaines River WRF as the screenings at that facility will discharge directly into the new washer compactor. The bid form Table B-3 has been revised.

7) **Section 11331-2.07.E outlines a NEMA 7 local control station, with Start-Stop push buttons with lockout. Specification plan 25-E-4 outlines a 4-Hole local control station, with Slow-Fast, HOA, FOR, and E-Stop. Please confirm desired pilot devices to be provided with the screen local control station.**

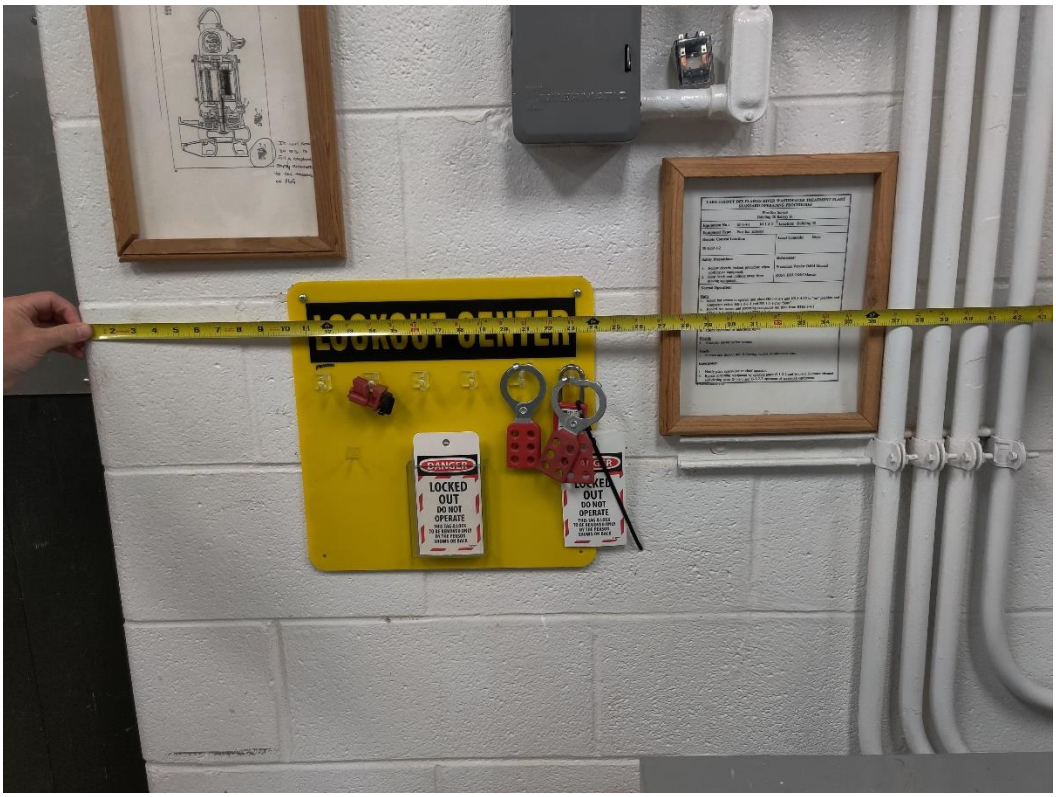
The control panels shall be equipped as required by the manufacturer to control the devices and provide the instrumentation functions shown on the P & ID diagrams 09-N-1 of the NCT WRF plan set and 09-N-2 of the DPR WRF facility plan set. The panel layout configurations shown on the details on sheets 20-E-4 and 25-E-4 are examples and not intended to preclude alternative configurations.

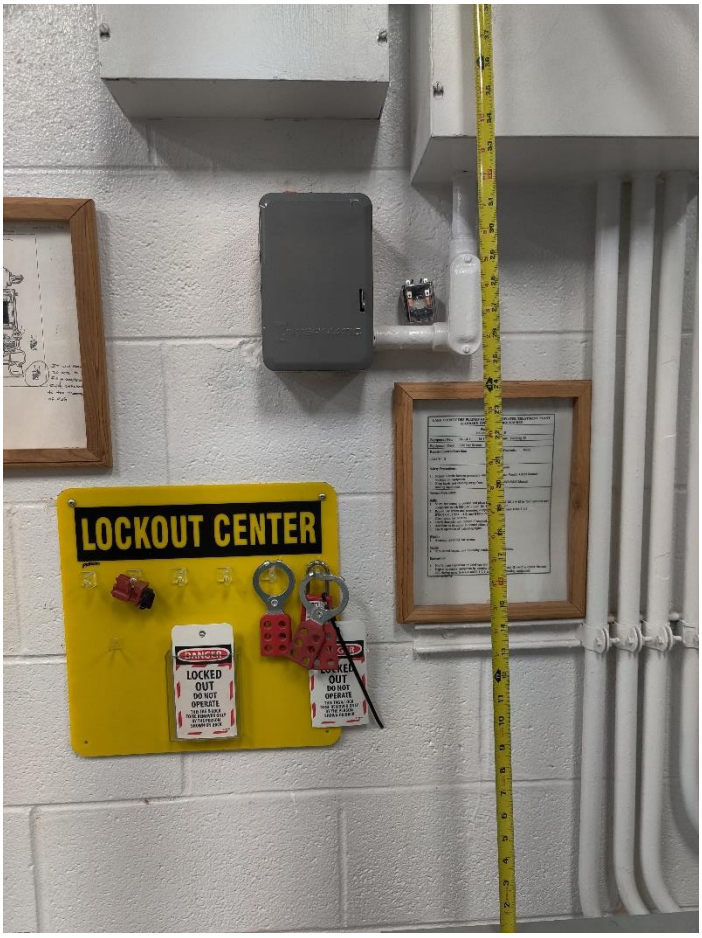
Regarding the screen local stations, specifically, a NEMA 7 4-hole local control station is required.

8) **Section 11331-2.07.D**
The spec appears to only outline running and fault lights for each piece of equipment. Specification plans 25-E-4 and 20-E-4 appear to both show additional lights for the screen control panels. Please confirm desired lights that should be provided on each of the screen control panels. If per the drawings, please outline lights required as the provided drawing tags are not legible.

Indicators required for the main control panels are outlined on sheet 09-N-2 for DPR WRF control panel 20-LCP-2-1 and sheet 09-N-1 for NCT control panel 20-LCP-1-1. The indications and selections outlined on the P&ID drawings may be provided by the OIT rather than lights, buttons and selectors. Run and fault lights are specifically required in case the OIT is damaged, as these indicators are not present on the local panels.

At DPR WRF, please note the indicated 36" x 30" x 12" dimension of the main screen control panel and the space available for the panel. The photos of the are on sheet 20-E-2 are reproduced on the following page for clarity.


LOCKOUT CENTER
DANGER
LOCKED
OUT
DO NOT
OPERATE


LOCKOUT CENTER
DANGER
LOCKED
OUT
DO NOT
OPERATE

9) **Section 11340-2.05.A.9 outlines a 3-Hole local control station for the press including Loc-Auto, FOR, E-Stop. Specification plans 25-E-4 and 20-E-4 both outline 4-Hole local control stations, including Trough OCA, HOA, FOR, E-Stop. Please confirm desired operators to be provided on the press local control station.**

   A minimum 3-Hole local control station is required for the press with HOA, FOR, and E-Stop. Trough Off-Close-Auto is required if selector switches to control the spray wash are not provided at the main panel.

10) **Specification plan 09-N-1 appears to show separate screen and press main control panels for the DPR facility. Please confirm the DPR facility will have Qty. (1) main control panel, controlling both the screen and press.**

   There will be one (1) new panel installed at DPR to control the new screen and new press. However, the separate panels to control the existing fine screens and grinder wash presses will remain.

11) **Specification plan 99-NE-1 shows an Ethernet switch to be provided in the main control panel. Please confirm type of Ethernet switch.**

   Four-port Ethernet switch as approved by the system integrator. Hirschmann, N-tron, or Moxa.

12) **Is there an owner preference for Headworks to be listed as the (A) manufacturer for Mechanical Bar Screen and Washer Compactor, and JDV for the Shaftless Conveyor on the Bid Form? Within the specifications 11331, 11340, and 1140, all manufactures are listed as acceptable.**

   The existing fine screens which will remain in operation at the DPR facility are Headworks models. The bid form has been set up so that LCPWD can make a final evaluation taking potential operational synergies into consideration.

13) **I would like to request that the current (C) listed equipment manufacturer, Saveco Enviro-Care, be listed as and (A) or (b) in the "Acceptable Preferred Equipment Manufacturer" column on the bid form.**

   The substitute equipment manufacturers are listed in alphabetical order. The language is typical of historical Lake County Public Works bid forms.

14) **While at the pre-bid walk through last week at the Des Plaines location, the screen inside the building is limited with access hatches and structural doors. Thus, we would like to note that the screen being supplied per drawing 20-SM-2, and specification 11331 -4 Section 2.01 B will need to be assembled in sections upon installation.**

   Confirmed that the screen to be replaced in the Des Plaines WRF will be located in a building with limited access hatches and structural doors. The screen shall be supplied in flanged subassemblies

complete with installed drive chains and rake bar. The flanged subassemblies shall be bolted together onsite during installation.

15) **Can you verify the below spare parts quantities are total, per screen, or per site (VH NCT WRF & DPR WRF)?**

Per 11331, 1.04, D, 1. It states the following:
"The bar screen manufacturer shall supply the following spare parts:
1 set of wiper arm wear pads
1 five-foot chain segment
2 rake bars"

The washer compactor spec is clearer as it says "each unit" so that may be what they're meaning for the screens. Please also confirm on the compactor quantity per unit or each site or total for project

All spares are total per site.

16) **11400 – SCREENINGS CONVEYOR**

The Motion Failure Alarm box is NEMA 4 per the specification; please confirm it will be installed in a non-explosion proof area.

Yes, the motion failure alarm box can be installed in the control room at NCT, with a wire running to the conveyor.

17) **Can the GL limits of $2M/$4M be reached via a combination of underlying GL and Umbrella Limits?**

Yes.

PLANS:

1) **DPR – As part of Base Bid Item #7, remove 3 existing concrete (approximately 16” x 16” x 2”) pads west of bar screen building. See revised sheet 20-R-1.**

SPECIFICATIONS:

See revised section 01000 Project Requirements, parts 1.02.C.1, 1.02.C.2 and 1.06.A.3.
See revised section 11331 Mechanical Bar Screen, adding part 2.03.D. Renumbering parts 2.04-2.09.

BID FORM and NOTES:

1) **A Revised Bid Form dated 9/22/21 is included with this addendum.**
2) **A revised specification Section 01000 is included with this addendum.**
3) **A revised specification Section 11331 is included with this addendum.**
4) **Revised drawing sheet 20-R-1 for Des Plaines River WRF**

REVISED BID FORM

BID NUMBER: #21122

PROJECT NAME: Vernon Hills NCT and Des Plaines River Water Reclamation Facilities Screening Improvements Project

Project Number: PW#2020.098

for the Lake County Public Works Department
Lake County, Illinois

THIS BID IS SUBMITTED TO:

Lake County Public Works Department
650 West Winchester Road
Libertyville, IL 60048

(hereinafter called OWNER)

1) The undersigned Bidder proposes and agrees, if this bid is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Bid Price and within the Bid Times indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2) Bidder accepts all of the terms and conditions of the Official Notice to Bidders and Instructions to Bidders, including without limitation those dealing with the disposition of the Bid Security. This Bid will remain open for the period of time specified in the Official Notice to Bidders after the day of Bid opening. Bidder will sign and deliver the required number of counterparts of the Agreement with the Bonds, evidence of insurance coverage, and other documents required by the Bidding Requirements within 10 days after the date of OWNER's Notice of Award.

3) In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

   a) Bidder has examined and carefully studied all the Bidding Documents and Addenda, receipt of all which is acknowledged.

   b) Bidder has visited the site and become familiar with and satisfied itself as to the general, local, and site conditions that may affect cost, progress, performance and furnishing of the Work;

   c) Bidder is familiar with and has satisfied itself as to all federal, state, and local laws and regulations that may affect cost, progress, performance, and finishing of the Work.

d) Bidder acknowledges that OWNER and ENGINEER do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to Underground Facilities at or contiguous to the site. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all such examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the site or otherwise which may affect cost , progress, performance or furnishing of the Work or which relates to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder and safety precautions and programs incident thereto. Bidder does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance and furnishing of the Work in accordance with the time, price, and other items and conditions of the Contract Documents.

e) Bidder is aware of the general nature of the Work to be performed by OWNER and others at the site that relates to Work for which the Bid is submitted as indicated in the Contract Documents.

f) Bidder has correlated the information known to Bidder from information and observation obtained from visits to the site, reports, and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

g) Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to Bidder, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which the Bid is submitted.

h) This Bid is genuine and not made in the interest or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, or organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

i) Bidder certifies that Bidder is not barred from bidding on this Contract as a result of a conviction for either bid-rigging or bid-rotating under the provisions contained in chapter 38, Paragraphs 33E-3 and 33E-4 of the Illinois Revised Statutes.

4) Bidder will complete the work in accordance with the Contract Documents for the following price(s) on the bid form.

Table B-1 Base Bid (See Tables B-2 and B-3 for Equipment Manufacturer)

ITEM	DESCRIPTION	Unit	Quantity		Bid Price
1	Demolition of existing Screens at NCT WRF - Removal and disposal of existing Climber Screens and appurtenances.	LSUM	1	$	
2	New screening equipment at NCT WRF – Furnish and install two (2) new Mechanically Raked Bar Screens, one (1) Shaftless Spiral Conveyor and one (1) Washer Compactor, appurtenant equipment, electrical, controls and channel modifications.	LSUM	1	$	
3	Skylight replacement at NCT WRF including removal and disposal of existing skylight, curbing, roofing work, and painting of interior metal coping	LSUM	1	$	
4	Demolition of existing Screen at DPR WRF - Removal and disposal of existing Coarse Screen and appurtenances.	LSUM	1	$	
5	New screening equipment at DPR WRF – Furnish and install one (1) new Mechanically Raked Bar Screen, one (1) Washer Compactor, appurtenant equipment, electrical, controls and channel modifications.	LSUM	1	$	
6	Modification for central control of DPR Screening - Contractor to install ethernet connections and acquire quote from Allan Integrated Control Systems to reprogram interface to allow for control of all Raw Wastewater Pump Station screens and wash presses at 20 RTU-2. Ted Zess, Allan Integrated Control Systems, 2021 Beulah Avenue, East Troy, WI 53120, 262-642-7800	LSUM	1	$	
7	At DPR, Replace existing west door with new double door. Relocate existing light switch and all other items surrounding existing door. Remove existing concrete pads west of bar screen building.	LSUM	1	$	
8	At DPR, Install Fine screen at alternate location. Cut 5’ x 5’ hole in operating floor for screen. Remove channel constriction on lower level. Relocate emergency stop for existing fine screen no. 2. Fill bar screen hole in floor with concrete.	LSUM	1	$	
	TOTAL BASE BID AMOUNT ITEMS 1 TO 8			$	

Table B-2 NCT_WRF Equipment Manufacturers

Spec. Section	Equipment	NCT WRF LCPW Preferred Equipment Manufacturer	NCT WRF Substitute Equipment Manufacturer	Total Amount of Deduction (-) or Addition (+) from Base Bid. For Base Bid Manufacturer enter "0".
11331	Mechanical Bar Screen	(A) Headworks	(B) Kusters-Water (C) SAVÉCO (Enviro-Care)	(A) $_____ (B) $_____ (C) $_____
11340	Washer Compactor	(A) Headworks	(B) Kusters-Water (C) SAVÉCO (Enviro-Care)	(A) $_____ (B) $_____ (C) $_____
11400	Shaftless Spiral Conveyor	(A) JDV	(B) Kusters-Water (C) SAVÉCO (Enviro-Care)	(A) $_____ (B) $_____ (C) $_____

Table B-3 DPR-WRF Equipment Manufacturers

Spec. Section	Equipment	DPR WRF LCPW Preferred Manufacturer	DPR WRF Substitute Manufacturer	Total Amount of Deduction (-) or Addition (+) from Base Bid. For Base Bid Manufacturer enter "0".
11331	Mechanical Bar Screen	(A) Headworks	(B) Kusters-Water (C) SAVÉCO (Enviro-Care) (D) Vulcan	(A) $_____ (B) $_____ (C) $_____ (D) $_____
11340	Washer Compactor	(A) Headworks	(B) Kusters-Water (C) SAVÉCO (Enviro-Care) (D) Vulcan	(A) $_____ (B) $_____ (C) $_____ (D) $_____

NOTES – APPLICABLE TO ALL SECTIONS

Note 1) To be considered responsive, bidder must supply pricing information for every base bid item.

Note 2) See specification section 01205, "Measurement and Payment" and the plans for work, materials, etc. included in each bid item.

Note 3) The owner reserves the right to remove any bid item from the contract award following determination of the low bidder.

TOTAL BID AMOUNT BASE BID (SUM OF 1 THROUGH 8 ABOVE)

(written)_____

($_____(figures))

5) Bidder agrees that the work will be substantially completed and ready for final payment in accordance with Paragraph 15.06B1 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6) Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the times specified in the Agreement.

7) The following document is attached and made a condition of this Bid:

Required Bid Security in the form of _____
(Certified Check or Bid Bond)

in the amount of _____
(Dollars or Percent)

8) Communications concerning this Bid shall be addressed to the Bidder as indicated below:

Name: _____

Address: _____

State: _____

Telephone No.: _____

9) The terms used in this Bid are defined in the General Conditions of the Construction Contract or the Instructions to Bidders.

I hereby certify that as Bidder I/we have examined and carefully prepared this Bid from the Bidding Documents and have checked the Bidding Documents in detail before submitting this Bid, and that all statements herein are made on behalf of:

An Individual: By (Written) _____
(Typed) (Individual's Name)

doing business as _____

Business address: _____

_____

_____

Phone No.: _____

A Partnership: By _____ (Firm Name)

By (Written) _____

(Typed) (General Partner)

Business Address: _____

_____

_____

Phone No.: _____

A Corporation: By _____ (Corporation Name)

_____ (State of Incorporation)

By (Written) _____

(Typed) (Name of Person Authorized to Sign)

(Title) (Corporate Seal)

Attest (Written) _____

(Typed) (Secretary)

Business address: _____

_____

_____

Phone No.: _____

A Joint Venture: By (Written) _____

(Typed) (Name)

_____ (Address)

By (Written) _____

(Typed) (Name)

_____ (Address)

Phone number and address for receipt of official communications:

_____

_____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above).

Sworn and subscribed to before me this

_____ day of _____, 20_____ .

_____

Notary or other officer authorized to administer oaths

My commission expires: _____

Bidders shall not add any conditions or qualifying statements to this Bid as otherwise the Bid may be declared irregular as being not responsive to the advertisement. BIDDERS SHALL USE THIS BID FORM IN SUBMITTING THEIR BIDS.

SECTION 01000

PROJECT REQUIREMENTS

1. GENERAL

1.01 DESCRIPTION

A. Work Specified Herein and Elsewhere

1. This Section includes:

a. Summary of the Work
b. Coordination
c. Abbreviations and symbols
d. Preconstruction meeting
e. Coordination meeting
f. Construction schedules
g. Shop Drawings and product data and samples
h. Operation and maintenance manuals
i. Record documents
j. Quality control
k. Construction facilities and temporary controls
l. Materials and equipment
m. Work sequence
n. Operation of existing facilities
o. Contractor use of premises

1.02 SUMMARY OF WORK

A. Work Covered by Contract Documents

1. The Work to be performed under this Contract consists of the construction of the NCT and DPR Water Reclamation Facility Bar Screen Improvements. Perform all Work in accordance with this Contract. Furnish all materials, equipment, tools, and labor which is reasonably and properly inferable and necessary for the proper completion of the Work, whether specifically indicated in this Contract or not.

2. All fees and permits for the permanent construction which are required by controlling agencies or authorities, including fees for the review of Contract Documents prior to construction, will be procured by the OWNER. Other licenses or permits for construction facilities of a temporary nature which are necessary for the prosecution of the work shall be secured and paid for by the Contractor.

B. Contract

1. Construct the Project under a Lump Sum Contract.

C. Work Included

1. The Work includes all labor, equipment, and materials to construct the Vernon Hills NCT Water Reclamation Facility Bar Screen Improvements, including but not limited to, the following:

   a. Two (2) new 18 MGD mechanically raked bar screens

   b. One (1) new shaftless spiral conveyor.

   c. One (1) new washer compactor.

   d. Channel modifications to pre-screening building.

   e. Replacement of the skylight on the pre-screening building.

   f. Electrical system upgrades for the new equipment and facilities to be installed and constructed under this Contract.

2. The Work includes all labor, equipment, and materials to construct the Des Plaines River Water Reclamation Facility Bar Screen Improvements, including but not limited to, the following:

   a. One (1) new 26 MGD mechanically raked bar screen

   b. One (1) new washer compactor.

   c. Electrical system upgrades for the new equipment and facilities to be installed and constructed under this Contract.

2. In addition, repair, replace, or otherwise settle with the OWNER, if damage to property or existing facilities occurs, including damage to pavements, utilities, lawns, structures, etc.

D. Restriction of Working Hours

1. Construction activities shall be restricted to Monday through Friday between the hours of 7:00 a.m. and 3:30 p.m.. Work after 3:30 pm and on weekends will be approved or denied by the OWNER on a case by case basis.

1.03 COORDINATION

A. Contractor shall be fully responsible for the coordination of its Work and the Work of its employees, Subcontractors, and Suppliers and to assure compliance with schedules.

B. The coordination requirements of this Section are in addition to the requirements of the General Conditions, and the Supplementary Conditions.

l.04 ABBREVIATIONS AND SYMBOLS

A. Referenced Standards

1. Any reference to published specifications or standards of any organization or association shall comply with the requirements of the specification or standard which is current on the date of the Advertisement for Bids. In case of a conflict between the referenced specifications or standards, the one having the more stringent requirements shall govern.

2. In case of conflict between the referenced specifications or standards and the Contract Documents, the Contract Documents shall govern.

B. Abbreviations

1. The following are definitions of abbreviations which may be used this Contract:

a. AA - Aluminum Association
b. AASHTO - American Association of State Highway and Transportation Officials
c. ACI - American Concrete Institute
d. ANSI - American National Standard Institute
e. ASTM - American Society for Testing and Materials
f. AWS - American Welding Society
g. AWWA - American Water Works Association
h. CRSI - Concrete Reinforcing Steel Institute
i. E/A - ENGINEER and/or Architect
j. FS - Federal Specifications
k. IBC - International Building Code
l. NEC - National Electrical Code
m. NECA - National Electrical Contractor's Association
n. NEMA - National Electrical Manufacturer's Association
o. NSF - National Science Foundation
p. OSHA - U.S. Department of Labor, Occupational Safety and Health Administration
q. PS - United States Products Standards
r. STD.SPEC. - Applicable State Department of Transportation Standard Specifications for Road

and Bridge Construction
s. SSPC - Structural Steel Painting Council
t. UL - Underwriter's Laboratories, Inc.

1.05 CONSTRUCTION SCHEDULES

A. Submit an overall schedule of operations to the OWNER and ENGINEER for approval prior to any construction operations. The construction schedule is to be updated on a monthly basis. No pay request will be processed until the updated schedule is received. An updated schedule shall be included with each pay request. Inform the ENGINEER of all changes in the schedule.

B. The above schedule of operations shall include the following activities:

1. Shop drawing submittals
2. Equipment deliveries
3. Mobilization
   a. Contractor
   b. Subcontractors
4. Readiness of equipment for channel bypass operations
5. Demolition work
6. Installation work
7. Electrical service back in operation
8. Start up
9. Substantial completion
10. Final completion

1.06 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Shop Drawings

l. Shop Drawings are original drawings, prepared by Contractor, a Subcontractor, Supplier, or distributor, which illustrate some portion of the Work; showing fabrication, layout, setting, or erection details.

2. Shop Drawings shall be prepared by a qualified detailer and shall be identified by reference to sheet and detail numbers on the Contract Drawings. Reproductions for submittal shall be full size opaque diazo prints or other print acceptable to the ENGINEER. Reduced size prints will not be reviewed nor approved.

3. Shop drawings shall be submitted at least for the following items:

   a. Mechanical Bar Screens
   b. Washer Compactors
   c. Shaftless Spiral Conveyors
   d. Valves
   e. Valve actuators

f. Ultrasonic Level Sensors
g. Pipe
h. Grating and platforms
i. Handrail
j. Motors
k. Variable frequency drives
l. Motor control center modifications
m. Disconnects, breakers, fuses and other electrical components
n. Electrical panels
o. Channel bypass equipment and operating plan
p. Roofing materials
q. Sky Light
r. FRP Aluminum Hybrid Door (if bid item #7 is selected by LCPWD)
s. Demolition plan

B. Product Data

1. Product data are manufacturer's standard schematic drawings and manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.

2. Standard drawings shall be modified to delete information which is not applicable to the Work and supplemented to provide additional information applicable to the Work.

3. Catalog sheets, brochures, etc., shall be clearly marked to identify pertinent materials, products, or models.

C. Samples

1. Samples are physical examples to illustrate materials, equipment, or workmanship and to establish standards by which Work is to be evaluated.

D. Contractor's Responsibilities

1. Prior to submission, Contractor shall thoroughly check shop drawings, product data, and samples for completeness and for compliance with the Contract Documents and shall verify all quantities, dimensions and field conditions and shall coordinate the shop drawings with the requirements for other related Work.

2. The Contractor's responsibility for errors and omissions in submittals is not relieved by the ENGINEER's review of submittals.

3. Contractor shall notify the ENGINEER, in writing at the time of submission, of deviations in submittals from

the requirements of the Contract Documents. Contractor's responsibility for deviations in submittals from the requirements of the Contract Documents is not relieved by the ENGINEER's review of submittals, unless the ENGINEER gives written acceptance of specific deviations.

4. Begin no Work which requires submittals until return of submittals with ENGINEER stamp and initials or signature indicating the submittal has been reviewed.

E. Submission Requirements and ENGINEER Review

1. The ENGINEER will retain four (4) copies of approved shop drawings and product data. Submit four (4) plus the desired amount of return copies for review. Submit the number of samples indicated in the individual Specification Sections.

2. Shop drawings, product data, and samples shall be submitted by Contractor to the ENGINEER. Submittals shall be properly identified with the name of the Contract, dated, and each lot submitted shall be accompanied by a letter of transmittal referring to the name of the Work and to the Specification page number and/or Contract Drawing number for identification of each item. Submittals for each type of Work shall be numbered consecutively, and the numbering system shall be retained throughout all revisions.

3. Submittals shall bear Contractor's stamp of approval certifying that they have been checked. Submittals without Contractor's initialed or signed certification stamp and submittals which, in the ENGINEER's opinion, are incomplete, contain numerous errors or have not been properly checked, will be returned unchecked by the ENGINEER for resubmission.

4. At the time of each submission, Contractor shall give the ENGINEER specific written notice of each variation that the shop drawings or samples may have from the requirements of the Contract Documents and shall cause a specific notation to be made on each shop drawing submitted of each such variation.

5. The ENGINEER will review submittals with reasonable promptness. The ENGINEER's review of submittals shall not be construed as a complete check, and shall not relieve Contractor from responsibility for complete compliance with the Contract requirements. The ENGINEER's review will be only for conformance with the design concept of the Work and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or

procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety pre-cautions or programs incident thereto. The review of a separate item as such will not indicate approval of the assembly in which the item functions. No corrections, changes, or deviations indicated on submittals reviewed by the ENGINEER shall be considered as a Change Order.

6. Contractor shall make corrections required by the ENGINEER and shall return the required number of corrected copies of shop drawings for review. Contractor shall direct specific attention in writing to revisions other than the corrections called for by the ENGINEER on previous submittals.

7. In the event a third submittal is required, due to previous submittals of incomplete or incorrect data or not in compliance with the Contract Documents, the Contractor will be charged one-half of the cost incurred by the ENGINEER for the review of the third submittal. The Contractor shall bear the total cost incurred by the ENGINEER for all subsequent reviews. The ENGINEER costs charged to the Contractor will be at the cost plus rate generally charged by the ENGINEER and will be deducted by the OWNER from payments due to the Contractor.

8. Distribution of copies of acceptable submittals will be as mutually determined by Contractor, OWNER, and ENGINEER on an individual item basis during or following the preconstruction conference.

1.07 OPERATION AND MAINTENANCE MANUALS

A. Operation and Maintenance Manual

1. Contractor shall be responsible for obtaining installation, operation, and maintenance manuals from manufacturers and Suppliers for each item of equipment furnished under the Contract. Submit four copies plus the desired amount of return copies of each complete manual to the ENGINEER within 90 Days after approval of shop drawings, product data, and samples and not later than the date of shipment of each item of equipment to the Work Site. These manuals will be reviewed by the ENGINEER in the same manner as shop drawings and returned for correction and resubmittal if found deficient. Manuals will be used by the ENGINEER in assembling a comprehensive operation and maintenance manual for OWNER.

2. Manuals shall be provided for each piece of equipment including individual components and subsystems of complete assemblies. The section of the manual on operation shall describe the function of each component and its relationship to the system of which it is a part. Where several models, options, or styles are described, the manual shall identify the items actually provided.

3. The manual shall contain the following:

   a. An 8-1/2 x 11-inch typewritten sheet listing the manufacturer's identification, including order number, model, and serial number and location of parts and service centers.

   b. A separate 8-1/2 x 11-inch typewritten list of recommended stock of parts, including part number and quantity.

   c. Complete replacement parts list.

   d. Performance data and rating tables.

   e. Specific instructions for installation, operation, adjustment and maintenance.

5. Each manual shall be bound in a folder and labeled to identify the contents and the Work to which it applies.

6. One (1) CD copy of each submitted manual shall be furnished to the ENGINEER with two (2) printed copies.

7. Operation and maintenance manuals specified herein are in addition to any operation, maintenance, or installation instructions required by Contractor to install, test, and startup equipment.

1.08 RECORD DOCUMENTS

A. As the Work progresses, Contractor shall mark on a set of Contract Documents all changes from the Contract Documents.

B. Mark on the Contract Drawings all changes in direction and location of structure, piping, equipment, electrical, and mechanical Work.

C. Mark on the Specifications the manufacturer, trade name, catalog, and Supplier of each product actually installed, and mark changes made by Change Order or Field Order.

D. At the completion of the Work, deliver the record documents to the ENGINEER, in good condition and free from any extraneous notation.

1.09 QUALITY CONTROL

A. Laboratory Testing Services

1. Except where specified in individual Specification Sections, Contractor shall employ and pay for an independent testing laboratory to perform specified testing services. If OWNER's independent testing laboratory is expressly specified to perform testing services initial testing shall be paid for by OWNER and additional testing required because of faulty or rejected Work shall be deducted from the Contract Price.

2. If testing is specified to be performed by OWNER's testing laboratory, Contractor shall cooperate with OWNER's laboratory personnel and provide access to the Work to be tested. Contractor shall notify the laboratory sufficiently in advance of operations to allow scheduling of tests. Contractor shall furnish casual labor and facilities to obtain and handle samples at the Work Site and to store and cure test samples as required.

3. Any testing laboratory utilized by Contractor shall be an independent laboratory acceptable to OWNER and the ENGINEER and complying with the latest edition of the "Recommended Requirements for Independent Laboratory Qualification", published by the American Council of Independent Laboratories.

4. Testing laboratories, whether provided by OWNER or Contractor, shall promptly notify the ENGINEER and Contractor of irregularities or deficiencies of the Work which are observed during performance of services. Laboratories shall submit two (2) copies of all reports directly to the ENGINEER and two (2) copies to Contractor.

B. Testing Materials

1. Unless otherwise specified, all materials shall be sampled and tested in accordance with the latest published standard methods of ASTM in effect at the time Bidder's Proposals are received. If no ASTM Standards apply, applicable standard methods of the Federal Government or of other recognized agencies shall be used.

2. Test of materials shall be made by a representative of Contractor, unless otherwise provided. Testing of equipment shall be the responsibility of Contractor or an authorized manufacturer's representative. All test results shall be furnished to the ENGINEER in writing. Contractor shall provide facilities required to collect and forward samples. Contractor shall furnish the required samples without charge.

3. Contractor shall not make use of or incorporate in the Work, the materials represented by the sample until tests have been made and the material found to be in accordance with the requirements of the Specifications.

4. Materials to be tested and the applicable test procedure shall be as outlined in the individual Sections of these Specifications.

C. Source and Quality of Materials and Equipment

1. The source of materials to be used shall be in accordance with the Contract Documents and as approved by the ENGINEER before delivery. The approval of the source of any material shall continue as long as the material conforms to the Specifications.

2. All material not conforming to the requirements of the Specifications shall be considered as defective and shall be removed from the Work. If in place, faulty materials shall be removed by Contractor at its expense and replaced with acceptable material unless permitted otherwise by OWNER. No defective materials which have been subsequently corrected shall be reused until approval has been given.

3. Upon failure of Contractor to comply immediately with any order of the ENGINEER to remove and replace defective material, OWNER shall have authority to remove and replace defective materials, and to deduct the cost of removal and replacement from any monies due or to become due to Contractor. Failure to reject any defective materials or Work at the time of installation shall in no way prevent later rejection when such defects are discovered, nor obligate OWNER to issue its Final Acceptance.

1.10 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

A. Responsibility

1. All construction facilities and temporary controls remain the property of Contractor establishing them and shall be maintained in a safe and useful condition until removed from the Work Site.

B. Temporary Electric Service

1. Furnish and maintain a complete temporary lighting and power system of the phase and voltage required.

2. Include in the Bid all costs for providing temporary electrical service to the site including, but not limited, to the following:

   a. Utility company charges for extending temporary service to the site.

   b. Utility company charges for installing and removing primary switches and fuses, lightning arrestors, transformers, metering and meter rental, poles, lines, etc.

3. Temporary service shall include protective enclosures, branch wiring, outlets, lamps, and grounding as required by NEC and Local Electrical Codes.

4. If temporary wiring interferes with construction, it shall be relocated. Maintain service during all work hours and one-half hour before and after working hours.

5. When permanent electrical power and lighting systems are in operating condition, they may be used for construction purposes provided that Contractor assumes full responsibility for the entire power and lighting systems, replaces all lamps used for temporary lighting, and pays all costs for electrical energy and for operation of the system.

6. When temporary service is no longer needed, remove all temporary electrical facilities from the site.

C. Temporary Heating

1. Contractor shall furnish fuel or power and provide and operate all temporary heating units. Heat shall be provided as necessary to thaw or heat materials, to control humidity, to protect all water-bearing materials against injury by frost or freezing, and to provide heat required for operations outside buildings or until buildings are enclosed and the permanent heating system can be used. Temporary heating units shall be adequately vented and approved devices which will not damage finished areas. Contractor shall also furnish all tarpaulins and temporary enclosures necessary to provide this protection.

2. Contractor shall provide heat at a minimum of 55 degrees F in enclosed and existing buildings or as

required or recommended for the normal operation of the existing facilities or construction operations.

3. Contractor shall pay any costs of operating and maintaining the permanent heating system for temporary heat until the project is accepted for used by OWNER.

4. No claims shall be made for extra compensation for furnishing temporary heat because of variations from the progress schedule.

D. Temporary Ventilation

1. Contractor shall provide, operate, and furnish power for temporary ventilation required for the proper installation and curing of materials and safety of workmen.

E. Temporary Water

1. OWNER will provide water for all pipeline testing purposes.

2. Large quantities of water for testing pipelines shall be drawn only at night or as directed by the OWNER or ENGINEER.

3. Negligence or wastefulness by Contractor will be cause to waive the provision of water provided by OWNER.

4. Contractor shall pay for water used at the established water rates.

5. Contractor shall furnish potable drinking water in suitable dispensers and with cups for use of all employees at the job.

6. Contractor shall provide all temporary piping, hoses, etc., required to transport water to the point of usage.

F. Temporary Sanitary Facilities

1. Provide temporary toilet facilities as required. Maintain these during the entire period of construction under this Contract for the use of all construction personnel on the job. Enough chemical toilets shall be provided to conveniently serve the needs of all personnel. Chemical toilets and their maintenance shall meet the requirements of State and Local Health Regulations and Ordinances.

G. Temporary Pumping and Site Drainage

1. Contractor shall keep the Work Site free from water at all times to permit continuous access and to prevent damage to the Work. All water pumped from trenches shall be discharged into the storm drainage system via an approved portable sediment containment system.

H. Material Hoists and Cranes

1. Provide all material hoists and special rigging and hoisting facilities required for construction. Employ skilled hoist operators. Provide all necessary guards, signals, safety devices, etc., required for safe hoist operation. The construction and operation of material hoists shall be in accordance with the applicable ANSI Standards, the "Manual Code of Accident Prevention in Construction" of the Associated General Contractors of America, OSHA, and of other Federal, State, and municipal codes or ordinances. Contractor shall prohibit the use of hoists for transporting personnel. Hoists shall be located to avoid risk of damage to completed Work.

I. Temporary Runways, Scaffolding, and Ladders

1. Provide temporary ladders, ramps, and runways as required for performance and inspection of the Work. The above facilities shall be constructed and maintained in accordance with the applicable Federal, State, and Municipal regulations and codes.

2. Furnish, erect, and maintain all scaffolding required for this Work. Scaffolding shall be constructed and maintained in accordance with applicable State and Federal laws and local ordinances. Scaffolding shall be promptly removed after serving its purpose.

3. The structural strength and safety of scaffolding, runways, covers, railings, ladders, stairs, etc., and compliance with law shall be the sole responsibility of Contractor.

J. Fencing of Site

1. Provide and maintain construction area enclosures as necessary to assure security of the Work Site. Keep unauthorized people and animals from the Work Site. Doors and gates shall have locks, and keys shall be furnished to the OWNER and the ENGINEER.

2. Remove temporary fencing at completion of the Work or when directed by the OWNER and/or ENGINEER.

K. Security

1. Contractor shall provide inspection of Work Site area daily and shall take whatever measures are necessary to protect the safety of the public, workmen, and materials, and provide for the security of the Work Site, both day and night.

L. Dust and Mud Control

1. The Contractor shall take all necessary precautions to control dust and mud associated with the work of this Contract.

2. The Contractor shall have available a high-efficiency vacuum assisted mechanical sweeper for pavement cleaning. The Contractor shall clean the pavement of all dirt and debris at the end of each days operations, and at other times as necessary. All streets within the project corridor, including adjacent to side streets, shall be swept as directed by the ENGINEER.

3. The Contractor shall be responsible for obtaining and paying for water for mechanical sweeping.

4. Dust shall be controlled as often as necessary by the uniform application of a dust control agent. The dust control agent shall be calcium chloride (or approved equal) having a minimum chemical content of 77 percent calcium chloride at an application rate of 3 pounds per square yard of surface covered at locations as directed by the ENGINEER.

5. If the Contractor does not meet the requirements of controlling dust as determined by the ENGINEER, the OWNER shall make the necessary arrangements to control dust. The cost of such dust control will be deducted from any monies due or to become due to the Contractor.

6. Unless a pay item is included in the Schedule of Prices, the cost for Dust and Mud Control will be considered incidental to the Contract and no additional compensation will be provided.

M. Noise

1. The Contractor shall conduct all his operations so that they will cause the least annoyance to the residents in the vicinity of the work, and shall comply with all applicable local ordinances.

2. Compressors, generators, pumps and other apparatus shall be equipped with such mechanical devices as may be necessary to minimize noise. Compressors shall be equipped with silencers on intake lines. All gasoline or oil operated equipment shall be equipped with

silencers or mufflers or intake and exhaust lines. Storage bins and hoppers shall be lined with material that will deaden the sounds. The operation of dumping rock and of carrying rock away in trucks shall be so conducted as to cause a minimum of noise.

N. Contractor's Field Office and Storage Sheds

1. Contractor shall provide field office and storage sheds as required for the performance of the Work and protection of materials and equipment.

O. Removal of Temporary Construction

1. Remove the various temporary facilities, services, and controls and legally dispose of them as soon as the ENGINEER deems permissible. Portions of the Work Site used for temporary facilities shall be properly reconditioned and restored to a condition acceptable to the ENGINEER.

1.11 MATERIALS AND EQUIPMENT

A. Transportation and Handling

1. Manufactured materials and products shall be delivered to the Work Site as needed for installation, undamaged, in original packages, containers, or bundles, as packaged by the manufacturer with manufacturer's name, brand, seals, and labels intact.

2. Materials other than those designated within the Specifications or approved by the ENGINEER shall not be delivered to the Work Site.

B. Storage and Protection

1. Contractor shall be responsible for protection and preservation of all materials until Final Payment.

C. Protection of Completed Work

1. Provide temporary weathertight enclosures to protect the Work from damage by the elements, and protect finished surfaces to prevent any damage resulting from the Work of any trade.

D. Substitutions and Product Options

1. The intent of these Specifications is to provide OWNER with a quality facility without discouraging competitive bidding. Substitutions may be submitted and will be evaluated as specified herein.

2. For products specified by reference standards only, Contractor may provide any product complying with the specified standard.

3. For products specified by performance and descriptive methods, without naming manufacturer's products, Contractor may provide the products of any manufacturer complying with the Contract Documents, subject to the review of product data and concurrence by the ENGINEER as specified herein.

4. For products specified by naming two or more manufacturer's products followed by the words "or approved equal", Contractor may provide any of the named products or may substitute a product by another manufacturer as an equal for the review of product data and concurrence by the ENGINEER as specified herein subject to conditions specified elsewhere. If requirements are specified in addition to naming manufacturer's products, any product provided must comply with all of the specified requirements.

5. If Contractor wishes to provide a product other than one named in the Specifications, Contractor shall submit sufficient information to the ENGINEER for evaluation and determination of acceptability of the product prior to purchase and delivery of the product. Contractor is responsible for obtaining information required by the ENGINEER for the evaluation of products. The ENGINEER is responsible for determination of the equality of products, and ENGINEER's decision shall be final, except as otherwise provided by Law.

6. The substitution requirements of this Section are in addition to the requirements of the General Conditions and the Supplementary Conditions.

1.12 WORK SEQUENCE

A. Contractor shall be responsible for sequence of construction. Contractor shall keep ENGINEER and OWNER informed and updated on their planned sequence and schedule.

1.13 OPERATION AND EXISTING FACILITIES

A. OWNER must be able to continue to operate and maintain existing facilities for twenty-four (24) hours a day, seven (7) days a week, during construction of this Work. The Vernon Hills NCT and Des Plaines River Water Reclamation Facilities are required by its National Pollutant Discharge Elimination System (NPDES) permit issued by the State of Illinois to receive, pump, and

provide treatment of all raw wastewater coming into the plant. Do not perform any work that results in a reduction of full plant capacity. The Contractor shall be responsible for all consequential damages resulting from a reduction in treatment plant capacity caused by his construction activities.

B. Contractor shall coordinate all construction activities with OWNER. Work shall be done in accordance with the OWNER's Work rules, applicable Agency requirements, and during such hours, OWNER may designate.

C. Certain individual systems or units in existing facilities may be temporarily by-passed or removed from service for connection to the new facilities or for required repairs or renovations. All such by-passes or shut-downs shall be scheduled with OWNER 48 hours in advance of the actual Work. In no case shall any system or unit in the existing facilities be out of service for more than 24 hours at a time.

D. Contractor shall cooperate with OWNER and the ENGINEER to provide continuous operation of the existing facilities during the construction period.

1.14 CONTRACTOR USE OF PREMISES

A. General

1. Confine operations at the site to areas permitted by applicable laws, ordinances, permits, and by the Contract Documents. Do not unreasonably encumber the site with materials or equipment. Do not load structures with weight that will endanger the structure. Contractor shall assume full responsibility for protection and safekeeping of products stored on the site.

1.15 PROTECTION OF BUILDING CONSTRUCTION

A. Contractor shall provide protection for work in place and shall provide all necessary rigging, cables, etc., necessary to protect his work. No roof areas shall be left opened at any time. Provide necessary water protection. Any work opened during the day shall be closed and be rain tight at the end of each work day. Damages due to normal rainfall shall be the responsibility of the Contractor.

B. Prior to cutting which affects architectural safety, submit written request to the ENGINEER for permission to proceed with cutting.

1.16 WORK INCIDENTAL TO CONSTRUCTION

A. Work classified as incidental to the construction and included in the general cost of the work as part of the Contract Price shall include, but not necessarily be limited to, the following:

1. Cutting and patching finished work by others.

2. Excavation and backfill required to install items furnished under this Contract.

3. Replacing or repairing damages to work by others due to the construction.

4. Building in all necessary anchors, supports, etc. to secure component structures.

5. Miscellaneous support structures required to install items furnished under this contract.

6. Adjusting heights of installed items to correct for field conditions.

7. Furring out walls to conceal pipes, structural supports, or to bring surfaces plumb and true.

8. Lowering ceilings and/or dropping soffits to conceal ductwork, plumbing piping, electrical conduit, heating piping, etc.

9. Level existing and/or new floors to make true and level to receive finished materials.

10. Cleaning all glass and finished surfaces.

B. All changes from the plans, necessary to make the work conform to the building as constructed or conform to rules of governmental authorities having jurisdiction N.F.P.A., O.S.H.A., and the local building codes shall be made by the Contractor without extra cost to the OWNER.

END OF SECTION

SECTION 11331

MECHANICALLY CLEANED BAR SCREEN

1. GENERAL

1.01 DESCRIPTION

A. Work Specified Herein and Elsewhere

1. Work under this Section includes:

   a. Mechanically cleaned bar screen

   b. The equipment shall be installed as shown on the plans, as recommended by the manufacturer and in compliance with all OSHA, local, State and Federal codes and regulations.

2. Related work specified elsewhere:

   a. Submittals - Division 1
   b. Manufacturer's Services - Division 1
   c. Materials and Equipment - Division 1
   d. Painting - Division 9
   e. Conveyors - Division 11
   f. Electrical Work - Division 16

1.02 QUALITY ASSURANCE

A. Source Quality Control

1. Prior to shipment the equipment shall be tested at the manufacturer's plant to demonstrate the suitability of the equipment as a part of the complete installation. Submit a written test report certifying to full details of test methods and procedures, instruments utilized, and results.

2. Motors shall be tested as specified in Division 16.

3. The complete system shall be given an operational test of all equipment at the factory to check for excessive vibration, and for correct operation of the control system and auxiliary equipment.

B. Acceptable Manufacturers:

1. Bar Screen Type MS2 by Headworks, Inc.

2. ProTechtor® Multirake Screen (Model MRS) by Kusters-Water.

3. FSM HUR by SAVÉCO North America, Inc. (formerly Enviro-Care, Inc.)

4. VMR by Vulcan, Inc.

1.03 MANUFACTURER'S SERVICES

A. The manufacturer shall provide the following services as specified in Division 1:

1. Mechanical Start-up Services and Training at NCT WRF

a. Provide a minimum of one day of mechanical start-up service by a qualified field technician service personnel during one trip to the NCT site.

b. Provide an additional one day of training services in this trip or a subsequent visit.

2. Mechanical Start-up Services and Training at DPR WRF

a. Provide a minimum of one day of mechanical start-up service by a qualified field technician service personnel during one trip to the DPR site.

b. Provide an additional one day of training services in this trip or a subsequent visit.

1.04 SUBMITTALS

A. Shop Drawings and Product Data

1. Submit shop drawings and product data for the products of this Section in compliance with Division 1. A Professional ENGINEER’s stamp and certification is NOT required on documents provided by the equipment manufacturer to the CONTRACTOR for inclusion in submittal. Submittal shall include the following:

a. Design calculations of loads and stresses for all components.

b. Bearing loads and stresses.

c. Motor data as specified in Division 16.

d. Manufacturer's recommended procedures for job site storage, handling, installation, and start-up.

e. Detailed layout of equipment, piping, conduit, controls, etc.

f. Anchor bolt layouts and details, support and bracket details, and other drawings required for proper installation.

g. A copy of the proposed manufacturer's guarantee and information about the nature and location of parts, service crews, and repair facilities.

h. A Professional ENGINEER’s stamp and certification is NOT required on documents provided by the equipment manufacturer to the CONTRACTOR for inclusion in submittal.

B. Operation and Maintenance Manuals

1. Submit operation and maintenance manuals for the equipment in compliance with Division 1.

C. Special Tools

1. Provide to the OWNER one (1) set of special tools, calibration devices, or instruments if required by the manufacturer for operation, calibration, and maintenance of the equipment. If a gearbox removal tool is required by the manufacturer to remove the gearbox, please provide this tool.

D. Spare Parts

1. The bar screen manufacturer shall supply the following spare parts:

1 set of wiper arm wear pads
1 five-foot chain segment
2 rake bars

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Comply with Division 1 and the manufacturer's written instructions.

2. PRODUCTS

2.01 GENERAL

A. Operating Conditions at NCT WRF

1. Quantity of Units: 2
2. Width of Channel: 5 feet
3. Depth of Channel: 5 feet
4. Discharge Chute Height Above Operating Floor: 4 feet minimum
5. Opening Between Bars: 3/16 inch (5 mm) maximum
6. Angle of Screen from Vertical: 10 degrees
7. Downstream Design Depth of Flow in Channel: 21” @ 9 MGD per screen
8. Flow Velocity Through Screen:
   a. Maximum of 6 fps @ 9 MGD per screen
9. Maximum Head Loss Through Clean Screen: 9” @ 9 MGD per screen
10. Motor Horsepower: Minimum 2 HP
11. Electrical Requirements: 480 Vac, 3 Phase, 60 Hz

B. Operating Conditions at DPR WRF

1. Quantity of Units: 1
2. Width of Channel: 5 feet
3. Depth of Channel: 9 feet
4. Height of Operating Floor Above Channel: 13 feet 6 inches
5. Discharge Chute Height Above Operating Floor: 4 feet minimum
6. Opening Between Bars: 1/4 inch maximum
7. Angle of Screen from Vertical: Maximum 15 degrees, see drawing 20-SM-2
8. Downstream Design Depth of Flow in Channel: 72” @ 26 MGD per screen
9. Flow Velocity Through Screen:
   a. Maximum of 5 fps @ 26 MGD per screen
10. Maximum Head Loss Through Clean Screen: 5” @ 26 MGD per screen
11. Motor Horsepower: Minimum 2 HP
12. Electrical Requirements: 480 Vac, 3 Phase, 60 Hz

C. Description

1. The bar screen shall be a mechanically cleaned, front-cleaned bar screen of the multi-rake type and consisting generally of the following:

a. Bar rack.
b. Dead plate and frame.
c. Covers.
c. Screening chute.
d. Raking mechanisms.
e. Drive unit.
f. Controls.
g. Housing.

2.02 BAR RACK

A. The bar rack shall consist of 8mm x 4mm x 40mm or 6mm x 3mm x 40mm stainless steel bars uniformly spaced to provide clear openings. The openings on the units to be delivered to NCT WRF shall be no larger than 5 mm and the openings on the unit to be delivered to DPR WRF shall be ¼ inch. The bars shall be straight and inclined 10 degrees from the vertical for NCT WRF and a maximum of 15 degrees from vertical for DPR WRF. The bar rack shall project at least one (1) foot above maximum water level. All parts shall be designed and manufactured so the screen structure and bar rack can withstand the hydraulic force exerted by the maximum water depth. All structural and functional parts shall be adequately sized to prevent deflection and vibration which could impair raking operation.

2.03 DEAD PLATE AND FRAME

A. Provide a dead plate between the top of the bars and the discharge location above the operating floor. The dead plate shall be constructed of not less than 3/16-inch thick 304 stainless steel plate, suitably reinforced. Dead plate shall be true and flat such that a close clearance between the raking tines and the plate can be maintained during the cleaning cycle. The debris plate shall be constructed to guarantee a maximum gap of 1/8-inch between rake bar and debris plate, leading to the discharge chute without interruption.

B. Framework of screen shall be constructed of stainless steel with cross section of minimum thickness 3/16”. Various parts fastened by welding, riveting, or bolting shall be braced as necessary to ensure a rigid structure. The side frames shall be minimum 3/16” formed to a channel profile. The bottom thickness shall be a minimum of 3/16”. The frame shall have support beams with U-profile thickness of 3/16” on the front above the maximum water line. The screen frame superstructure shall be constructed such that it forms a strong and rigid internal structure that spans the width of the chamber.

C. Rubber or neoprene side seals shall seal the screen to the channel walls.

D. The screen shall be supplied in flanged subassemblies complete with installed drive chains and rake bar. The flanged subassemblies shall be bolted together onsite during installation.

2.04 COVERS

A. Covers, which are easily removable, shall be provided for easy maintenance above the channel. Covers shall be constructed of clear, impact-resistant polycarbonate material (thickness is minimum 1/4") to allow for visual observation during screen operation.

B. Polycarbonate covers shall have reinforced plastic pull handles. Polycarbonate covers shall be held in place with threaded plastic hand knobs or bolts. Stainless steel covers shall not be used.

2.05 DISCHARGE AND SCREENING CHUTE

A. A screening chute of minimum 3/16-inch stainless steel shall be provided. The chute shall be attached to the apron discharge lip. The chute shall be inclined not greater than 35 degrees from vertical.

B. Screenings shall be discharged on the downstream side of the screen to the new shaftless conveyor (NCT) or washer compactor (DPR).

2.06 RAKING MECHANISM

A. The screenings shall be mechanically cleaned from the bar rack by a series of engaging rakes carried by two (2) endless roller chains mounted on each side of the screen.

B. Chains shall be heavy duty roller type with a minimum weight of 6 lbs/ft and made of 304 (NCT)/ 316 (DPR) stainless steel of high tensile strength and resistance to corrosion. Chain rollers must be stainless steel. The average ultimate strength of the chain shall be minimum 20,232 pound-force. Chain pins shall be stainless steel and hardened.

C. The chains shall run over stainless steel drive sprockets keyed to a main, solid, stainless steel drive shaft which shall be mounted in externally mounted bearings and driven by a shaft mounted motor-driven gear unit.

D. The screen rakes shall be designed such that screenings will not wrap around the tines or the stationary bars and will not fall back into the sewage flow during the cleaning cycle.

E. The screen shall be provided with lower revolving sprockets/guides with 8 teeth and a nominal pitch diameter of 13”. The sprockets shall have a minimum plate thickness of 1”.

F. The lower revolving sprocket/guide bearings shall consist of a life sealed bushing system. The system shall consist of a stainless steel stub shaft supporting a ceramic sleeve. The ceramic collar will interface with a high lubricity, low friction composite bushing surface to ensure zero metal to metal contact. This composite bushing must be designed for extreme wear life in highly abrasive, high impact environments. Lower bushings that require any maintenance or have metal to metal wear will not be accepted.

G. Proper alignment of the rake arm assembly shall be accomplished by guide follower rollers, if required, which travel in guide tracks attached to the side frame. The rake shall be traversed forward over the discharge chute by action of the guide follower roller and the accumulated debris shall be removed by a wiper arm. The wiper shall be designed to pivot to allow

efficient cleaning of the rake on each pass and cushioned during travel to the rest position by shock absorber. The rakes and the rake support arm shall be stainless steel.

H. The raking mechanism shall be capable of two cleaning speeds. Normal speed shall have an approximate ten second cleaning interval and high speed shall have an approximate five second cleaning interval.

I. The minimum rake capacity shall be as follows:

Capacity/Rake Bar: 0.074 f^3/ft Screen Field Width (SFW)

Total Screen Capacity at approx. 10 second cleaning interval of 128 (ft^3/hr)

Total Screen Capacity at approx. 5-second cleaning interval of 258(ft^3/hr)

2.07 DRIVE UNIT

A. The drive mechanism for the rakes shall incorporate a solid shaft constructed of stainless steel.

B. The drive shall consist of a worm gear reducer with AGMA Class II rating.

C. The motor shall be NEMA Design B, rated for use in a Class I, Division I, Group D location, per N.E.C. with moisture-proof windings. Motor shall be minimum 2 HP and shall operate on 480 Vac, 3 Phase, 60 Hz, with a 1.15 service factor.

D. The screen shall automatically reverse and self-clean upon detection of a jam condition. A true power monitor controller shall be mounted in the screen control panel to detect and monitor the force generated by the gear reducer and when the force exceeds the high torque set point the screen shall be in jam mode. Jam mode will cause the screen to enter the self-cleaning mode. The screen shall automatically stop and run in reverse for the time value entered into the control panel. The screen shall then stop and run forward. If the cause of the jam condition is cleared the screen will resume normal operation. If the jam condition is detected again the reversing cycle shall repeat itself up to four (4) times. If the self-cleaning mode should prove

unsuccessful then the screen shall stop and the control system will initiate an alarm signal. The use of springs mounted to the screen torque arm for high torque detection shall not be allowed.

2.08 CONTROLS

A. The new bar screen main control panels shall be furnished by the screen MANUFACTURER, completely pre-wired and tested, requiring only wall mounting and connection to interconnecting power and SCADA wiring in the field by an electrical CONTRACTOR. The control panel shall include all equipment required to control one or more bar screen(s) as specified herein. The control panel shall bear a serialized UL 508, UL 698A, or CSA label when applicable and shall be manufactured by a CSIA certified panel shop. The control panel enclosure shall be sized as required to house equipment and shall be suitable for wall mounting or mounting to strut-type supports. The enclosure shall be rated NEMA 4X Grade 304 stainless steel.

B. The main bar screen control panel at NCT WRF shall contain variable frequency drives (VFD) or motor starters as required by the manufacturer to energize the two screens. If utilized, the VFDs shall have solid state overload integral. The electrical panel shall contain an Allen-Bradley MicroLogix 1400 programmable logic controller (PLC) and PanelView Plus Operator Interface Terminal (OIT). The panel shall be in a NEMA 4X enclosure and mounted in the ground floor control room in the Preliminary Treatment building.

C. The new bar screen control panel at DPR WRF shall contain a variable frequency drive (VFD) or motor starter as required by the manufacturer to energize the new fine screen and a motor starter to energize the compactor drive. If utilized, the VFD shall have solid state overload integral. The electrical panels shall contain an Allen-Bradley MicroLogix 1400 programmable logic controller (PLC), PanelView Plus Operator Interface Terminal (OIT). The panel shall be in a NEMA 4X enclosure and mounted in the control room on the ground floor of the Raw Wastewater Pump Station.

D. Door mounted NEMA 4X indicating lights shall be provided on the new control panels to indicate running

and alarm status of the bar screen(s), conveyor and washer compactors. Legend plates and a door mounted alarm reset push button shall also be provided.

E. Each screen shall be supplied with a separate "Start-Stop" pushbutton station, with lockout provisions, in a NEMA 7 enclosure. The two local control panels for control of the NCT screens shall be mounted in the NCT Preliminary Treatment screening room. The local control panel for control of the DPR screen shall be mounted in the Raw Wastewater Pump Station. All electrical equipment to be installed in the screening facilities shall be rated for use in a Class I, Division I, Group D location.

F. Placement of the "Hand-Off-Auto" switch in the "Auto" position shall allow the Multi-rake Screens to be activated by an ultrasonic differential level controller. Upon reaching a predetermined differential set point the screen shall begin operation in low speed and shall shut down after a predetermined time if the differential level is less than the predetermined set point. Upon reaching a second, higher predetermined differential set point, the screen shall operate in high speed.

G. An ultrasonic level controller located outside of the hazardous area and connected by cables to ultrasonic transducers mounted in the channels upstream and downstream of the channel shall sense the differential headloss across each screen. If in between timer activated screen operations the headloss reaches a predetermined level, then the ultrasonic differential level controller shall automatically start the screen. When the headloss has been reduced below the predetermined level, the mechanism shall travel to the top of the frame and remain idle until either the timer or the level control initiates the cycle again. Ultrasonic level differential control shall be provided by the manufacturer.

H. The following auxiliary contacts shall be provided at NCT and routed to the exiting terminal strips on panel 25_PLC-1:

1. Two normally open contacts to signify bar screen failure (overload) for remote alarm indication.

2. Two normally open contacts for local indication of screen motor status (running light).

3. Two normally open contacts for remote indication of "Bar Screen High Water Level".

4. Two normally open contact to signify bar screen failure (overload) for remote alarm indication.

5. One normally open contact to indicate screenings conveyor motor status (running light).

6. One normally open contact to indicate screenings compactor motor status (running light).

7. One normally open contact to signify screenings conveyor failure (overload) for remote alarm indication.

8. One normally open contact to signify screenings compactor failure (overload) for remote alarm indication.

I. At NCT WRF, the CONTRACTOR shall route an Ethernet connections from the new main bar screen control panel to existing panel 25-PLC-1.

J. At DPR WRF, the CONTRACTOR shall route Ethernet connections from the new main bar screen control panel, the existing bar screen control panel and the existing grinder wash press control panel to the existing panel 20-RTU-2.

2.09 MATERIALS

A. All stainless steel utilized in wetted components of the screens to be installed at NCT WRF shall be Grade 304.

B. All stainless steel utilized in wetted components at DPR WRF shall be Grade 316 stainless steel.

3. EXECUTION

3.01 GENERAL

A. The equipment shall be installed in accordance with the manufacturer's instructions.

3.02 FIELD TEST

A. Prior to acceptance, conduct an operational test, under the observation of the ENGINEER AND OWNER, to determine if the installed equipment meets the purpose and intent of the Specifications.

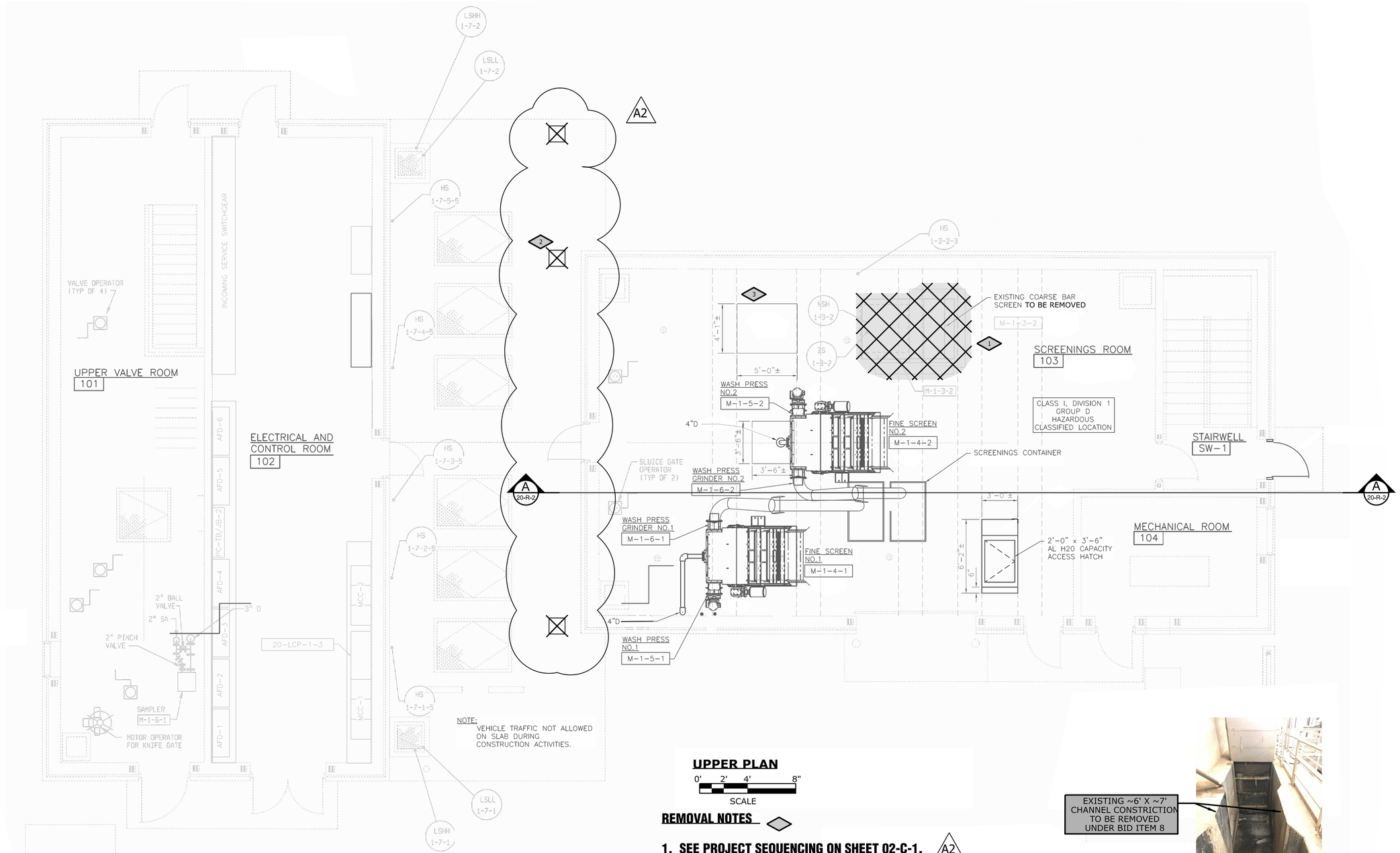
B. Prior to applying electrical power to any motor driven equipment, the drive train shall be rotated by hand to demonstrate free operation of all mechanical parts.

C. The equipment shall be operated for at least 48 hours and shall demonstrate that under all conditions of operation the system:

1. Has not been damaged by transportation or installation.
2. Has been properly installed.
3. Has no mechanical defects.
4. Is in proper alignment.
5. Has been properly connected to power and controls/ SCADA.
6. All mechanical components are operational as specified.

D. Any defects in the equipment or failure to meet the requirements of the specifications shall be promptly corrected by the CONTRACTOR.

END OF SECTION



NOTE:
VEHICLE TRAFFIC NOT ALLOWED ON SLAB DURING CONSTRUCTION ACTIVITIES.

UPPER PLAN

0' 2' 4' 8"
SCALE

REMOVAL NOTES

1. SEE PROJECT SEQUENCING ON SHEET 02-C-1. A2
2. FOR BID ITEM #7, REMOVE EXISTING 16" X 16" CONCRETE PADS.
3. FOR BID ITEM #8, CUT AN APPROXIMATELY 5' WIDE X 5' LONG HOLE IN THE OPERATING FLOOR FOR THE ALTERNATIVE SCREEN LOCATION. REMOVE CHANNEL CONSTRICTION ON LOWER LEVEL. SEE PHOTO.

PHOTO OF LOWER LEVEL COARSE SCREEN CHANNEL BELOW ALTERNATE SCREEN LOCATION

REVISIONS:

NO.	DESCRIPTION	DATE
01	ADDED NOTE TO REMOVE EXISTING CONCRETE PADS	

20-R-1
RAW WASTEWATER PUMP STATION
UPPER PLAN REMOVAL

2021 SCREENING IMPROVEMENTS PROJECT
DES PLAINES RIVER WATER RECLAMATION FACILITY
LAKE COUNTY PUBLIC WORKS - LAKE COUNTY, ILLINOIS

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DESIGNED BY:	PJL
DRAWN BY:	RWM
CHECKED BY:	SEZ
DATE:	AUGUST, 2021
PROJECT NO.:	22002121
SHEET	

20-R-1