UNIONCOUNTY
north carolina

Invitation for Bid No. 2024-076

Grassy Branch WRF Expansion

ADDENDUM No. 1
ISSUE DATE: June 18, 2024

Responding Offerors on this project are hereby notified that this Addendum shall be made a part of the above named IFB document.

The following items add to, modify, and/or clarify the IFB documents and shall have the full force and effect of the original Documents. This Addendum shall be acknowledged by the Offeror in the IFB document.

ADDENDUM NO. 1 TO CONTRACT DOCUMENTS

Date:	June 18, 2024
Project:	Grassy Branch WRF Expansion
Owner:	Union County Water
Engineer:	Hazen and Sawyer

To All Bidders:

Contractors submitting Proposals for the above-named Project shall take note of the following changes, additions, deletions, clarifications, etc., in the Contract Documents, which shall become part of and have precedence over anything contrarily shown or described in the Contract Documents, and all such shall be taken into consideration and be included in the Contractor's Bid Proposal.

All other general items, conditions, drawings, and specifications shall remain the same. Please acknowledge the receipt of Addendum No. 1 with the Bid Form.

Refer to the Attached Sheets.

Michael D. Parker, P.E.

HAZEN AND SAWYER

Grassy Branch WRF Expansion Project

Addendum No. 1

GENERAL:

Union County Water shall provide the water meter to Contractor upon 30-day written notice of the installation of the meter box, setter and all other appurtenances. Only the water meter shall be provided.

QUESTIONS & ANSWERS:

QUESTION	ANSWER
Please advise latest NTP date allowable.	September 30, 2024.
Can contract time be extended to allow for the long lead time package plant followed by a significant amount work on top of package plant earth fill? Or can we have additional time to complete the renovations of the existing structures once the new package plant is commissioned?	No.
Can trees be cleared north of the existing plant fence to give more room to work on the influent pump station and eq structure?	Tree clearing north of the existing plant fence will not be permitted. Targeted branch/limb removal will be permitted upon review of Owner and Engineer.
Is rock blasting allowed at the new influent pump station and/or anywhere on site?	Rock blasting will be permitted only at the new influent pump station. Refer to 31 23 16 – Excavation by Blasting for additional requirements.

SPECIFICATIONS:

SECTION 00 01 10 – TABLE OF CONTENTS

Page 00 01 10 - 7	Insert, Specification Section 31 23 16 – Excavation by Blasting, into the Table of Contents.
Page 00 01 10 - 10	Insert, Appendix F – Sole-Source Equipment Proposals, into the Table of Contents.

SECTION C-410 – BID FORM

C-410	Remove and Replace C-410 – Bid Form in its entirety. See **Attachment #1**. (For clarification, pre-negotiated pricing has been input for Disk Filtration and UV Disinfection equipment and SAVECO added as listed manufacturer for Influent Screening Equipment).

SECTION 31 23 16 – EXCAVATION BY BLASTING

31 23 16 Insert Section 31 23 16 – Excavation by Blasting into the bid documents in its entirety. See **Attachment #2**.

SECTION 40 05 19 – DUCTILE IRON PIPE

Page 40 05 19 - 2 Insert the following as paragraph 2.03.B:

B. "Epoxy-Lined Pipe

1. Epoxy-lined ductile iron pipe shall be furnished and installed where specified in the Drawings and Section 40 06 20 – Process Pipe, Valve, and Gate Schedules.

2. Epoxy-linings shall be Induron Protecto 401 ceramic epoxy lining, Tnemec Perma-Shield PL Series 431, or equal.

3. The finished lining shall have a minimum dry film thickness of 40 mils, except at the gasket groove and spigot end up to six inches back from the end of the spigot which shall be 6 mils dry film thickness, minimum.

4. Lining application shall be performed in strict accordance with the manufacturer's instructions by an applicator approved by the coating manufacturer and under controlled conditions at the applicator's shop or the pipe manufacturer's plant."

SECTION 40 06 20 – PROCESS PIPE, VALVE, AND GATE SCHEDULES

40 06 20 Remove Water Treatment Plant Piping Schedule (pages 40 06 20 – 4 through 40 06 20 – 6).

SECTION 40 61 13 – PROCESS CONTROL SYSTEMS GENERAL REQUIREMENTS

Page 40 61 13 - 4 Replace paragraph 1.5.A.4 with the following:

4. "RoviSys"

SECTION 40 61 96 – PROCESS CONTROL DESCRIPTIONS

Page 40 61 96 - 14 Insert the following as paragraph V.C.3.d:

d. "WWTP3-EQB-MOV-1603 is open if WWTP3-EQB-MOV-1602 is open; however, WWTP3-EQB-MOV-1603 is open even if WWTP3-EQB-MOV-1602 is closed."

SECTION 46 21 83 – INFLUENT SCREENING EQUIPMENT

Page 46 21 83 - 3 Replace paragraph 2.01.A with the following:

A. "The influent screening equipment shall include all necessary equipment and appurtenances manufactured by Lakeside Equipment Corporation of Bartlett, IL, Huber Technology of Huntersville, NC, Parkson Corporation of Fort Lauderdale, FL, SAVECO North America, Inc. of Gurnee, IL, or approved equal."

SECTION 46 61 41 – DISK FILTRATION EQUIPMENT

Page 46 61 41 - 7 Replace paragraph 2.05.B with the following:

B. "The drive assembly shall consist of a gear motor, steel chain, and steel sprockets. Any design using a belt drive assembly shall not be acceptable for use due to risk of stretching and failure when driving loads of this magnitude. The gear motor shall be SEW Eurodrive shaft mounted helical worm gear with integral standard AC induction motor. The motor shall be rated for 1.5 HP, 460V, 3 phase, 60HZ operation and as specified in Section 26 05 60 - Low Voltage Electric Motors."

Page 46 61 41 – 9 Clarification of paragraph 2.10.C. Note that backwash pumps do not have the ability to be provided with pump casing heaters.

Page 46 61 41 – 13 Clarification of paragraph 2.13.B.9. Please note the operator keypad/display, Fiber optic media converter, and fiber optic patch panel are not provided in the Discfilter panel.

APPENDIX C – GEOTECHNICAL REPORT

Appendix C Insert Geotechnical Report. See **Attachment #3.**

APPENDIX F – SOLE-SOURCE EQUIPMENT PROPOSALS

Appendix F Insert Sole-Source Equipment Proposals. See **Attachment #4.**

DRAWINGS:

C40 Add the following Notes:

"1. FM AND WW PIPING FROM INFLUENT PUMP STATION TO PACKAGE TREATMENT PLANT SPLITTER BOX SHALL BE EPOXY-LINED AND CONFORM TO THE REQUIREMENTS OF SPECIFICATION SECTION 40 05 19 – DUCTILE IRON PIPE."

M1 At “UV DISINFECTION”, delete the text:

“TOP EL 523.90”
[For clarification, elevation is determined by preselected unit.]

M110 Add the following Notes:

“1. FINAL ARRANGEMENT OF BURIED PLUG VALVES IMMEDIATELY DOWNSTREAM OF INFLUENT PUMP STATION VALVE VAULT SHALL BE DETERMINED IN THE FIELD WITH INPUT FROM THE OWNER AND THE ENGINEER.”

M165 Add the following Notes:

“1. CONTRACTOR TO PROVIDE A MINIMUM OF TWO (2) 2’-0” x 1’-4” STAINLESS STEEL ISOLATION SLIDE PLATES FOR FLOW SPLITTER BOX.”

M300 Add the following Notes:

“3. CONTRACTOR TO INSTALL HUGHES MODEL 15GEW-BLKT-HT EYEWASH STATION ADJACENT TO CONTAINMENT AREA.”

M340 Add the following Notes:

“3. CONTRACTOR TO INSTALL VALVE STEM EXTENSION SUPPORTS IN ACCORDANCE WITH SPECIFICATION SECTION 40 05 07 – PIPE SUPPORTS.”

S420 For clarification, please note that the north arrow is oriented incorrectly. Refer to sheets C40 and E420 for correct orientation.

S421 For clarification, please note that the north arrow is oriented incorrectly. Refer to sheets C40 and E420 for correct orientation.

A420 For clarification, please note that the north arrow is oriented incorrectly. Refer to sheets C40 and E420 for correct orientation.

A421 For clarification, please note that the north arrow is oriented incorrectly. Refer to sheets C40 and E420 for correct orientation.

ATTACHMENTS:

- Attachment #1: C-410 – Bid Form
- Attachment #2: 31 23 16 – Excavation by Blasting
- Attachment #3: Appendix C – Geotechnical Report
- Attachment #4: Appendix F – Sole-Source Equipment Proposals

ATTACHMENT NO. 1

BID FORM

UNION COUNTY WATER
UNION COUNTY, NORTH CAROLINA
GRASSY BRANCH WRF EXPANSION PROJECT
UCW PROJECT NO. 7882-2
IFB # 2024-076

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Union County Government Center
Attn: Vicky Watts
500 N. Main Street, Suite 709
Monroe, NC 28112

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No.	Addendum, Date

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the e execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

Lump Sum Bid Price	$

and

Unit Price Items			
Disposal of Residuals to Subtitle D Landfill	100 TN	$_____ / TN	$ _____
Minor Steel Shell Repairs	1000 SF	$_____ / SF	$ _____
Major Steel Shell Repairs	2000 LB	$_____ / LB	$ _____
Strut Repairs	2000 LB	$_____ / LB	$ _____

and

Lump Sum Pre-Negotiated Equipment Prices	
Disk Filtration System	$ 294,057.00
UV Disinfection System	$ 100,613.00

and

Allowance Items	
Lump Sum Contingency Allowance	$ 300,000.00
Union County Building Code Enforcement Permit Fee Allowance	$ 15,000.00
Union Power Cooperative Power Line Relocation Allowance	$ 30,000.00

Total of All Line Items = Total Bid Price $ _____

Total Deductive Alternate Bid 1 $ _____

Total Deductive Alternate Bid 2 $ _____

[See Section 01 20 00 – Measurement and Payment for descriptions of Deductive Alternate Bids.]

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete within **450** calendar days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within **500** calendar days after the date when the Contract Times commence to run.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security;

B. List of Proposed Subcontractors;

C. List of Proposed Suppliers;

D. List of Project References;

E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;

F. Contractor's License No.: _____;

G. Required Bidder Qualification Statement with supporting data;

H. Minority Participation Forms;

1. Identification of HUB Certified/Minority Participation Form

2. Affidavit A or Affidavit B, as applicable

3. NC Division of Water Infrastructure MBE/WBE (DBE) Compliance Supplement

I. Appendix A, 31 C.F.R. Part 21 – Certification Regarding Lobbying

CERTIFIED LIST OF PROPOSED MANUFACTURERS/ SUBCONTRACTORS

As part of the procedure for submission of Bids on this project, Bidder submits the following lists of Subcontractors and Suppliers to be used in the performance of work to be done on said Project. The lists furnished shall be based on requirements of the Contract Documents. Changes to this list after the Bid opening shall only be as approved by the Owner upon request by the Contractor or as required by the Owner based upon review of Contractor's submittals.

CATEGORY	SUBCONTRACTOR
Electrical	
HVAC / Mechanical	
Plumbing	

SCHEDULE OF SUPPLIERS

The following **Major Equipment & Supplier Table** designates items which shall be identified by the Bidder upon submittal of Bid.

1. The Bidder must circle one (1) named supplier for each item listed in the table. The named supplier circled for each equipment item will identify whose equipment is included in the Bidder's Lump Sum Bid Price and whose equipment will be supplied by the Bidder during construction. If no supplier is circled for any equipment item, the Owner will choose the named manufacturer whose equipment will be supplied by the Bidder at no adjustment of the Bidder's Lump Sum Bid Price.

2. Owner acceptance of equipment supplied by a named manufacturer or supplier does not constitute a waiver of the Specifications.

3. Equipment by a manufacturer or supplier not named in the referenced equipment specification will be considered for equivalence to the Acceptable Manufacturer(s) listed in the referenced equipment specification **during the bid period only** in accordance with Article 11 of the Instructions to Bidders. A non-named manufacturer shall demonstrate full compliance with the specifications in all aspects including form, features, construction materials, O&M cost, mechanical and control functionality, performance reliability, quality, and general configuration. To be considered, non-named manufacturers shall submit the following information to the Engineer and Owner within the time allowed in accordance with Article 11 of the Instructions to Bidders:

    a. Dimensional and weight information on components and assemblies.
    b. A list of any requested exceptions to the Contract Documents.
    c. Catalog information and cuts.
    d. Manufacturer's specifications, including materials description.
    e. Performance data as applicable.
    f. Field interface requirements for each component, such as, but not limited to water and drain connections, electricity (field wiring requirements), air supply connections, ventilation, etc.
    g. Horsepower of all motors supplied.
    h. Functional descriptions of any packaged instrumentation and control systems.
    i. List of parameters monitored, controlled, or alarmed.
    j. Addresses and phone numbers of nearest service center and a listing of the manufacturer's or supplier's services available at this location.
    k. Addresses and phone numbers for the nearest parts warehouse capable of providing full parts replacement and/or repair service.
    l. A list of the manufacturer's five (5) most recent domestic (USA) installations with similar size equipment in service. Include contact name, telephone number, mailing address, and names of Engineer, Owner, and installing Contractor.
    m. Description of structural, electrical, mechanical, and all other changes or modifications necessary to adapt the equipment or system to the arrangement shown and/or functions described in the Specifications and/or Drawings.
    n. Any additional specific requirements listed in the referenced equipment specification.

4. Failure to include all listed information with the submittal shall result in a determination that the non-named equipment manufacturer is not considered "or equal" and, therefore, not acceptable.

5. The Engineer and Owner will determine if the non-named manufacturer's equipment will be added as a named manufacturer ("or equal") in the referenced equipment specification. Final determination is at the sole discretion of the Engineer and Owner, and will occur prior to the Bid opening. There will be no process to appeal this determination.

6. If the Engineer and Owner determine that any non-named manufacturer is considered equivalent ("or-equal") to the named manufacturer(s), the referenced equipment specification will be revised by Addendum to include additional named manufacturers. However, addition of a manufacturer by addendum shall not relieve the Bidder of full responsibility for any facility redesign or other costs required to install the equipment. The manufacturer/ supplier and Bidder shall comply with the following during construction:

    a. Manufacturer/Supplier shall include in his quote to potential Bidders all additional construction costs (mechanical, architectural, structural, electrical, and engineering redesign costs) associated with the proposed equipment. The Bid shall also include all paid licenses necessary for the use of the proposed equipment, if required by the manufacturer.

    b. Any redesign associated with the proposed equipment shall be prepared by the Engineer. Reimbursement for engineering redesign shall be based on the Engineer's raw salary costs times a multiplier of 3.15 plus any direct, non-labor expenses such as travel, per diem, or reproduction services. The Owner will bill the Contractor monthly based on the Engineer's invoice to the Owner. The Contractor shall reimburse the Owner, who will in turn reimburse the Engineer, within 30 days of receipt of the Owner's billing. Non-payment within 30 days shall constitute grounds for the Owner to withhold partial payment to Contractor.

    c. Bidder agrees that delays caused by redesign necessary for the proposed equipment shall not constitute grounds for a contract modification, change order, claim, or contract time extension.

7. The Major Equipment Table is provided with blank spaces for an "or equal" equipment item approved by the Engineer and named via addendum during the Bid period, in accordance with Article 11 of the Instructions to Bidders.

Major Equipment Table

(Circle Only One Supplier / Manufacturer Named in the Reference Specification Section)

Specification	Equipment	Manufacturer to be Provided
26 29 23	Electrical Equipment (Including Low Voltage Variable Frequency Motor Controllers)	• Schneider Electric (Square-D) • Rockwell (Allen-Bradley) • Toshiba • _____
26 32 13	Diesel Engine Generator Set	• CAT • Cummins • MTU Onsite Energy • _____
40 61 13	I&C System Subcontractor	• CITI • MR Systems • Revere • RoviSys • _____
43 25 13	Submersible Solids-Handling Pumps	• Flygt • ABS/Sulzer • _____
43 41 43	Polyethylene Storage Tanks	• Poly Processing Company • Assmann Inc. • _____
46 07 53	Package Wastewater Plant	• Pro-Water Systems • Evoqua • _____
46 21 83	Influent Screening Equipment	• Huber • Lakeside • Parkson • SAVECO • _____
46 33 44	Peristaltic Tube Metering Pumps	• Blue-White • Verderflex • Watson-Marlow • _____
46 51 33	Fine Bubble Diffused Aeration Equipment	• Sanitaire • SSI • _____
46 61 41	Disk Filtration System	• Kruger • _____
46 66 00	UV Disinfection System	• TrojanUV • _____

DEFINED TERMS

7.02 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 8 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

NOTE TO USER: Use in those states or other jurisdictions where applicable or required.

ATTACHMENT NO. 2

SECTION 31 23 16
EXCAVATION BY BLASTING

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. Furnish all labor, equipment and materials required to drill, blast, loosen, excavate, and dispose of material to complete the work shown on the Drawings and specified herein. Blasting shall only be acceptable for the installation of the Influent Pump Station as shown on the Drawings. If the Contractor requires additional blasting, the Contractor shall request written approval from the Owner and Engineer.

B. The work shall include, but not be limited to:

1. Blast round design.

2. Planning and execution of appropriate site-specific safety measures to be employed during all blasting operations, and the safe handling and storage of high explosives and blasting agents.

3. Drilling blast holes, loading blast holes with explosives, and wiring and safe detonation of blast rounds.

4. Removal from the site of all excess excavated soil, debris, and rock as indicated in the contract Documents, or as directed by the Engineer, and disposal of excess materials at a permitted disposal site.

5. Dewatering and maintenance of groundwater and surface water in all excavations.

6. Performance of all surveys necessary to establish and verify the lines and grades, and to determine the amount of material removed.

7. Implementation of monitoring program to monitor condition of existing structures and utilities in vicinity of proposed blasting operations to ensure existing features remain undamaged by blasting procedures.

8. A pre and post blast condition survey at existing structures within 800 feet of proposed blasting including photographs.

9. A test blast program prior to production blasting to determine site specific vibration response and to evaluate the feasibility of proposed blast design including ability to adequately fracture bedrock, resulting size of rock, and depth of overbreak. The test blasts shall consist of two blasts typical of each type of blast anticipated for the work. The test blasts shall be located at the furthest practical points from existing structures and utilities.

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C. All excavations shall be in conformity with the lines, grades, and cross sections shown on the Drawings or established by the Engineer.

D. The Contractor shall conduct the construction activities in such a manner that erosion of disturbed areas and off-site sedimentation be absolutely minimized, both at the excavation site and at the disposal site, as well as along any haul routes used.

E. All blasting shall be controlled blasting defined as excavation in rock in which the various elements of the blast, including hole size, position, alignment, depth, spacing, burden, charge size, distribution and delay sequence are carefully controlled to excavate the rock to the desired lines with a relatively uniform surface with minimal overbreak and fracturing of rock beyond the design excavation limits and to maintain resulting noise, overpressure and peak particle velocity within specified maximum limits.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 10 00 – Clearing, Grubbing, and Site Preparation

B. Section 31 23 19 – Dewatering

C. Section 31 00 01 – Earthwork

D. Section 31 25 00 – Erosion and Sedimentation Control

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. North Carolina Occupational Safety and Health Standards in Construction for Blasting & Use of Explosives.

1.04 SUBSURFACE CONDITIONS

A. Reference is made to Section 01 11 00 – Summary of Work of the Specifications for the identification of those surveys and investigation reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the work which have been relied upon by Engineer in preparing the Drawings and Specifications.

B. Attention is directed to the fact that there may be water pipes, storm drains, sewer lines, electric conduits, and other utilities located around the proposed excavation. Contractor shall perform all repairs to same in the event that excavation activities should disrupt service.

1.05 SUBMITTALS

A. In accordance with the procedures and requirements set forth in Section 01 33 00 – Submittal Procedures, the Contractor shall submit the following at least 30 working days prior to beginning any blasting operations:

1. Names, addresses, telephone numbers, and qualifications of the blasting subcontractor(s) and explosives supplier(s) that will be used, including the designated Blaster-In-Charge.

2. Copies of Training Certificates for the designated Blaster-In-Charge, blasting foreman and any other key personnel that will be responsible for the work, showing that they have received specialized training in the proper handling of explosives.

3. Documentation including all photographs of both pre and post blast surveys and condition assessments. Pre and post blast surveys and condition assessments should be conducted with the joint presence of the Contractor, Blaster-in-Charge, Engineer, and Owner.

4. A Blasting Plan, indicating the methods, materials and equipment to be used. The Blasting Plan should indicate the types of explosives to be used, drilling patterns, and a general layout and schedule for executing the work in accordance with the state/commonwealth and local regulations. Blasting Plan shall also include the proposed test blast program to be conducted prior to actual demolition blasting. Blasting Plan shall be sealed by a currently licensed Professional Engineer in the state or commonwealth where the project is located.

5. A ground vibration and air blast monitoring plan, indicating structures that will be monitored, monitoring equipment that will be used, and personnel that will perform the monitoring. The monitoring plan should also be sealed by a currently licensed Professional Engineer in the state or commonwealth where the project is located.

B. At least 24 hours before each blast round, Contractor shall submit a detailed blast round design plan to the Engineer's on-site representative. The blasting plan submitted is for quality control and record keeping purposes. Review by the Engineer shall not relieve the Contractor of his responsibilities as provided herein. The blast round design submittals shall include:

1. Location (state, grid coordinates) and limits of the shot.

2. Number, diameter, and depth of blast holes to be detonated in the round, and a plan showing the drill hole pattern, spacing and distance to the free face.

3. Depth of overburden.

4. Total weight of explosives in the round and the types of explosives to be used.

5. Loading diagram showing the location of explosives, primers, and initiators; and location, depth, and type of stemming to be used in each hole.

6. Initiation sequence, including delay timer and delay system, total weight of explosive to be detonated on each delay, and a list of the timing of the delays.

7. Manufacturer’s data sheet for all explosives, primers, and initiators to be used.

8. Planned seismic monitoring positions, distances from the blast round, and seismograph types to be used to monitor vibrations and air blast overpressures.

9. Type and amount of blasting mats and/or depth of soil cover to be used over the top surface of the shot.

10. Any other information required by applicable state/commonwealth and federal regulations.

C. Within 24 hours after each blast round, Contractor shall submit a blasting report. The blasting report shall include:

1. Date and time of shot.

2. Foreman’s name.

3. Number and depth of holes detonated.

4. Weather conditions at the time of detonation.

5. Type of explosives and detonators used.

6. Peak particle velocity of ground motion and primary frequency for all ground vibration monitoring stations.

7. Peak air blast overpressure measured.

8. Distance from the blast round to each monitoring station for vibrations and air blast.

9. Amount of explosive used in each hole, and maximum weight of explosive detonated on any single delay in the blast round.

1.06 USE OF EXPLOSIVES

A. When the use of explosives is necessary for the prosecution of the work, the Contractor shall exercise the utmost care not to endanger life or property. The Contractor shall be responsible for any and all damage or injury to persons or property resulting from the use of explosives.

B. All explosives shall be stored in a secure manner, in compliance with all laws, and all such storage places shall be marked clearly "DANGEROUS EXPLOSIVES".

C. The Contractor shall notify any public utility company having facilities in close proximity to the site of his intention to use explosives. This notice shall be given sufficiently in advance to enable the utility companies to take whatever steps they consider necessary

to protect their property from injury. The Contractor shall also give the Engineer, all occupants of adjacent property, and all other Contractors working in or near the Project, notice of his intention to use explosives.

PART 2 – PRODUCTS

2.01 MATERIAL REQUIRING EXCAVATION BY BLASTING

A. Any material occupying an original volume of at least one cubic yard which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having draw bar pull rated at not less than 60,000 pounds at a velocity of 1.0 mph (Caterpillar D8N or equivalent).

2.02 INITIATORS

A. Contractor is advised of the possible presence of high-voltage electric power lines and radio towers at the project site. Only non-electric type initiators may be used.

PART 3 – EXECUTION

3.01 BLASTING OPERATIONS

A. Explosives shall be of such quantity and power and shall be used in such locations as will neither open seams nor otherwise disturb the material outside the prescribed limits of excavation. As the excavation approaches its final limits, the depth of holes for blasting and the amount of explosives used for each hole shall be reduced so that the underlying or adjacent rock will not be disturbed or shattered.

B. BLASTING SHALL NOT BE PERFORMED WITHIN 100 FEET OF NEWLY PLACED CONCRETE THAT HAS CURED LESS THAN 7 DAYS. NO BLASTING SHALL BE PERMITTED WITHIN 50 FEET OF ANY EXISTING STRUCTURE OR ANY NEW STRUCTURE IN PROGRESS.

3.02 BLAST MONITORING

A. A pre-construction survey, condition inspection and documentation of adjacent structures on-site and off-site shall be performed by the Contractor and submitted as required in Paragraph 1.05. The Contractor shall exercise the utmost care not to damage property on-site and off-site. The Contractor shall notify each adjoining property owner within 2,500 feet of the site of the anticipated ground vibrations and noise which will occur due to his blasting operations. This notice shall be given 30 days in advance to enable the adjacent property owners to take whatever precautions they consider necessary. The Contractor shall limit his operations to minimize any disturbance to the adjacent property owners. Motorists on adjacent roadways shall be notified in accordance with state/commonwealth regulations. Adequate signage to alert motorists to

blasting operations shall be provided in accordance with requirements of the Department of Transportation in the state or commonwealth where the project is located. The Contractor shall be responsible for any damage to any structure or utility line, pipes, etc., on-site, and off-site because of his operations.

B. Equipment for on-site and off-site particle velocity and air overpressure monitoring shall be 4-channel (one overpressure and three seismic channels) units capable of digitally storing collected data. Equipment must be capable of printing ground motion time histories and summaries of peak motion intensities, frequencies and USBM RI8507 PPV frequency plots. Printed report records must also include date, time of recording, operator name, instrument number and date of last calibration.

1. Instruments shall have a flat frequency response between 2 and 250 Hz for particle velocity and from 2 to 200 Hz for air-overpressure.

2. The digitizing sampling rate for peak particle velocity and air overpressure measurements shall be at least 1,024 samples per second.

3. Seismographs shall be capable of performing a self-test of velocity transducers and printed event records shall indicate whether the sensor test was successful.

4. Seismographs used for off-site compliance monitoring shall be capable of recording overpressure from 100 to 148 dB-L, and particle velocity from 0.05 to 5.0 inches/second.

5. Systems shall be capable of providing printed event reports that include all peak measurements, frequencies, and complete waveform plots.

6. Seismographs shall have adequate memory to digitally record the entire duration of the blast-induced motion.

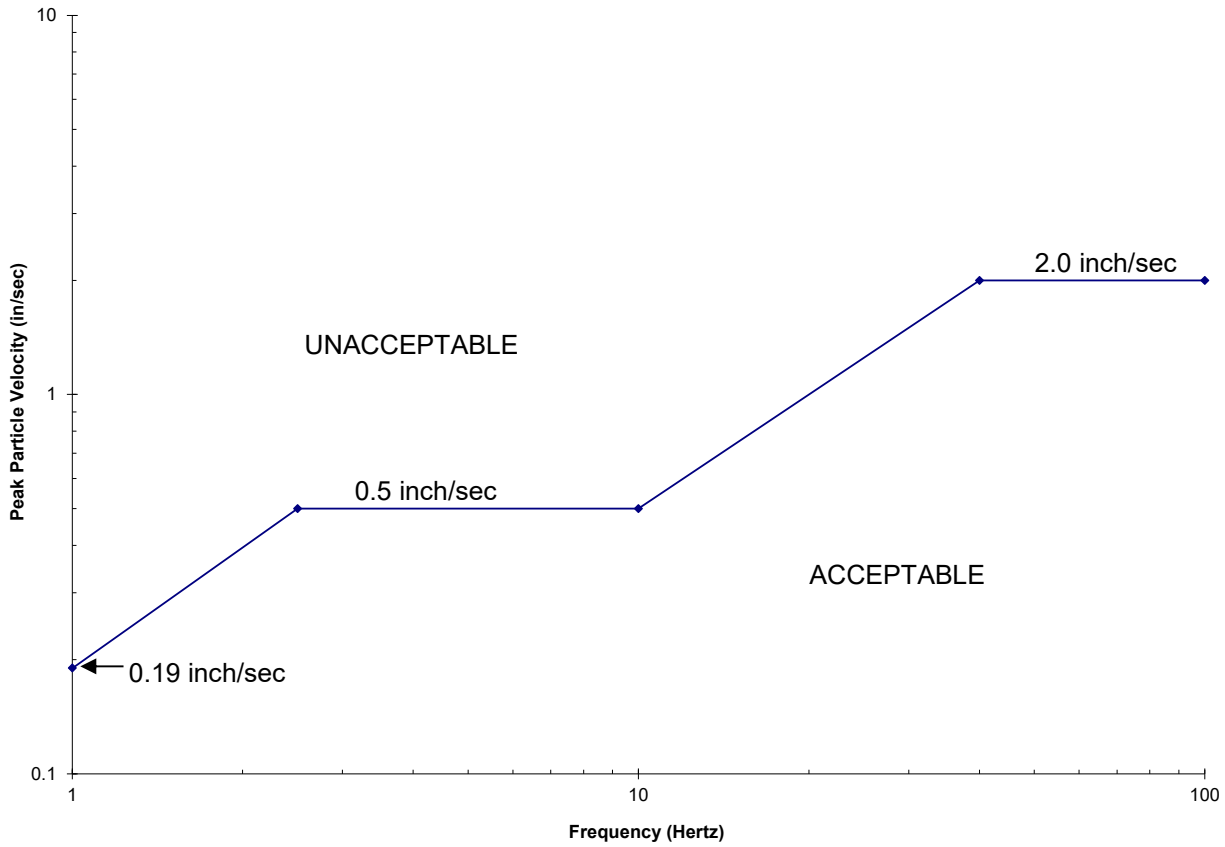
7. All seismograph/software systems shall be capable of saving back-up copies of all event files.

C. For each blast round, Contractor shall monitor and record noise and air blast overpressures at the site perimeter nearest the blast location and at the on-site or off-site structure located nearest to the round. Peak air blast overpressure shall not exceed 0.018 psi, measured at the site perimeter.

D. The site of every blast round shall be sufficiently covered with blasting mats or other devices to prevent any flying debris. The number and type of blasting mats must be satisfactory to the Engineer. The Contractor will be fully responsible for any damage caused by flying debris, both to on-site and off-site properties.

E. Whenever blasting is to be performed within 2500 feet of any structure, the Contractor shall measure the peak particle velocities of ground vibration resulting from each blast at the structure. Vibrations shall be monitored utilizing a seismograph capable of providing a record of particle velocity and frequency along three mutually perpendicular axes

utilizing internal calibration. Measured peak particle velocity of ground motion at the monitored structure shall not exceed values indicated in chart below:



END OF SECTION

ATTACHMENT NO. 3

GEOTECHNICAL ENGINEERING REPORT

Grassy Branch WRF Expansion
1629 Old Fish Road
Monroe, North Carolina 28110

CVET Project No. 24-518

May 8, 2024

PREPARED FOR:

Hazen and Sawyer

PREPARED BY:

CATAWBA VALLEY
ENGINEERING & TESTING

GEOTECHNICAL • CONSTRUCTION MATERIALS • ENVIRONMENTAL

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May 8, 2024

Michael Connor
Hazen and Sawyer
9101 Southern Pine Blvd
Suite 250
Charlotte, North Carolina 28273
mconnor@hazenandsawyer.com

Re: Geotechnical Engineering Report
Grassy Branch WRF Expansion
1629 Old Fish Road
Monroe, North Carolina 28110
CVET Project No.: 24-518

Dear Mr. Connor:

Catawba Valley Engineering and Testing (CVET) is pleased to submit to you our Geotechnical Engineering Report for the proposed Grassy Branch Water Reclamation Facility (WRF) Expansion in Monroe, North Carolina. This report presents the findings of our subsurface exploration and geotechnical recommendations for design and construction of the project.

CVET appreciates the opportunity to provide our geotechnical engineering services for this project. If you have any questions regarding the contents of this report, or if we can provide additional services for the project such as construction materials testing or special inspection observations, please do not hesitate to contact us.

Sincerely,

CATAWBA VALLEY ENGINEERING AND TESTING, P.C.

5/8/2024

Neill A. Belk, PhD, PE
Senior Engineer
NC 052399

David M. LeGrand, Jr, PE
Principal Engineer
NC 041419

Geotechnical Engineering

Environmental Services

CMT/Special Inspections

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1.0 PURPOSE AND SCOPE OF SERVICE

The purpose of the subsurface exploration and geotechnical engineering evaluation was to explore the subsurface conditions at the site, collect representative samples of soil for examination in our laboratory, and provide recommendations for design and construction of the proposed Grassy Branch WRF Expansion located at 1629 Old Fish Road in Monroe, North Carolina. CVET's scope of service included items outlined in CVET 23-380P dated December 19, 2023.

The Geoprofessional Business Association (GBA) organization has prepared important information for studies of the type performed, and we have included their document for your review in Appendix A. An assessment of the environmental aspects, regulated wetlands, groundwater recharge, or stormwater runoff conditions at the site is beyond the scope of this study.

2.0 PROJECT INFORMATION

Based on the site drawings (for review only) dated April 2024 and prepared by Hazen and Sawyer (Hazen), the project consists of a new Package Treatment Plant with supporting structures and pads. We have included a summary of our understanding of the proposed improvements along with their top-of-structure elevations and foundation top-of-slab elevations. Additionally, a new influent pump station is planned in the northeast corner of the site.

Structure	Top Elevation (feet)	Foundation Top-of-Slab Elevation (feet)
Package Treatment Plant (Aeration/Sludge Holding)	527.83	513.83
Secondary Clarifiers	527.83	513.83
Influent Screening	527.83	520.50
Blowers and Blower Pad	n/a	520.50
Alkalinity Facility	n/a	520.50
Electrical Building	n/a	520.50
UV Disinfection	n/a	520.50
Cloth Disk Filter	n/a	520.50
Transformer	n/a	520.50
Generator	n/a	520.50
Influent Pump Station	520.00	500.00
Valve Vault (Influent Pump Station)	520.00	514.00

n/a = not applicable

The project site is a 1.88-acre parcel (Union Co. Parcel No. 08123007B) situated at the end of a gravel driveway and in the northeast corner of the property located at 1619 Old Fish Road (Union Co. Parcel No. 0812300780) in Monroe, North Carolina. The site is located approximately 750 feet north of Old Fish Road.

The site lies within an agricultural field adjacent to the existing Grassy Branch Pump Station. The site is bounded by agricultural fields to the west and south, the existing Grassy Branch facility to the north, and the gravel access drive to the east. Note that the overall site is situated southwest of the confluence of Grassy Branch and Crooked Creek.

Historic aerial imagery (Google Earth Pro, accessed April 2024) indicates the existing Grassy Branch facility was constructed between February 1993 and March 1998. Imagery also shows what appears to be a possible drainage ditch or irrigation ditch that extends from a pond to the west of the agricultural field and jogs east across the field and turns northeast through the project site. The ditch appears to have pre-dated the existing Grassy Branch facility.

Elevation data from NC OneMap for Union County and the proposed site plan shows the site generally slopes from south and west to the northeast. Drainage appears to enter a storm culvert below the gravel access drive and empties into Grassy Branch to the east. The existing Grassy Branch facility is situated on an elevated fill pad above the agricultural field and has an approximate finished grade of about EL 520 feet that slopes down from all sides. Existing elevations within the proposed expansion area generally range from EL 520 feet at the north and east down to about EL 514 feet south of the existing fill pad. Based on the proposed top-of-slab elevations for the package plant and the anticipated foundation slab thickness, we anticipate less than about 10 feet of temporary cut and backfill to install the new package plant facility. We anticipate the ancillary structures around the package plant will bear on new structural fill.

3.0 EXPLORATION PROCEDURES

Exploration procedures for this project included drilling test borings at the site and laboratory testing of representative soil samples at our laboratory in Hickory, North Carolina.

3.1 Field Exploration

CVET drilled three (3) soil test borings (denoted B01 to B03) at the locations indicated on Figure 2 – Boring Location Plan in Appendix B. CVET advanced the borings on March 13, 2024 to depths extending from 3 to 13 feet below existing ground surface (bgs). CVET personnel noted the exploration locations utilizing hand-held GPS, and these locations should be considered accurate to the degree in which they were placed. We approximated boring elevations based on the data obtained from the existing conditions

plan prepared by Hazen; therefore, the boring locations and elevations on Figure 2 and Figure 3, and the boring logs (Appendix C) should be considered approximate.

CVET performed SPT drilling with a Geoprobe track-mounted drill rig (Rig 1 Geoprobe 7822DT - Serial No.: 78221710005) using continuous-flight hollow stem augers (HSA). We obtained soil samples by means of the split-barrel sampling procedures performed in general accordance with ASTM D1586 in which a 2-inch O.D., split-barrel sampler was driven into the soil a distance of 18 inches by means of an automatic hammer. The number of blows required to drive the sampler through the final 12-inch interval is termed the Standard Penetration Test (SPT) "N" value and is shown for each sample on the boring logs. This value can be used to provide an indication of the in-place relative density of cohesionless soils or relative consistency of cohesive soils.

CVET selected representative portions of each SPT sample, sealed them in airtight containers, and returned the samples to our laboratory in Hickory, North Carolina for classification and storage. See the individual soil test boring logs in Appendix C for more details. Note that the soil samples will be discarded after 60 days from this report date, unless otherwise directed by Hazen and Sawyer.

3.2 Laboratory Testing

CVET geotechnical personnel examined and visually classified the soil in general accordance with the Unified Soil Classification System (USCS) (ASTM D2487). We then selected representative soil samples for laboratory testing, which included Soil Moisture Content (ASTM D2216), Grain Size Distribution (ASTM D422), Atterberg Limits for Plasticity (ASTM D4318, and Organic Content (ASTM D2974).

4.0 SUBSURFACE CONDITIONS

The subsurface conditions at the site are described in the following paragraphs.

4.1 Site Geology

The site is located in the Piedmont Physiographic Province of North Carolina. The name "piedmont" means "foot-of-the-mountains" which reflects remnants of an ancient mountain range that has since been extensively weathered, decomposed and eroded to form rolling terrain and hillsides. The bedrock is metamorphic in nature (igneous or sedimentary rocks that have been changed by heat and/or pressure) and typically consists of schist, gneiss and/or granite. Extensive weathering over time has reduced the bedrock in-place to form overburden residual soils that range from clay topsoil to sandy silts and silty sand that grade with depth back to saprolite and partially-weathered-bedrock. The degree of weathering varies both laterally and vertically. Based on the 1985 North Carolina Geologic Map, the site is underlain by the Floyd Church Formation

(Metamudstone and Meta-Argillite) described as "thin to thick bedded; bedding plane and axial-planar cleavage common; interbedded with metasandstone, metaconglomerate, and metavolcanic rock." The site is also situated very near the mapped Cid Formation (Felsic Metavolcanic Rock) described as "metamorphosed dacitic to rhyolitic flows and tuffs, light gray to greenish gray; interbedded with mafic and intermediate metavolcanic rock, meta-argillite, and metamudstone."

It is common for profiles in this type of geology for a very dense layer of soil, referred to as partially weathered rock (PWR), to divide the overlying residual soil and the underlying bedrock. PWR generally consists of irregular zones of very dense soil and rock with SPT N-values exceeding 100 blows per foot (bpf) or more.

Published soil data (Soil Survey, Union County, North Carolina, USDA) indicates that native site soils belonging to the Badin channery silt loam map unit, which consists of channery (rocky) silt loam, silty clay, and relatively shallow weathered bedrock and unweathered bedrock. The residual soil weathers from metavolcanics and/or argillite.

Undocumented fill

Fill soils are those that have been placed or reworked in conjunction with past construction, grading, or farming. Fill soils can range from compacted engineered fills where no construction records exist to a heterogenous mix of soil types, organics, cobbles, boulders, construction debris, building rubble, trash, industrial waste, and contaminants. In some limited cases, properly engineered fills can be sampled and tested, and their shear strength and compressibility determined for design purposes. However, no practical amount of exploration and testing can be attempted to try to characterize the shear strength and compressibility for the wide range of deleterious materials found in most uncontrolled fill soils. There is an inherent risk of construction and fill placement over areas of existing undocumented fill that may impact construction scheduling and costs.

4.2 Soils

Soil boring logs and a profile section are included in Appendix C. The subsurface soils generally consist of residual soil overlain by existing fill soil. The generalized subsurface conditions are described below.

CVET encountered 3 inches of surficial topsoil in soil test boring B02 only.

CVET encountered existing, undocumented fill in each of the borings to depths ranging from approximately 0 to 8 feet bgs. The existing fill generally consists of sandy silt or sandy elastic silt, clayey sand, silty gravel, and clayey gravel with sand. We encountered organics within the existing fill. The SPT N-Value within the cohesive fill soil was 32 blows per foot (bpf), indicating hard soil consistency. The SPT N-Value within the cohesionless

fill soil ranged from 3 to 36 bpf, indicating very loose to dense relative soil densities. We expect gravel and rock fragments within the matrix elevated the reported N-values for the existing fill.

CVET encountered residual soil in boring B03 to depths ranging from about 8 to 12.5 feet bgs. The residual consisted of clayey gravel with sand. The SPT N-Value within the cohesionless residual soil was 74 bpf, indicating a very dense relative soil density.

4.3 Partially Weathered Bedrock and Bedrock

CVET encountered partially weathered bedrock (PWR) sampled as clayey gravel (GC) from about 2 to 2.5 feet bgs in borings B01 and B02. We encountered split spoon refusal at a depth of about 12.5 feet bgs in boring B03. We did not core refusal materials; however, based on the geologic setting and our experience in similar settings, we anticipate the refusal material represents bedrock.

4.4 Groundwater

CVET encountered groundwater at a depth of 8 feet bgs in boring B03 only at the time of drilling. Note that boreholes are left open for only a short period of time during the drilling operation, so the detection of groundwater during this brief period is difficult. Also note that soil moisture and groundwater conditions vary depending on conditions such as temperature, precipitation and season. Therefore, soil moisture and groundwater location at other times of the year may vary from those observed at the time of this subsurface exploration and as described in this report.

We also noted the borehole cave-in depth in boring B03 was 9 feet bgs. In this geology, the cave-in depth of a boring is sometimes an indication of the stabilized water level, although the water level may be a few feet below the cave-in depth and therefore cannot be directly observed. If the location of the groundwater elevation is important at this site, we recommend the installation of temporary observation wells.

5.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

Based on our understanding of the proposed site development and subsurface materials encountered in the borings, we expect the proposed structures may be supported on conventional shallow foundations. The extents and depths of relatively loose undocumented fill creates and elevated risk of post-construction settlement that may result in distresses within the structure. This risk cannot be eliminated without complete removal of the existing fill, but it can be reduced by performing additional construction testing and evaluation. Based on the proposed bearing elevations of the package plant and the proposed extents of temporary excavation, we anticipate the existing fill will be removed during construction.

Additionally, the relatively shallow PWR and bedrock (relative to the proposed bearing elevations) at the site is anticipated to result in excavation difficulty during foundation and utility excavation.

The following recommendations are for the construction of the proposed development based on the results of our understanding of the project, subsurface exploration, site observations, and experience in similar geologic settings. The recommendations stated herein shall not be applied to any other project, or used in conjunction with any other recommendation, and shall be used explicitly for this project.

5.1 Site Preparation

Site preparation should consist of removing the surface layer, relocation or proper abandonment of any existing utilities, as applicable, along with removing all other soft or unsuitable material from proposed building envelopes and associated pavement areas. Site preparation operations should extend a minimum of 10 feet beyond the planned limits of any buildings and a minimum of 5 feet beyond the planned limits of the pavement areas. These limits should also extend beyond the perimeter of structural fill slopes, as applicable, laterally equal the depth of necessary structural fill to achieve finished grades.

Once stripping and rough excavation has been accomplished, the exposed subgrade should be evaluated by proofrolling. Proofrolling consists of driving the appropriate equipment, typically a dump truck with axle weights of 10 or 20 tons for single and double axles respectively, over the subgrade at a walking pace. The proofrolling equipment should first make overlapping passes across the subgrade in one direction, followed by passes in a perpendicular direction. We recommend that the proofrolling be observed by the geotechnical engineer or his qualified representative.

Based upon the presence of the encountered fill soil across the site, areas of instability are anticipated during proofrolling operations within the areas to receive structural fill. Instability during proofrolling of exposed subgrade soils should also be anticipated if elevated in-place moisture content of the encountered elastic/plastic site soils is observed. Any unstable areas shall be undercut and replaced with approved structural fill soil, as directed by CVET. If conditions revealed during site preparation operations vary from those described in this report, the on-site geotechnical engineer shall contact the engineer of this report to discuss potential options to address the varying site conditions.

5.2 Earthwork

Based on the provided drawings, the package plant will be supported on a foundation slab bearing below elevation EL 513.83 feet with much of the remaining foundation slabs bearing near finished grade for the site at about EL 520 feet. We anticipate cut and fill depths to be less than about 10 feet.

Some moisture conditioning of cut soils should be anticipated to achieve compaction with acceptable soil moisture contents during mass earthwork operations. Moisture conditioning may include mechanical drying (plowing or disking).

Any required fill soils should be compacted to at least 98 percent of the maximum dry density obtained in accordance with ASTM Specification D-698, Standard Proctor Method, with a moisture content within +/- 3% of the optimum moisture content (OMC). Acceptable fill soils should be soil that has less than 5 percent organic content and a liquid limit and plasticity index less than 50 and 20, respectively. Soils with USCS group symbols of SP, SW, SM, SC, and ML are recommended for use as controlled fill, although it is important to note that silty soils (ML and MH) are very moisture sensitive and not as strong as sandy soils. Soils having a plastic index of 20% or greater (MH, CH, and some SC and CL) should not be utilized within 5 feet of bearing elevation if utilized as structural fill. Organic laden soils shall not be utilized as structural fill. All fill soils should be placed in horizontal loose lifts and compacted with adequately-sized equipment. Loose lift thicknesses will vary depending on the size of the compaction equipment: we recommend a maximum of 8 inches for large self-propelled compactors, 6 inches for small self-propelled compactors, and 4 inches for remote-controlled compactors and hand-operated equipment (plate tampers, wacker-packers, or jumping jacks). Vibratory smooth-drum rollers are appropriate for cohesionless/coarse-grained soils while sheepsfoot rollers are appropriate for cohesive/fine-grained soils. We anticipate the existing site soils will not be suitable for reuse as structural fill. See Section 5.8 for acceptable fill types and limits for backfill against subterranean structural walls.

Fill embankments should be benched into the existing side slopes for existing subgrade slopes that exceed 4H:1V. The maximum bench height should not exceed 4 feet.

Traffic exposure to wet subgrades can degrade an otherwise satisfactory subgrade condition, which would require remedial work to repair them. Once the planned subgrade levels have been achieved, construction traffic should be rerouted from planned structural areas after periods of precipitation to allow the subgrade to dry.

We recommend that positive site drainage is maintained during earthwork operations to prevent the ponding of water on exposed subgrades. Soil subgrades should be protected from inclement weather (rain especially) by 'sealing' the subgrades prior to forecasted inclement weather. 'Sealing' can be performed by rolling with a smooth steel-drum roller without vibration. Ruts should not be created during the 'sealing' operation. Prior to the placement of additional fill, the 'sealed' subgrade should be scarified.

If earthwork is performed during winter months or after inclement weather, the subgrade soil conditions could potentially be more unstable due to wet soil conditions, which may require stabilization or undercutting.

We recommend the implementation of a settlement monitoring program if structural fill depths exceed 10 feet. The settlement monitoring program should consist of settlement monitoring plates at the base of the fill and brass settlement hubs at the top of the fill, once completed. The settlement should be monitored until it reaches an acceptable value to begin building and pavement construction. If this is not implemented, settlement resulting from self-weight consolidation of the new fill should be anticipated and cause distresses within the new structures.

5.3 Excavation

We anticipate that it should be possible to excavate site soils above the partially weathered rock with conventional earthwork equipment, although some harder residual soils, particularly those immediately above partially weathered rock, may require ripping. Partially weathered rock with SPT values ranging from approximately 50/6-inches to 50/3-inches can often be excavated from open-cut excavations by ripping or excavation with rock-teeth. We recommend ripping operations to be performed by a CAT D-8 bulldozer with a single tooth ripper (or equivalent machinery). Partially weathered rock and auger refusal materials will require the use of pneumatic hammers or blasting to excavate. As a result of shallow partially weathered rock and bedrock, we expect that ripping and/or the use of pneumatic tools will be necessary within portions of the site to achieve proposed finished grades and during utility installation operations.

All excavations and trenches shall be performed in accordance with Occupational Health and Safety Administration (OSHA) 1926 Subpart P regulations to provide stable and safe working conditions for any temporary excavations. Based on visual classification, we recommend that OSHA soil classification Type C be used during sloping and benching configurations for this project in soils. For cuts made within unweathered bedrock, we expect an OSHA soil classification Type A may be used only if verified by CVET or a qualified CMT firm.

Construction site safety is the sole responsibility of the contractor, who controls the means and methods and sequencing of construction operations. CVET assumes no responsibility, implied nor inferred, for construction site safety.

5.4 Groundwater Control

We encountered groundwater at a depth of about 8 feet bgs (approximate EL 511 feet) in boring B03 during the time of drilling. We anticipate groundwater control will be required in both temporary and permanent applications to facilitate site development. Groundwater control is the purposeful drawdown of the groundwater levels to facilitate necessary construction. Temporary dewatering operations consist of well points and sump pumps, while permanent dewatering operations typically consist of French

underdrains which discharge by means of gravity flow into the site storm drainage system.

The drawings indicate the top of the foundation slab for the influent pump station will be at EL 500 feet, which is below the groundwater table measured during field exploration. We expect appropriately sized sump pumps may be utilized at the base of the excavation while the new pump station is constructed. The base of the excavation will require a minimum of 12 inches of free draining stone (No. 57 stone) to provide a working base at the bottom of the excavation. We recommend installing a separation filter fabric at the base of excavation.

Note that soil moisture and groundwater conditions vary depending on conditions such as temperature, precipitation and season. Therefore, soil moisture and groundwater location at other times of the year may vary from those observed at the time of this subsurface exploration and as described in this report.

5.5 Foundations

We expect shallow foundations will either bear on new structural fill or approved native residual soils/PWR. If the subgrade is prepared in accordance with our recommendations and structural fill meets the criteria outlined in Section 5.2, shallow foundations bearing on structural fill or native residual soils/PWR can be designed with an allowable net bearing pressure of up to 2,500 pounds per square foot (psf). We recommend minimum foundation widths and embedment depths of 24 and 18 inches, respectively. We recommend a minimum of 8 to 12 inches of compacted No. 57 stone placed below the bottom of footing elevation. If unweathered rock is present at the bottom of footing elevation, we recommend over excavation of 8 to 12 inches and backfill with compacted No. 57 stone. The free-draining material should be wrapped in a separation filter fabric. These foundations should be designed for possible hydrostatic uplift pore pressures from the groundwater table and applicable design flood elevation for the project site.

We do not recommend bearing any foundations directly on elastic/plastic fill soils, especially perimeter foundations which have a greater chance of being subjected to surface water. Plastic/elastic soils should be undercut to depths of at least 24 inches from where they are encountered at the foundation bearing elevation and replaced with approved fill materials or ABC stone. Plastic/elastic soils are moisture sensitive and prone to shrink/swell with moisture changes.

We expect zones of undercut and replacement will be required based on relatively loose fill observed at or near proposed bearing depth of the package plant.

A site-specific settlement analysis has not been performed. However, based on the requirement that the foundation subgrade soils bear in the remedial measures stated above (to be verified by CVET or another qualified CMT firm), we expect total settlements

of structures foundations to be less than 1 inch. In general, differential settlements between building components are expected to be on the order of 1/3 to 1/2 of the total settlements. We expect settlements in the building foundations to occur relatively soon after the loads are applied and after primary settlement of any grade-raised fill has been achieved. The foundation subgrade should be thoroughly evaluated using a Dynamic Cone Penetrometer (DCP) to verify the recommended bearing capacity.

5.6 Floor / Concrete Slabs

We recommend that grade slabs be supported on approved fill, residual soils or newly compacted structural fill. As a result of the encountered site conditions, we recommend a modulus of subgrade reaction (k_s) of up to 100 pounds per cubic inch (pci) for slabs supported by properly prepared non-elastic/plastic soil subgrade. This value is representative of a 1-ft square loaded area and may need to be adjusted depending on the size and shape of the loaded area and the method of structural analysis. We consider properly prepared soil subgrade to consist of approved residuum/PWR or approved structural fill soils within the top two feet of finished grades compacted to 100% of the standard Proctor method (ASTM D698). Compacted soils should be placed within ±3% of the optimum moisture content (OMC) as determined by the standard Proctor method.

CVET recommends the use of 8 inches of free-draining granular material (NCDOT No. 57 stone or recycled concrete) as both aggregate base course under the slab and capillary break below slabs on grade. Foundation slabs should have a minimum of 12 inches of free-draining material below the bearing elevation. We recommend wrapping the free-draining material with a separation filter fabric. Prior to placing the granular material, the subgrade for the entire slab area should be proofrolled.

Please note that site preparation and earthwork operations shall be performed in accordance with our Geotechnical Engineering Report to ensure adequate subgrade soil conditions for direct slab on grade support. The structural engineer of record should be provided with the report for review.

The use of a vapor retarder should be considered beneath concrete slabs on grade which will be covered with wood, tile, carpet or other moisture-sensitive or impervious coverings, per ACI 302 and/or ACI 360. Construction joints, contraction joints, and isolation joints should be provided in the slab to reduce the impacts of cracking and shrinkage. See ACI 302 for additional details regarding slab joint design.

5.7 Permanent Slopes

We recommend that permanent slopes be graded no steeper than 3H:1V. Building structures should be situated a minimum of 15 feet from the crest of any permanent fill slopes. Paved areas should be situated a minimum of 10 feet from the crest of any permanent fill slopes.

The permanent slopes should be vegetated for long-term surficial stability. The Owner can expect minor sloughs that may need to be repaired until permanent vegetation has taken to the slope soils.

5.8 Lateral Earth Pressure

Lateral earth pressure coefficients are presented below for use in determining lateral earth pressures against below grade retaining walls restraining structural fill soils. The values displayed below were developed based upon the encountered subsurface soil conditions assuming no hydrostatic pressure and level backfill behind the wall. The wall designer will need to account for any and all loading conditions that may be behind the wall. Note these are for back-wall pressures for wall design only.

- Moist Unit Weight = 125 pcf
- Angle of Internal Friction of Retained Fill = 30 degrees
- Active Earth Pressure Coefficient (K_a) = 0.33
- At-Rest Earth Pressure Coefficient (K_o) = 0.50
- Passive Earth Pressure Coefficient (K_p) = 3.0

If fixity of the wall system exists at the top or if no wall movement can be tolerated, we recommend At-Rest earth pressures be utilized in the design of retaining systems. Furthermore, sliding resistance can be provided by friction between the concrete foundation and the exposed subgrade soils, and through passive resistance. We recommend passive resistance be neglected in design and that a coefficient of friction of 0.35 be utilized for concrete bearing on newly compacted structural fill and/or approved residual soils.

Please note that the previous parameters are typical values for design purposes. Prior to construction of the retaining system, the proposed backfill should be subject to adequate laboratory testing to confirm design parameters, to confirm that they meet or exceed the parameters listed above. CVET does not recommend the use of fine-grained soils (CL, CH, ML, and MH) for use within the retained zone at a 1H:1V slope behind the heel (cast-in-place concrete footing) of the proposed structural walls.

Implementation of a drainage feature within the retaining system is a critical feature that shall be addressed during design. The buildup of hydrostatic water pressure behind the wall can lead to excessive lateral pressures, not accounted for in the design, thus leading to potential wall failure. We recommend a minimum of 12 inches of free-draining fill (NCDOT No. 57 stone) behind all subsurface retaining structures. A permanent French drain should be installed at the base of the drainage fill and hydraulically vented to daylight or to a nearby stormwater drainage structure. The drainage fill should be separated from the retained soil by use of a geotextile filter fabric (approved 4oz non-

woven). For below-grade structures where hydrostatic pressures cannot drain away, the structure should be designed for full hydrostatic backwall pressures.

Heavy earthwork equipment should maintain a minimum horizontal distance of 5 feet from wall face. While within this area, lighter, handheld compaction equipment should be used to compact wall backfill. Heavy equipment or material should not be parked or placed behind within 10 feet of the retaining wall during construction.

All design and construction considerations for retaining systems are site dependent. CVET would be pleased to provide design services for these systems or construction materials testing/ special inspection observations as an additional scope of services.

Temporary Support-of-Excavation Considerations

We understand that temporary support-of-excavation (SOE) may be required to facilitate excavation and construction of the new package plant/clarifiers, influent pump station, and equalization drain vault due to the proximity of nearby existing facility structures.

Based on the relatively shallow PWR and bedrock at the site, we anticipate temporary SOE may likely include a drilled-in soldier pile wall with temporary lagging. Depending on the depth of excavation and size of elements, temporary anchors and/or internal bracing may be required to limit horizontal deflection of the temporary SOE. We expect the design will require passive resistance developed along the embedded length of vertical elements in PWR and rock to resist the soil and applied loads along the retained height. Temporary SOE systems are typically designed by the contractor. CVET should be given an opportunity to review the temporary SOE design drawings and calculations prepared by the contractor.

5.9 Seismic Site Classification

Based on the borings, it is our opinion that a Seismic Site Classification of "C" is appropriate for this site. We based our opinion on SPT N-values in general accordance with *ASCE 7-10 Minimum Design Loads for Buildings and Other Structures*.

5.10 Construction Materials Testing and Special Inspections

Construction materials testing (CMT) and inspections should be performed at regular intervals throughout the course of the project. CVET is qualified for this work and would be pleased to provide these services during construction.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of Hazen and Sawyer and their agents for specific application to the referenced property, in accordance with generally accepted

soils and foundation engineering practices. No warranties, express or implied, are intended or made. The recommendations presented in this report are based on the specific test borings and laboratory testing performed as part of our scope of service, and do not reflect variations in subsurface conditions that may exist between test boring locations or in unexplored portions of the site. Note that the soil data presented in this report is for the specific time of this subsurface exploration. While the type of material encountered in the test borings will not likely change significantly over time, the properties of the materials can and will change over time, including soil moisture content, density, consistency, SPT "N" values, etc. Fluctuations in the groundwater level can have a significant impact on the material properties, as can seasonal changes. Site safety, excavation support related to OSHA requirements, and construction dewatering requirements are the responsibility of others, not CVET. In the event changes are made to the proposed construction plans, design or location of the project as described within this report, the recommendations provided in this report shall not be considered valid unless CVET is given the opportunity to review the changes, and either verifies or modifies the recommendations contained in this report in writing.

APPENDIX A – GEOPROFESSIONAL BUSINESS ASSOCIATION PAMPHLET

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

APPENDIX B – PROJECT FIGURES

CATAWBA VALLEY
ENGINEERING & TESTING

P.O.B. 747 HICKORY, NORTH CAROLINA 28603
TELE: 828-578-9972

GRASSY BRANCH WRF EXPANSION

OLD FISH ROAD
MONROE, NC 28110

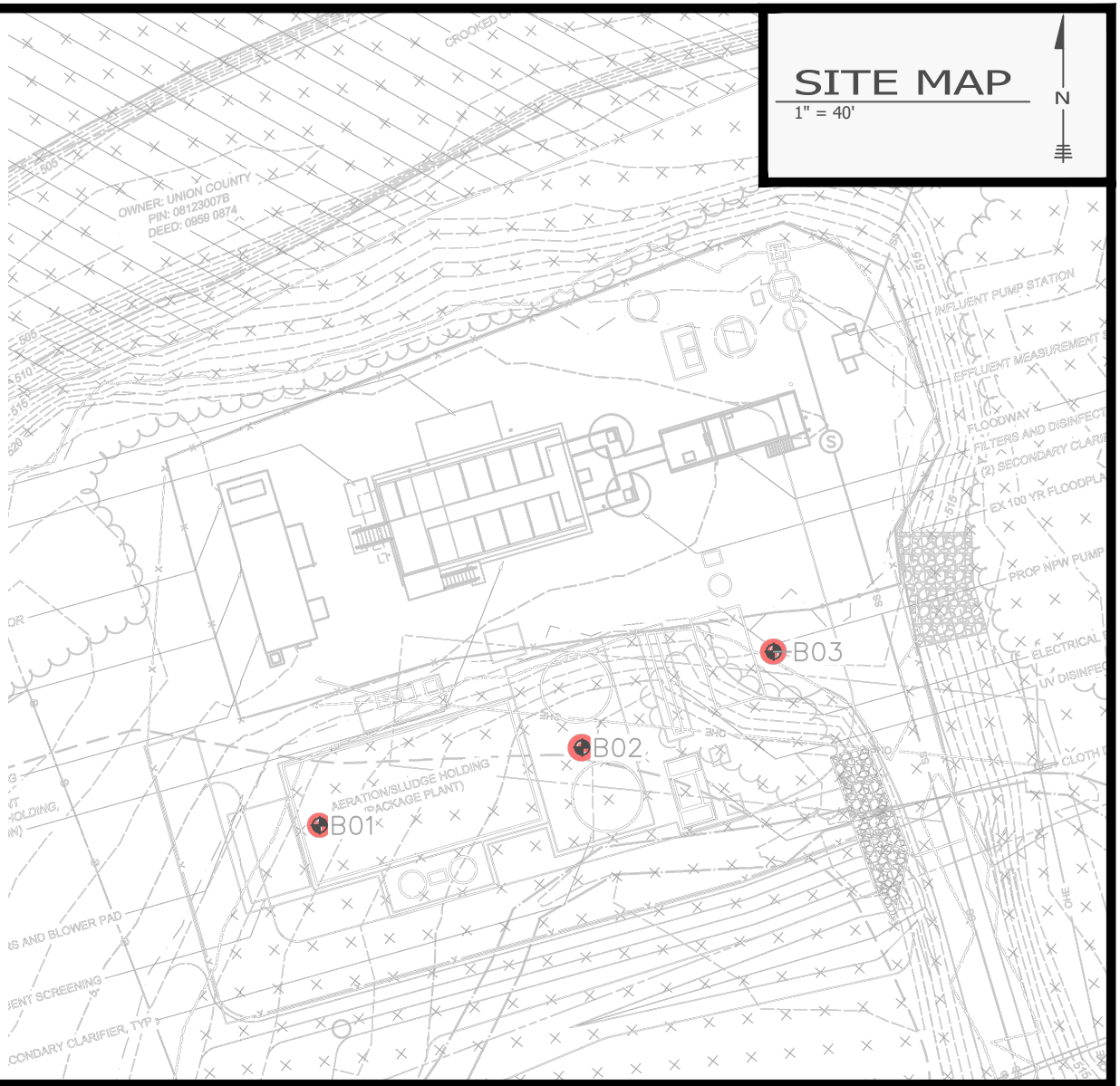
DRAWN BY	PROJECT NO.
SBS	24-518
DATE	SHEET NO.
03/07/2024	FIG. 1

NOTES:
1) BORING LOCATIONS ARE APPROXIMATE AND FOR ILLUSTRATION ONLY.
2) APPROXIMATE BORING LOCATIONS BASED ON PROPOSED LOCATIONS PROVIDED BY HAZEN AND SAWYER.

SITE MAP

1" = 40'

N



LEGEND

- STANDARD PENETRATION TEST
- CONE PENETRATION TEST (CPT)
- CPT NOT PERFORMED
- TEST PIT

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TELE: 828-578-9972

GRASSY BRANCH WRF EXPANSION

OLD FISH ROAD
MONROE, NC 28110

DRAWN BY	PROJECT NO.
SBS	24–518
DATE	SHEET NO.
03/07/2024	FIG. 2

Description	Elevation	Northing	Easting
B01	516	505817.87	1553124.69
B02	514	505835.75	1553185.03
B03	519	505857.79	1553229.03

BORING LOCATIONS AND ELEVATIONS ARE APPROXIMATE. BORING ELEVATIONS ARE BASED ON TOPOGRAPHIC CONTOURS SHOWN ON HAZEN AND SAWYER DRAWINGS C4 DATED OCTOBER 2023.

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ENGINEERING & TESTING
P.O.B. 747 HICKORY, NORTH CAROLINA 28603
TELE: 828-578-9972

GRASSY BRANCH WRF EXPANSION

OLD FISH ROAD
MONROE, NC 28110

DRAWN BY	PROJECT NO.
SBS	24-518
DATE	SHEET NO.
03/07/2024	FIG. 3

APPENDIX C – BORING LOGS

REFERENCE NOTES FOR BORING LOGS

I. Drilling Sampling Symbols

SS	Split Spoon Sampler	ST	Shelby Tube Sampler
RC	Rock Core, NX, BX, AX	PM	Pressure meter
DC	Dutch Cone Penetrometer	RD	Rock Bit Drilling
BS	Bulk Sample of Cuttings	PA	Power Auger (no sample)
HSA	Hollow Stem Auger	WS	Wash Sample
REC	Rock Sample Recovery %	RQD	Rock Quality Designation %

II. Correlation of Penetration Resistance to Soil Properties

Standard penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Density	*Adjective Form*
Under 4 blows/ft	Very Loose
5 to 10 blows/ft	Loose
11 to 30 blows/ft	Medium Dense
31 to 50 blows/ft	Dense
Over 51 blows/ft	Very Dense

Particle Size Identification		
Boulders		8 inches and larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	¼ to ½ inch
Sand	Coarse	2.00 mm to ¼ inch
	Medium	0.42 to 2.0 mm
	Fine	0.074 to 0.42 mm
Silt and Clay		0.0 to 0.074 mm

B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	*Consistency*	*Unconfined Comp. Strength Q_p (tsf)*	*Degree of Plasticity*	*Plasticity Index*
Under 2	Very Soft	Under 0.25	None to Slight	0-4
3 to 4	Soft	0.25-0.49	Slight	5-7
5 to 8	Medium Stiff	0.50-0.99	Medium	8-22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.00		
31 to 50	Hard	4.00-8.00		
Over 51	Very Hard	Over 8.00		

III. Water Level Measurement Symbols

WL Water Level	BCR Before Casing Removal	DCI Dry Cave-in
WS While Sampling	ACR After Casing Removal	WCI Wet Cave-in
WD While Drilling	▽ Est. Groundwater Level	▽ Est. Seasonal High GWT

The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clay and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.

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KEY TO SYMBOLS

CLIENT Hazen and Sawyer **PROJECT NAME** Grassy Branch WRF

PROJECT NUMBER 24-518 **PROJECT LOCATION** Monroe, North Carolina

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)

- FILL: Fill (made ground)
- GC: USCS Clayey Gravel
- PWR: Partially Weathered Rock
- STONE: Stone
- TOPSOIL: Topsoil

SAMPLER SYMBOLS

- Split Spoon

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTIC INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

TV - TORVANE
PID - PHOTOIONIZATION DETECTOR
UC - UNCONFINED COMPRESSION
ppm - PARTS PER MILLION

- Water Level at Time Drilling, or as Shown
- Water Level at End of Drilling, or as Shown
- Water Level After 24 Hours, or as Shown

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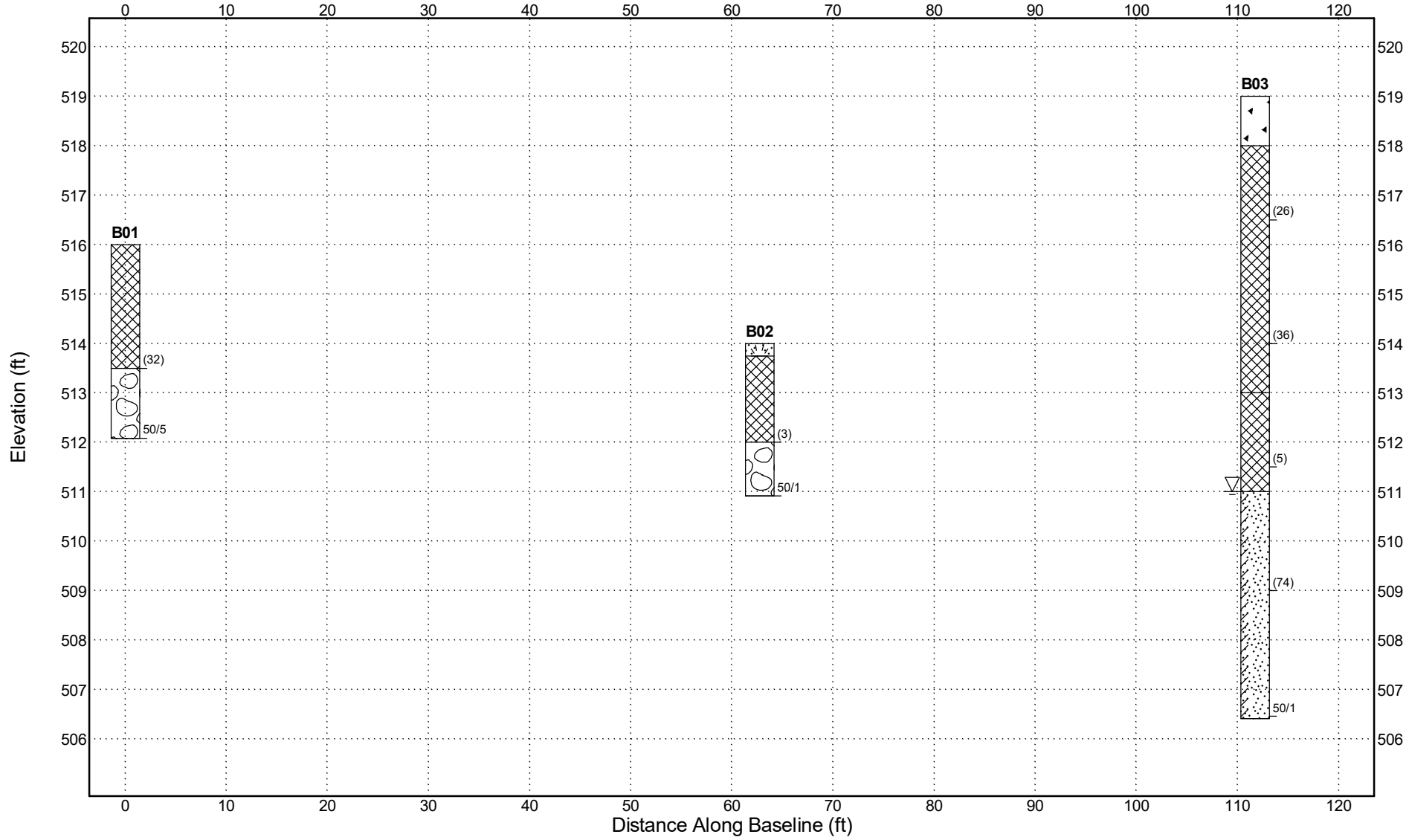
161 Lenoir-Rhyne Blvd./PO Box 747 Hickory, NC 28602 828 578 9972

SUBSURFACE DIAGRAM

PROJECT NUMBER 24-518
PROJECT NAME Grassy Branch WRF
CLIENT Hazen and Sawyer
PROJECT LOCATION Monroe, North Carolina



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BORING NUMBER B01

CLIENT Hazen and Sawyer
PROJECT NAME Grassy Branch WRF
PROJECT NUMBER 24-518
PROJECT LOCATION Monroe, North Carolina
DATE STARTED 3/13/24 **COMPLETED** 3/13/24
GROUND ELEVATION 516 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING ---
LOGGED BY TV **CHECKED BY** NAB
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	▲ SPT N VALUE ▲ (20 40 60 80)
0.0		(ML/MH) FILL: Sandy SILT or Sandy Elastic SILT, With Organics, Brown, Moist, Hard						
			SS 1	17	10-15-17 (32)			
2.5		513.5						
		(GC) PWR: Clayey GRAVEL, Gray, Tan, Orange, Dry, Very Dense						
		512.1	SS 2	40	50/5"			>>

Bottom of borehole at 3.9 feet.

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BORING NUMBER B02

CLIENT Hazen and Sawyer
PROJECT NAME Grassy Branch WRF
PROJECT NUMBER 24-518
PROJECT LOCATION Monroe, North Carolina
DATE STARTED 3/13/24 **COMPLETED** 3/13/24
GROUND ELEVATION 514 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
TIME OF BORING ---
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING ---
LOGGED BY TV **CHECKED BY** NAB
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION		SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT	▲ SPT N VALUE ▲ 20 40 60 80
0.0		TOPSOIL: (3 Inches)	513.8						
		(SC) FILL: Clayey SAND wth Gravel, With Organics, Brown, Moist to Wet, Soft - 3.3% Organics by Weight in SS1	512.0	SS 1	100	2-1-2-3 (3)	16	24	
2.5		(GC) PWR: Clayey GRAVEL, Brown, Gray, Wet, Very Dense	510.9	SS 2	92	6-26-50/1"			>>▲

Bottom of borehole at 3.1 feet.

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BORING NUMBER B03

CLIENT Hazen and Sawyer
PROJECT NAME Grassy Branch WRF
PROJECT NUMBER 24-518
PROJECT LOCATION Monroe, North Carolina
DATE STARTED 3/13/24 **COMPLETED** 3/13/24
GROUND ELEVATION 519 ft MSL **HOLE SIZE** 2.25 inches
DRILLING CONTRACTOR CVET
GROUND WATER LEVELS:
DRILL RIG NUMBER 1 **HAMMER EFFICIENCY** 85%
▽ **TIME OF BORING** 8.00 ft / Elev 511.00 ft
DRILLING METHOD 2.25 Hollow Stem Auger
END OF BORING --- Cave at: 9
LOGGED BY TV **CHECKED BY** NAB
NOTES Elevation Data Pulled From NCOneMap 2' Contours

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	PLASTICITY INDEX	MOISTURE CONTENT
0.0	STONE: (12 Inches)					
	518.0					
	(GM) FILL: Silty GRAVEL, Tan, Gray, Moist to Dry, Medium Dense to Dense	SS 1	33	4-11-15 (26)		
2.5						
		SS 2	3	27-19-17 (36)		
5.0						
	513.0					
	(GC) FILL: Clayey GRAVEL with Sand, With Black Root Organics, Gray, Tan, Moist to Wet, Loose - 2.5% Organics by Weight in SS3	SS 3	67	5-2-3 (5)	13	18
7.5	▽					
	511.0					
	(GC) RESIDUAL: Clayey GRAVEL with Sand, Gray, Tan, Wet, Very Dense	SS 4	67	11-31-43 (74)		15
10.0						
12.5						
	506.4	SS 5		50/1"		

▲ SPT N VALUE ▲ (20, 40, 60, 80)

Refusal at 12.6 feet.
Bottom of borehole at 12.6 feet.

APPENDIX D – SOIL LABORATORY RESULTS

CATAWBA VALLEY
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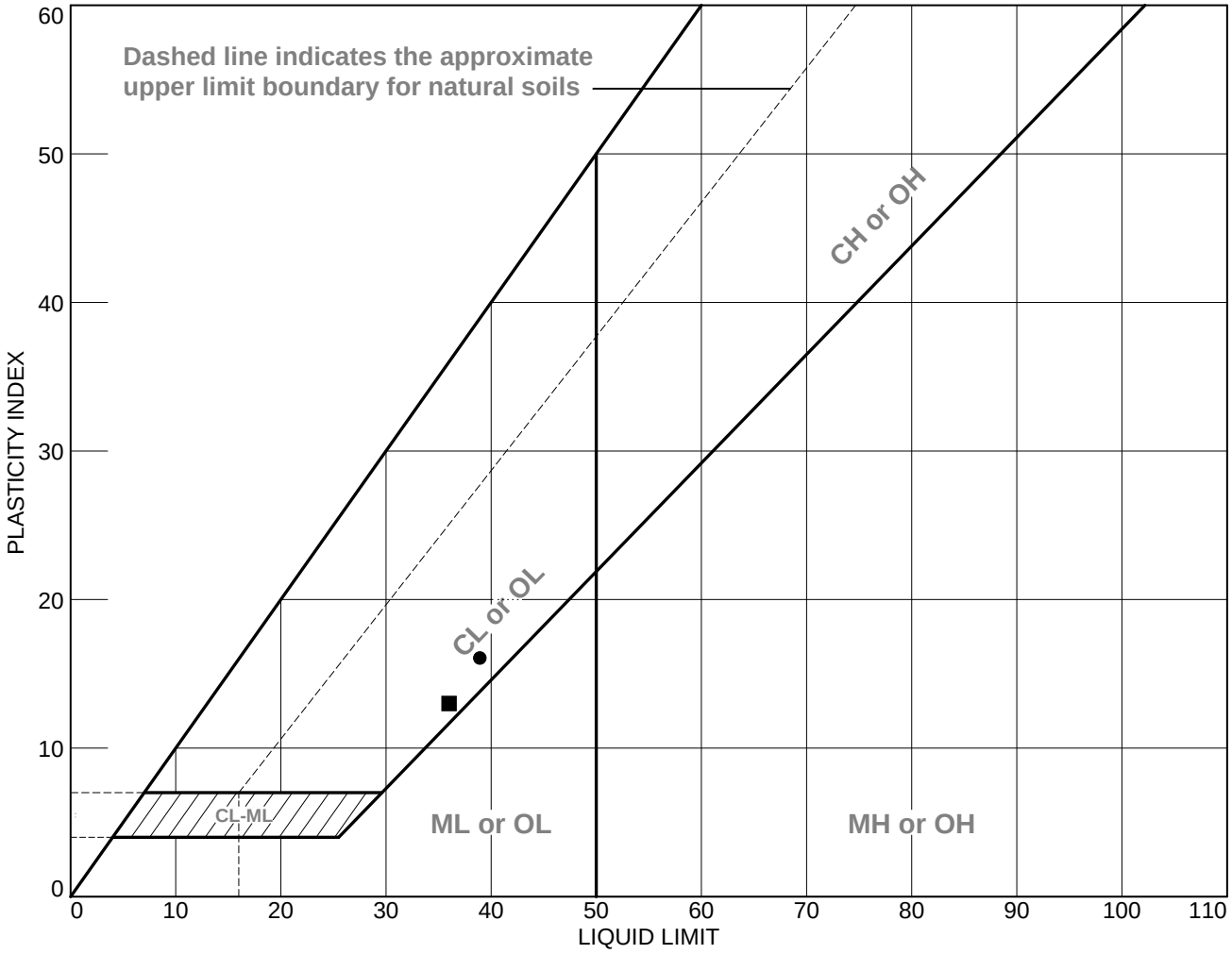
SUMMARY OF LABORATORY RESULTS

CLIENT Hazen and Sawyer **PROJECT NAME** Grassy Branch WRF

PROJECT NUMBER 24-518 **PROJECT LOCATION** Monroe, North Carolina

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% Gravel	% Sand	% Fines	Water Content (%)	Organics by Weight (%)
B02	0.0	39	23	16	25	31	44	23.9	3.3
B03	6.0	36	23	13	33	20	47	17.9	2.5
B03	8.5				54	26	20	14.7	

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

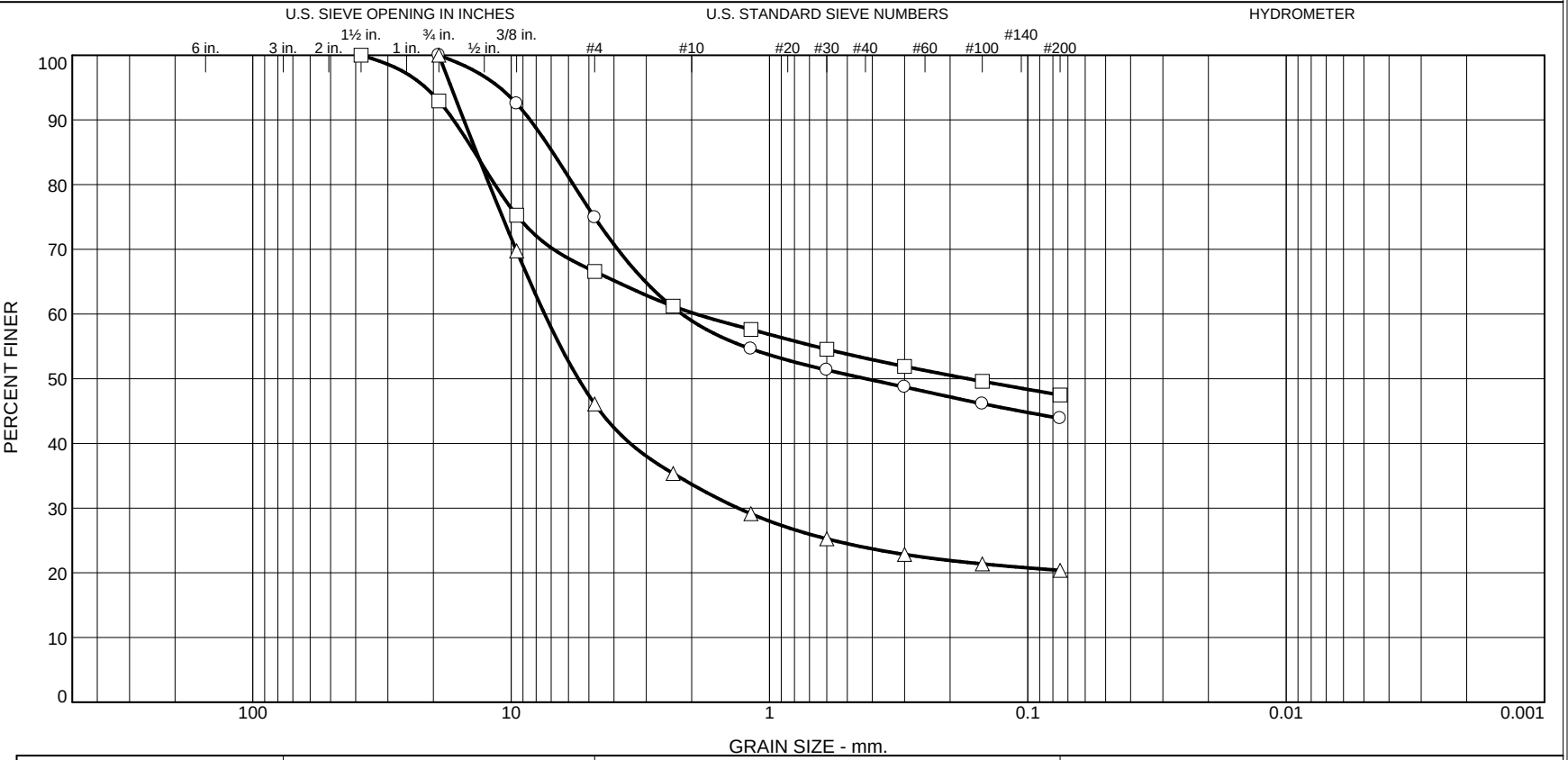
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Test Borings	8017	B-02, 0-2'	23.9	23	39	16	SC
■	Test Borings	8018	B-03, 6-7.5'	17.9	23	36	13	GC

Catawba Valley Engineering & Testing, P.C.
Hickory, North Carolina

Client: Hazen and Sawyer
Project: Grassy Branch WRF Expansion
Project No.: 24518 **Figure**

Tested By: BV **Checked By:** DR

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0	0	25	16	9	6	44	
□	0	7	26	7	7	6	47	
△	0	0	54	12	10	4	20	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	Test Borings	8017	B-02, 0-2'	03/19/24	SC	Brown Clayey SAND with Gravel	23.9	39	23
□	Test Borings	8018	B-03, 6-7.5'	03/19/24	GC	Brown Clayey GRAVEL with Sand	17.9	36	23
△	Test Borings	8019	B-03, 8.5-10'	03/19/24			14.7		

Client Hazen and Sawyer

Project Grassy Branch WRF Expansion

Project No. 24518 Figure

Catawba Valley Engineering & Testing, P.C.
Hickory, North Carolina

○ Organic content by weight: 3.3%
□ Organic content by weight: 2.5%

Tested By: BV **Checked By:** DR

ATTACHMENT NO. 4

Appendix F

Sole-Source Equipment Proposals

Disk Filtration System

To: All Bidding Contractors
Re: Union County Water Grassy Branch WRF Disk Filter

Section 46 61 41: Disk Filtration System

Veolia Project No. 5700133907

Bid Date: June 21, 2024
Proposal Date: May 31, 2024

Water Technologies

Veolia Water Technologies, Inc.
4001 Weston Parkway ● Cary, NC 27513 USA
Tel: 919-677-8310 ● Fax: 919-677-0082
www.veoliawatertech.com

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Veolia Water Technologies, Inc.
4001 Weston Parkway ● Cary, NC 27513 USA
Tel: 919-677-8310 ● Fax: 919-677-0082
www.veoliawatertech.com

1. PRICING TERMS AND SCHEDULE

1.1. DESCRIPTION OF WORK

Veolia, an equipment supplier, proposes and agrees to furnish all labor services, materials, equipment, and all other items and facilities necessary to supply and deliver the equipment items as specified in these Proposal Documents and conditions stated herein.

1.2. PROPOSAL PRICE

Price includes Discfilter equipment, as well as instrumentation and controls as detailed herein. Veolia's Bid Submittal is expressly conditioned upon the scope of supply, all terms and conditions, pricing, Comments to Bid Documents, and Veolia's Terms of Sale as included herein.

Veolia's scope of supply includes equipment and related site services as provided herein. To the extent engineering services are required for Veolia's scope of work, they will be performed by a properly licensed entity in the State of NC.

The price excludes sales and/or use taxes. Buyer agrees to provide the necessary tax-exempt certification or Reseller documentation for sales taxes exemption within thirty (30) days after receipt of a purchase agreement executed by all parties. Furthermore, Buyer accepts responsibility for all applicable state and local sales taxes as Supplier is not registered to collect or remit state sales and/or use taxes.

Veolia shall furnish and deliver (DDP Jobsite; Freight Estimated) Discfilter Equipment as well as instrumentation and controls, including submittals, start-up and other services, in conformance to the requirements set forth in this document for the Lump Sum price of:

$294,057

The price is valid for 90 days from the date of this Proposal. The proposed goods may be affected by the ongoing market fluctuations impacting material and shipping costs. Veolia reserves the right to re-evaluate the Proposal price prior to order acceptance.

The price above includes $8,500 as an estimate for shipping and freight costs. Please note that shipping will be billed based on actual price at time of delivery.

1.3. LIQUIDATED DAMAGES

Veolia shall not accept liquidated damages from Buyer, unless otherwise agreed to in writing between Buyer and Supplier. In any event, Veolia shall not be liable for liquidated damages imposed on an installing general contractor by the Owner.

1.4. TERMS OF PAYMENT AND CONDITION OF SALE

The terms of payment are 10% upon receipt of fully executed contract, 15% upon delivery of Submittals of shop drawings, and 75% upon delivery of equipment to destination.

Payment shall not be contingent upon receipt of funds by the CONTRACTOR from the OWNER and there shall be no retention in payments due to Veolia. All payment terms are net 30 days from date of invoice. Final payment shall not exceed 120 days from delivery of equipment. All other payment terms are as defined in Veolia's Standard Terms of Sale.

1.5. BONDS

Pricing does not include bonds. If bonds are required, Veolia shall provide a quotation as an adder that will be based upon a quotation from our Surety.

1.6. ESTIMATED DELIVERY SCHEDULE

Shop drawings will be submitted within 6 to 8 weeks of receipt of an executed Purchase Agreement signed by all parties.

Equipment is estimated to be delivered within 24 to 36 weeks of receipt of approved shop drawings. Actual equipment delivery lead times may vary at time of order. Veolia will work with the Buyer to update lead times at time of order. If Veolia is able to ship equipment sooner than the above schedule, contractor must accept deliveries and provide adequate storage on-site for such equipment.

Operation and Maintenance Manuals will be submitted within 30 days prior to delivery of equipment.

1.7. CONTACT INFORMATION

This bid submittal is respectfully submitted by:

	Veolia Contact	**Local Representative**
Name	Jim Daugherty	Spero Katsanos
Company	Veolia	VAND Solutions
Address	4001 Weston Parkway Cary, NC 27613	11010 Lake Grove Blvd, Ste 100-178 Morrisville, NC 27560
Mobile	(919) 349-2280	(919) 672-3086
Email	jim.daugherty@veolia.com	spero@vandsolutions.com

1.8. PROPRIETARY INFORMATION

The information or data contained in this proposal is proprietary to Veolia and should not be copied, reproduced, duplicated, or disclosed to any third party, in whole or part, without the prior written consent of Veolia. This restriction will not apply to any information or data that is available to the public generally.

1.9. STATEMENT REGARDING COVID-19

Veolia shall not be held liable in the event of a non-compliance with its obligations set forth herein to the extent such non-compliance is due to the consequences of the Covid-19 pandemic including without limitation (i) obligation to comply with the legislation enacted or measures taken by the authorities to address the Covid-19 pandemic (including mandatory closures, requisitions, transport limitations, social distancing requirements), (ii) observance of hygiene and security rules and recommendations resulting from the Covid-19 pandemic, (iii) inability to supply or distribute to relevant personnel appropriate personal protective equipment for the tasks to be performed, as a result of shortages of supply resulting from the Covid-19 pandemic, (iv) inability of a Veolia subcontractor or supplier to comply with its obligations for the reasons mentioned above; and to the extent the resulting impediments cannot be reasonably overcome.

In the event such consequences of the Covid-19 pandemic render Veolia's performance hereunder more onerous than could have been anticipated at the date hereof the parties shall negotiate alternative contractual terms, including for delivery/performance dates or service levels, which reasonably allow for the impact of the consequences of the Covid-19 pandemic referred to here above.

1.10. CONTRACT PRICE

Veolia shall be entitled to an adjustment of the Contract Price and/or time of performance in connection with exceptional circumstances beyond Veolia's control such as, without limitation, raw materials shortages, sudden fluctuations of raw material pricing, extension, suspension or delay of the the project schedule, sudden disruption on production of Goods and/or spare parts required for the Project, delay of carriers, which may affect the execution of Veolia's timely performance of the Work or affect it financially. Veolia shall notify the Owner accordingly within ten (10) days from the actual knowledge of such circumstances. Following submission of such notice, Veolia shall provide relevant justification reasonably satisfactory to the Owner to proceed to the necessary adjustments to the Contract Price and/or time of performance under the Contract.

2. VEOLIA - TERMS OF SALE

1. Applicable Terms. These terms govern the purchase and sale of the equipment and related services, if any (collectively, "Equipment"), referred to in Seller's purchase order, quotation, proposal or acknowledgment, as the case may be ("Seller's Documentation"). Whether these terms are included in an offer or an acceptance by Seller, such offer or acceptance is conditioned on Buyer's assent to these terms. Seller rejects all additional or different terms in any of Buyer's forms or documents.

2. Payment. Buyer shall pay Seller the full purchase price as set forth in Seller's Documentation. Unless Seller's Documentation provides otherwise, freight, storage, insurance and all taxes, duties or other governmental charges relating to the Equipment shall be paid by Buyer. If Seller is required to pay any such charges, Buyer shall immediately reimburse Seller. All payments are due within 30 days after receipt of invoice. Buyer shall be charged the lower of 1 ½% interest per month or the maximum legal rate on all amounts not received by the due date and shall pay all of Seller's reasonable costs (including attorneys' fees) of collecting amounts due but unpaid. All orders are subject to credit approval.

3. Delivery. Delivery of the Equipment shall be in material compliance with the schedule in Seller's Documentation. Unless Seller's Documentation provides otherwise, Delivery terms are DDP Jobsite. .

4. Ownership of Materials. All devices, designs (including drawings, plans and specifications), estimates, prices, notes, electronic data and other documents or information prepared or disclosed by Seller, and all related intellectual property rights, shall remain Seller's property. Seller grants Buyer a non-exclusive, non-transferable license to use any such material solely for Buyer's use of the Equipment. Buyer shall not disclose any such material to third parties without Seller's prior written consent.

5. Changes. Seller shall not implement any changes in the scope of work described in Seller's Documentation unless Buyer and Seller agree in writing to the details of the change and any resulting price, schedule or other contractual modifications. This includes any changes necessitated by a change in applicable law occurring after the effective date of any contract including these terms.

6. Warranty. Subject to the following sentence, Seller warrants to Buyer that the Equipment shall materially conform to the description in Seller's Documentation and shall be free from defects in material and workmanship. The foregoing warranty shall not apply to any Equipment that is specified or otherwise demanded by Buyer and is not manufactured or selected by Seller, as to which (i) Seller hereby assigns to Buyer, to the extent assignable, any warranties made to Seller and (ii) Seller shall have no other liability to Buyer under warranty, tort or any other legal theory. If Buyer gives Seller prompt written notice of breach of this warranty within 42 months from delivery or 2 year from beneficial use, whichever occurs first (the "Warranty Period"), Seller shall, at its sole option and as Buyer's sole remedy, repair or replace the subject parts or refund the purchase price therefore. In no event shall Seller's Warranty Period extend beyond February 2028 unless otherwise extended in writing by Seller and Buyer. If Seller determines that any claimed breach is not, in fact, covered by this warranty, Buyer shall pay Seller its then customary charges for any repair or replacement made by Seller. Seller's warranty is conditioned on Buyer's (a) operating and maintaining the Equipment in accordance with Seller's instructions, (b) not making any unauthorized repairs or alterations, and (c) not being in default of any payment obligation to Seller. Seller's warranty does not cover damage caused by chemical action or abrasive material, misuse or improper installation (unless installed by Seller). THE WARRANTIES SET FORTH IN THIS SECTION ARE SELLER'S SOLE AND EXCLUSIVE WARRANTIES AND ARE SUBJECT TO SECTION 10 BELOW. SELLER MAKES NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE.

7. Indemnity. Seller shall indemnify, defend and hold Buyer harmless from any claim, cause of action or liability incurred by Buyer as a result of third party claims for personal injury, death or damage to tangible property, to the extent caused by Seller's negligence. Seller shall have the sole authority to direct the defense of and settle any indemnified claim. Seller's indemnification is conditioned on Buyer (a) promptly, within the Warranty Period, notifying Seller of any claim, and (b) providing reasonable cooperation in the defense of any claim.

8. Force Majeure. Neither Seller nor Buyer shall have any liability for any breach (except for breach of payment obligations) caused by extreme weather or other act of God, strike or other labor shortage or disturbance, fire, accident, war or civil disturbance, delay of carriers, failure of normal sources of supply, act of government or any other cause beyond such party's reasonable control.

9. Cancellation. If Buyer cancels or suspends its order for any reason other than Seller's breach, Buyer shall promptly pay Seller for work performed prior to cancellation or suspension and any other direct costs incurred by Seller as a result of such cancellation or suspension.

10. LIMITATION OF LIABILITY. NOTWITHSTANDING ANYTHING ELSE TO THE CONTRARY, SELLER SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR OTHER INDIRECT DAMAGES, AND SELLER'S TOTAL LIABILITY ARISING AT ANY TIME FROM THE SALE OR USE OF THE EQUIPMENT SHALL NOT EXCEED THE PURCHASE PRICE PAID FOR THE EQUIPMENT. THESE LIMITATIONS APPLY WHETHER THE LIABILITY IS BASED ON CONTRACT, TORT, STRICT LIABILITY OR ANY OTHER THEORY.

11. Miscellaneous. If these terms are issued in connection with a government contract, they shall be deemed to include those federal acquisition regulations that are required by law to be included. These terms, together with any quotation, purchase order or acknowledgement issued or signed by the Seller, comprise the complete and exclusive statement of the agreement between the parties (the "Agreement") and supersede any terms contained in Buyer's documents, unless separately signed by Seller. No part of the Agreement may be changed or cancelled except by a written document signed by Seller and Buyer. No course of dealing or performance, usage of trade or failure to enforce any term shall be used to modify the Agreement. If any of these terms is unenforceable, such term shall be limited only to the extent necessary to make it enforceable, and all other terms shall remain in full force and effect. Buyer may not assign or permit any other transfer of the Agreement without Seller's prior written consent. The Agreement shall be governed by the laws of the State of North Carolina without regard to its conflict of laws provisions.

3. DESIGN SUMMARY

3.1. DESIGN CRITERIA

The proposed system is designed per the Basis of Design contained in Annex A and conditioned on the details contained within Section 3 in its entirety:

3.2. PERFORMANCE GUARANTEE

I. Definitions

A. Supplier: Veolia Water Technologies, Inc. dba Veolia

B. Purchaser: Shall mean the party that has or will enter into a Contract or Purchase Order with Supplier for the purchase of the Equipment.

C. System Stability: Is achieved when the Basis of Design conditions being met, the system appears to be acclimated to the water or wastewater that it is intended to treat, the System's unit operations are treating the TSS being provided and appear to be functioning at acceptable operating conditions, and the System is being operated with proper pre-treatment, pre-conditioning, or chemical conditioning as instructed by Supplier.

D. System: The facility at which the Supplier's Equipment is to be installed inclusive of upstream and downstream Equipment and appurtenances.

E. Equipment: Equipment provided by the Supplier upon which the Process Guarantee applies.

II. Basis of Design

A. Purchaser hereby agrees to and certifies the Basis of Design is as provided in Annex A.

III. Process Guarantee

A. The Process Guarantee as defined in Annex B shall be conclusively and finally demonstrated through the successful completion of the Performance Test as described herein.

B. Supplier's obligation to comply with the Process Guarantee is strictly subject to and conditioned on the following criteria in effect during start up, operation and Performance Test periods:

1. The influent is in compliance with the Basis of Design in accordance with Annex A ("Compliant Influent").

2. The operation of the System is in accordance with Supplier's Operation and Maintenance manual and/or Supplier's direction.

3. Purchaser allowing Supplier access to the site and any and all data deemed relevant by Supplier and documentation for the facility and its operation.

4. Remote access monitoring at Supplier's discretion.

5. All existing equipment and facilities of Purchaser are in good condition and free of defects.

6. All chemical feed equipment not provided by Supplier shall provide appropriate amounts and kinds of chemicals, as recommended by Supplier, to achieve proper treatment and feed them in accordance with the Supplier's instructions.

7. System Stability is achieved as deemed by Supplier.

C. A Performance Test Protocol shall be provided by Supplier at least 60 days before the start of feeding influent to the Equipment.

IV. Performance Test:

A. Activities and responsibilities

1. During start-up, operation and Performance Test periods, the Purchaser shall be responsible to provide trained, competent operators who will operate the facility in accordance with Supplier's Operation and Maintenance manual and/or Supplier's direction.

2. Purchaser shall be responsible and bear all costs for collecting all samples, carrying out all laboratory analysis or other tests, and furnishing all necessary labor, laboratory equipment, and supplies.

3. The Performance Test shall commence no later than 7 days after Supplier's written notice to Purchaser that System Stability has been reached.

4. The Performance test shall consist of one, 5-day performance test.

5. If by one (1) month after the Equipment is ready to accept influent, the design flow and / or TSS is not available, the Performance Test may be conducted on as much wastewater flow and TSS as is available.

6. This Performance Guarantee will be considered fully satisfied upon completion of the Performance Test demonstrating that the Equipment has delivered effluent as defined in Annex B.

7. During the Performance Test, if operations are interrupted for the maintenance, repair or replacement of Equipment necessary to the Performance Test, the Equipment shall be repaired or replaced (at the cost of the party who is responsible for the damage) and only the remaining portion of the Performance Test will be completed.

8. Upon successful completion of the Performance Test, Supplier shall execute and submit a performance test report and the Certificate of Performance Test Acceptance provided in Annex C to the Purchaser. The effective date for acceptance shall be the date the Performance Test was completed.

B. Unavailability of compliant Influent or other obstacles to the Performance Test

1. Non-Compliant Influent. Any change in the Basis of Design conditions provided in Annex A may have a negative impact on the performance of Supplier's Equipment. It is therefore agreed by the Parties that: (i) the Purchaser shall inform Supplier of any such changes in a timely manner in order to allow the Parties to assess any impact on the Basis of Design and/or the performance of Supplier's Equipment;

(ii) Supplier shall assess the consequences of such changes on the Performance Guarantee and/or Performance Test; and (iii) the parties shall meet to try to agree on any required revisions to the Performance Guarantee and/or Contract.

2. If, after the commencement of the Performance Test, the Purchaser is unable to deliver Compliant Influent to the Equipment, the Supplier shall attempt to treat the Non-Compliant Influent, while the Purchaser makes every effort to bring the Influent into compliance. Supplier shall assist Purchaser and use commercially reasonable efforts to adjust Equipment and/or operating and maintenance guidelines to optimize performance of the Equipment under the prevailing conditions.

3. Despite the efforts described above, if after the commencement of the Performance Test, any daily Influent samples taken during such Test are Non-Compliant Influent, then that day's results and any following days impacted will be excluded from the Performance Test's final results and that day(s) will be considered passed.

4. Disagreement over Compliant Influent. Should the Parties disagree on whether the Influent is Compliant Influent or not, Supplier may take additional Influent and Effluent samples and conduct laboratory testing at a mutually agreed upon 3rd party laboratory, and as applicable, either the Performance Test will be delayed (if not yet commenced) or the Performance Test will be rescheduled. The Contract Schedule and date of the Performance Test will be adjusted accordingly as provided in the applicable section of the Contract, until the results of such laboratory tests are issued. If the laboratory testing confirms the Influent is non-Compliant Influent, Purchaser shall reimburse Supplier for its costs and expenses.

5. Should the Performance Test fail due to reasons not attributable to Supplier (other than non-compliant influent), at Purchaser's request, cost and expense, Supplier may agree to conduct a subsequent Performance Test.

6. Should the Purchaser be unable or unwilling to conduct the Performance Test within 12 months from delivery of Supplier's Equipment, the Performance Test Period as defined herein, the requirement to conduct a Performance Test, and the Process Guarantee will be deemed met and Purchaser will execute the Certificate of Acceptance. At Purchaser's request, cost and expense, Supplier may agree to extend the time period to conduct the Performance Test.

C. Failure of the Performance Test due to Supplier

1. Should the Performance Test fail due to reasons attributable to Supplier, Supplier will be given the opportunity and a reasonable time to adjust or modify the System in accordance with Supplier's scope of supply, or to modify the operating protocols of the System, provided such operating protocols are in accordance with good engineering practices. Supplier shall be granted two (2) additional opportunities to successfully complete a Subsequent Performance Test. All such adjustments, modifications and additional testing shall be done at Supplier's expense.

2. In the event that the Equipment fails to meet the Process Guarantee following Supplier's efforts as described in the preceding paragraph, Supplier's sole obligation and Purchaser's sole remedy shall be to replace or modify the Equipment, as Supplier deems appropriate to enable the Equipment to meet the Process Guarantee, subject to the limitation of liability set forth in the Contract.

3. Supplier reserves the right to perform bench-scale demonstration testing to verify theoretical achievable performance. Demonstrated values will be used as the basis for revision to Performance Guarantee

Criteria or process adjustments, including but not limited to adjustment in chemical type, location, and dose.

V. Test Methods and Sampling Requirements

A. The following Sampling and Analytical Parameters table provides the minimum parameters for sampling and analysis. Supplier reserves the right to witness the sampling and testing and to take portions of the samples for analysis in its own laboratories.

B. The publication, Standard Methods for Examination of Water and Wastewater, most recent edition, shall be used as the primary laboratory and analytical procedure source, unless otherwise agreed to by Supplier. All other analyses, data reduction or tests not specified in that publication or otherwise specified shall be carried out using procedures furnished or approved by Supplier.

C. In the case of continuous reading instrumentation, OWNER/CONTRACTOR shall calibrate instrumentation at least once per test period. Calibration reports shall be available if requested by Supplier.

Sampling and Analytical Parameters		
Parameter	Sample Type	Frequency
Plant Flow, Influent/Effluent, MGD	N/A	Every 30 minutes / as needed to properly record
TSS, Influent/Effluent, mg/L	Composite	Every 24 hours

ANNEX A – BASIS OF DESIGN

Purchaser hereby agrees to the Basis of Design as defined herein, confirms its accuracy and completeness, and agrees that it shall serve as the basis for the Process Guarantee as provided in Annex B.

I. Compliant Influent Composition:

Parameter	Units	Values
Influent Source	NA	Secondary Clarification following Activated Sludge
Flow, Peak Hour	MGD (gpm)	0.47 (326)
Flow, Average Day	MGD (gpm)	0.067 (47)
TSS, Peak Influent	mg/L	45
TSS, Average Daily Influent	mg/L	15

A. Conditions and Clarifications:

1. The wastewater is biodegradable and does not contain any substance or element whose presence or concentration causes interference or inhibition, defined as: a substance that hinders the mechanisms of treatment; or whose treatment byproduct (sludge, dewatered liquor, etc.) is hazardous or otherwise requires additional cost for disposal; or may result in gases or vapors that pose a risk to system performance or human health; or that is corrosive, erosive, or abrasive; or which contains pollutants that obstruct the flow in the system. Examples include solvents, lubricants, preservatives, quaternary ammonium compounds, fugitive polymers, oils, etc.

ANNEX B – PROCESS GUARANTEE

Supplier warrants and represents that during the Performance Test, the Equipment will produce effluent meeting the objectives listed in the table below:

I. Compliant Effluent Composition:

EFFLUENT OBJECTIVES	
Monthly Average Effluent TSS, mg/L	≤ 5.0

A. Conditions and Clarifications:

1. Meeting the performance requirements is contingent on the upstream process providing influent to the filters with characteristics suitable for filtration, i.e., particles of sufficient size and strength to allow retention on the specified 10 um media surface.

2. Effluent Monthly Average TSS is based on average inlet conditions as defined herein.

ANNEX C – CERTIFICATE OF PERFORMANCE TEST ACCEPTANCE

The undersigned representative of Veolia Water Technologies Inc (dba Veolia) hereby certifies that the Equipment has successfully completed the Performance Test on:

_____

and as required by the Contract between Veolia and

_____

for the named project.

System: Hydrotech Discfilter Filtration System
Project: Union County, Grassy Branch WRF, NC DFS

Veolia Water Technologies Inc
Signed:

_____

Printed or Typed Name:

_____

Title:

_____

Date:

_____

ACCEPTANCE:

Purchaser hereby agrees that the Equipment has successfully completed the Performance Test and the Process Guarantee is discharged as of the completion date shown.

Union County, Grassy Branch WRF, NC DFS

Signed:

_____

Printed or Typed Name:

_____

Title:

_____

Date:

_____

4. EQUIPMENT SCOPE OF SUPPLY

4.1. GENERAL

Veolia will supply a total of one (1) Veolia/Hydrotech Discfilter unit – Model HSF2202-1C as described herein. Each filter unit will be supplied with

- Filter chassis and tank
- Filter Media
- Local control panel as detailed in Section 4.2
- 8" Influent and Effluent Flanges with loose galvanized flange rings
- 6" Backwash Sludge Reject Flange with loose galvanized flange rings
- Backwash pump

Each Discfilter shall be supplied as follows:

Table 2: Discfilter Design and Scope

Filter Design Data	
Filter Pore Size, µm	10
Filter Cloth Material	Polyester
Number of Filter Discs per unit	2
Filter Disc Diameter, m	2.2
Filter Submerged Surface Area per unit, ft^2	78
Dry Weight / Operational Weight, lbs	4,700 / 19,200
Hydraulic Loading rate, gpm/ft^2	4.16
Material of Construction	
Frame	304 SSTL
Disc	ABS
Covers	GRP
Filter Drive Unit	
Drive Motor	1.5 Hp, 460v, 3 phase
Drive Assembly	Drive chain and sprocket
Backwash Cleaning System	
Backwash Pump	2 Hp, 460v, 3 phase
Backwash Pressure, psi	110
Backwash Flowrate, gpm	14

The following is a list of spare parts provided for this project:

- 3 Filter Media Panels
- 2 Backwash Nozzles
- 1 Actuator
- 1 each type of valve
- 1 Strainer Basket

IMPORTANT NOTE: NO ADDITIONAL TOOLS AND/OR SPARE PARTS OTHER THAN LISTED ABOVE WILL BE PROVIDED AS PART OF VEOLIA'S SCOPE OF SUPPLY. OIL AND LUBRICANTS

ARE NOT INCLUDED AS PART OF VEOLIA'S SCOPE OF SUPPLY. THESE ARE TO BE THE RESPONSIBILITY OF THE CONTRACTOR.

4.2. CONTROL PANELS

The control system equipment detailed herein will be supplied with the Veolia/Hydrotech filter system and is to be installed by the contractor. Please note that Veolia intends to supply only the equipment detailed in this scope of supply. Any requests to modify components or quantity may result in price modification.

All PLC and operator interface programming is based on Veolia standards. Any requests or requirements that would deviate from this standard may result in additional costs. Veolia will be providing programming only for the Veolia supplied control panels. The programs developed by Veolia are for use on the Veolia supplied panels only. The Veolia supplied programs cannot be used, in whole or any part, for other uses. Veolia will supply copies of the completed programs at job completion. Prior to supplying the completed programs, Veolia requests that a non-disclosure agreement be signed and returned to Veolia.

Disc filter Control Panel

Qty	Description	Manufacturer
1	NEMA 4X 316 Stainless Steel Wall Mount Enclosure	Saginaw
1	30A 3-Pole 480VAC Fused Disconnect	Square D
AR	Feed Through Terminal Block	Phoenix Contact
1	1.5HP 460VAC Altivar 320 VFD for Shaft Motor /w Fuses	Square D
1	2HP 460VAC IEC Non-Reversing Starter w/Overload Protection for Backwash Pump Motor TeSys U	Square D
1	480VAC Disconnect Receptacle w/Aux Switch for Chemical Clean Pump Motor	Hubbell
1	460/120VAC 500VA Control Panel Transformer	Square D
1	10" Color Touchscreen PanelView Plus 7 Standard w/Ethernet	Allen Bradley
1	NEMA 4X Stainless Steel Window Kit for HMI	Saginaw
1	CompactLogix PLC w/IO	Allen Bradley
1	Ethernet Switch 4 RJ-45, 1 Fiber Port 10/100	Phoenix Contact
1	APC Smart-UPS 1000VA	APC
3	30mm Hand-Off-Automatic Switch Manual Return	Square D
1	30mm Pushbutton	Square D
2	Liquid Level Relay w/Base	SSAC
AR	Double Level Field Terminal Block	Phoenix Contact
AR	120VAC DPDT Relay w/Base	Square D
AR	Circuit Breakers	Square D
AR	Misc. Wire and Wire Duct	
1	Completed Panel Shop Tested and UL Labeled	Veolia
1	Panel site Start-Up and Testing	Veolia
1	Studio 5000 Standard License	Allen Bradley

- There will be one (1) Disc filter Control Panel. All field wiring and field terminations are by others.
- Disc filter Control Panel is shipped loose, and is field installed and mounted by the Contractor
- Discfilter Sunshields to be provided and installed by contractor as necessary
- Conduit and wire is required from the Backwash Motor to the Disc filter Control Panel, this is to be supplied and installed by the Contractor.
- Conduit and wire is required from the Drum Motor to the Disc filter Control Panel, this is to be supplied and installed by the Contractor
- Conduit and wire is required from the Low Level Pressure Switch, Backwash Level Probe and High Level Probe to the Disc filter Control Panel, this is to be supplied and installed by the Contractor

No other Instruments, Control Panel Components will be supplied unless they are explicitly listed in this Scope of Supply.

4.3. INSTRUMENTATION

Veolia shall supply the field instruments as detailed herein:

Field Instruments

Qty	Description
2	Level Probe (Backwash Initiation)
2	Level Probe (Bypass/High Level Indication)
2	Pressure Switch (Dry Run Backwash Pump Protection)

Veolia will calibrate and start-up Instruments supplied by Veolia. Instruments supplied by others will require calibration and start-up by others.

No other instruments such as magnetic flow meters, turbidimeters, pressure transmitters, and/or float switches are included in this proposal.

I&C Spare Parts

Qty	Description	Manufacturer
1	Compact Logix PLC Processor	Allen Bradley
1	Compact Logix PLC Power Supply	Allen Bradley
1	Compact Logix PLC Digital Input Module	Allen Bradley
1	Compact Logix PLC Digital Output Module	Allen Bradley
1	24VDC Power Supply 10A	Phoenix Contact

5. SCOPE OF WORK

Veolia is responsible for process design and equipment procurement required for the Discfilter process. Veolia scope of work does not include any equipment, materials or other services not specifically defined in this proposal. The equipment scope of supply shall include the equipment as shown in the attached scope of supply.

5.1. PROCESS DESIGN AND ENGINEERING

Veolia will perform engineering in accordance with the applicable national codes, standards, and/or regulations (except where otherwise noted) in effect at the time of this proposal. Additionally, Veolia will provide all necessary design, installation, and operating information for equipment within its stated scope of supply. Veolia is not responsible for the design, selection, installation, operation, or maintenance of any material, equipment, or services provided by others.

Veolia will provide process engineering and design support for the system as follows:

1. Technical instruction for operation and start-up of the system
2. Equipment layout drawings
3. Equipment installation instructions
4. O&M manuals

5.2. FIELD SERVICE

Veolia shall supply the following services of one (1) system-trained representative as detailed herein:

- Four (4) days, in not more than two (2) trips to assist with installation, testing, start-up and training

NOTES:

- Man-days are eight hour days Monday through Friday that include travel time.
- Man-days and/or trips required beyond those indicated above will be billed at Veolia's published standard rates at time of service, plus travel and lodging costs. Such additional days could become necessary for correction of improperly installed equipment or instrumentation, prolonged construction time, or Contractor's failure to properly coordinate start-up and training.

5.3. EXTENDED FIELD SERVICE

Veolia will provide remote performance support during the active equipment warranty phase, consisting of both incoming and outbound call support and regular reports to summarize performance observations and recommendations. This support will be provided through the Hubgrade digital service of Veolia. Support directly tied to warranty claims will not draw upon the Hubgrade support services.

a. Treatment Performance Summary Report: Quarterly

b. Outbound Wellness Call: Quarterly

c. Process/Automation Support Bank (Inbound Calls): 10

6. ITEMS NOT INCLUDED

6.1. SCOPE OF SUPPLY BY OTHERS

The following is a non-inclusive list of material that shall be furnished by the Contractor:

1. Obtain necessary construction permits and licenses, construction drawings (including interconnecting piping drawings), field office space, telephone service, and temporary electrical service.
2. All site preparation, grading, locating foundation placement, excavation for foundation, underground piping, conduits and drains.
3. Demolition and/or removal of any existing structures, equipment or facilities required for construction, and installation of the Veolia supplied systems.
4. Supply and install all bulk storage tanks, pads, and supports including the concrete basins required for the Veolia supplied systems. Provide all grouting for the bottom of the tanks, Discfilters, influent, effluent and bypass channels and all other required grout.
5. Provide and installation of all foundations, supply and installation of all embedded or underground piping, conduits and drains.
6. All backfill, compaction, finish grading, earthwork and final paving.
7. Receiving (preparation of receiving reports), unloading, storage, maintenance preservation and protection of all equipment, and materials provided by Veolia.
8. Installation of all equipment and materials provided by Veolia.
9. Supply, fabrication, installation, cleaning, pickling, and/or passivation of all stainless steel piping components.
10. Provide all imbedded pipe sections and valves for tank drains.
11. All cutting, welding, fitting, and finishing for all field fabricated piping.
12. Supply and installation of all flange gaskets and bolts for all piping components.
13. Supply and installation of all pipe supports.
14. Installation, termination and field wiring of all control panels and instrumentation supplied by Veolia.
15. Supply and install all sample pumps and sample lines required for instrumentation provided by Veolia.
16. Labor and material for winterizing all systems.

17. Supply and install all electrical power and control wiring and conduit to the equipment served plus interconnection between Veolia's furnished equipment as required, including wire, cable, junction boxes, fittings, conduit, etc.

18. Supply and install all insulation, supports, drains, hold down clamps, manhole covers, condensate drain systems, wastewater valves, flanges, flex pipe joints, expansion joints, boots, gaskets, adhesives, fasteners, safety signs, and all specialty items such as strainers and traps.

19. Provide all labor, materials, supplies and utilities as required for start-up, and performance testing including laboratory facilities, analytical work and chemicals.

20. Provide all chemicals, lubricants, glycol, oils, or grease and other supplies required for equipment start-up or plant operation.

21. Provide all anchor bolts, anchor adhesives, and mounting hardware.

22. Provide and install all piping required to interconnect to the Supplier's equipment.

23. Provide all nameplates, safety signs and labels.

24. Provide, and install all support beams and/or slabs for mixers, and/or chemical feed systems.

25. Provide all floor gratings, handrails, access hatches, ladders, and access platforms.

26. Concrete, mastic, sealing compounds.

27. The Contractor shall coordinate the installation and timing of interface points such as piping and electrical with the Supplier.

28. Supply and install all sunshields and/or additional enclosures, not as needed when installing equipment and instrumentation outdoors.

29. Contractor shall be responsible for all waste and sludge storage and disposal.

30. Video recording of any training activities.

31. All other necessary equipment and services not otherwise listed as specifically supplied by Veolia.

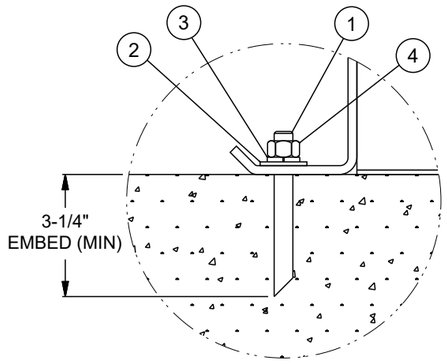
7. COMMENTS TO BID DOCUMENTS

Veolia reviewed the specifications and drawings pertaining to the equipment to be supplied as detailed herein. Please note the Veolia clarifications and exceptions to the specifications and drawings identified as follows:

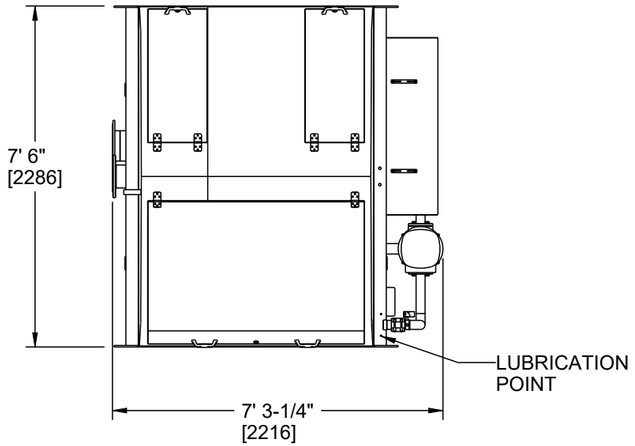
Number	Specification Section or Drawing Number	Referenced Documentation	Comment Verbiage
1	26 05 60.2.01.B	Electric motors shall be manufactured by Baldor/Reliance Electric Company, Nidec Motors, Toshiba Industrial and Power System, Inc., Siemens Energy and Automation, Inc., General Electric Company; or Equal	Please add SEW and Grundfos motors.
2	26 05 60.2.02.G.9	Unless otherwise specified in the equipment specifications, motors rated less than 200 HP that are controlled by a VFD shall be furnished with motor winding high temperature switches embedded in the stator windings with leads brought out to the motor terminal box.	Thermisistors to be supplied on the Drive Motor (VFD driven).
3	26 29 23.2.03.A	The VFD unit shall be the Eaton PowerXL DG1 series, Square D Altivar 600 series, Rockwell automation powerflex 750 series, ABB ACQ580 series, or Toshiba AS3/w& series.	Please note our VFD's are SEW Movimot VFD and Square D Altivar 320.
4	46 61 41: 2.05.B	Drive assembly chain and sprocket	Please note the language in the specifications is for a different unit style. The drive assembly shall consist of a gear motor, steel chain, and steel sprockets. The gear motor shall be SEW Eurodrive shaft mounted helical worm gear with integral standard AC induction motor. The motor shall be rated for 1.5 HP, 460V, 3 phase, 60HZ operation and as specified in Section 26 05 60 - Low Voltage Electric Motors.
5	46 61 41: 2.10.C	Pumps shall be provided with a motor heater and pump casing heater.	Note that the backwash pumps do not have the ability to be provided with pump casing heaters.

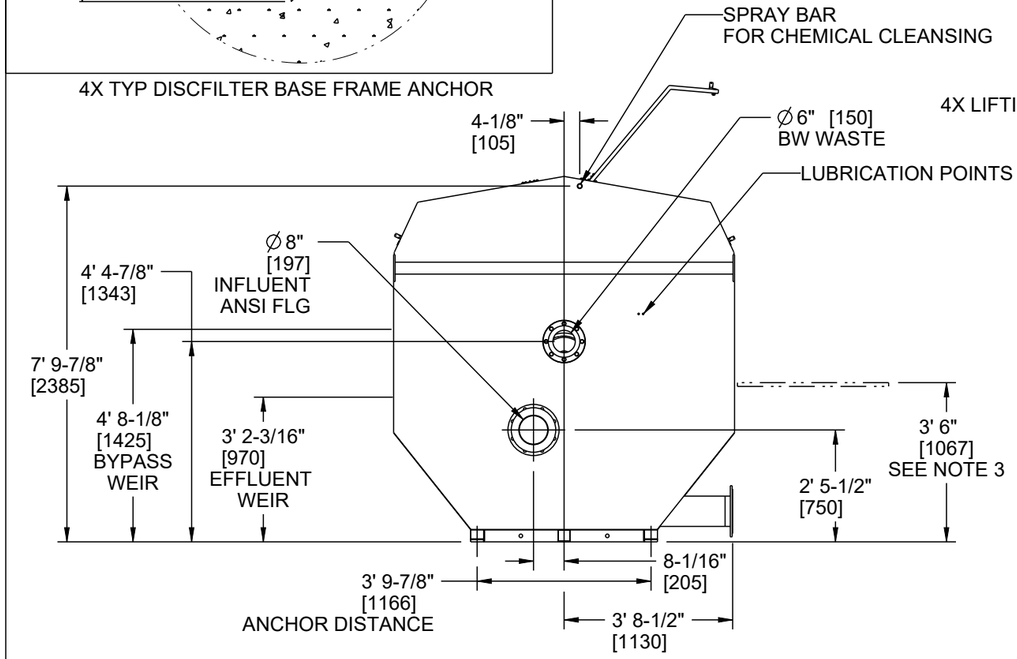
8. DRAWINGS

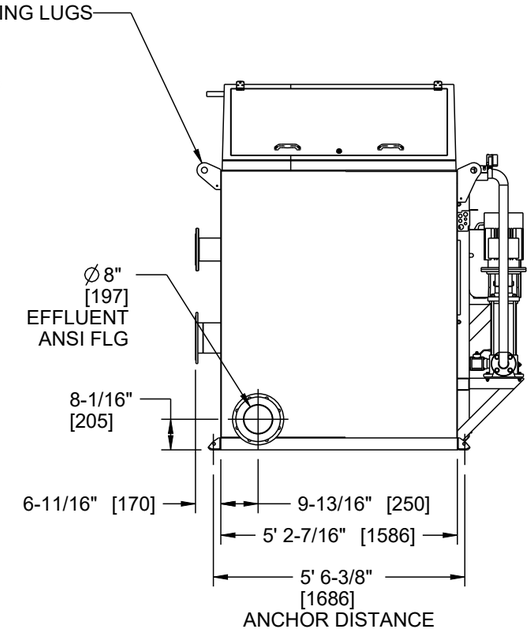
1	1/2" THREADED ROD: ASTM F593 W/ B1.1 UNC THDS
2	1/2" FLAT WASHER: ASTM A240 304 SS. PLATE
3	1/2" LOCK WASHER
4	1/2" HEX NUT: ASTM F594 W/ B1.1 UNC THREADS

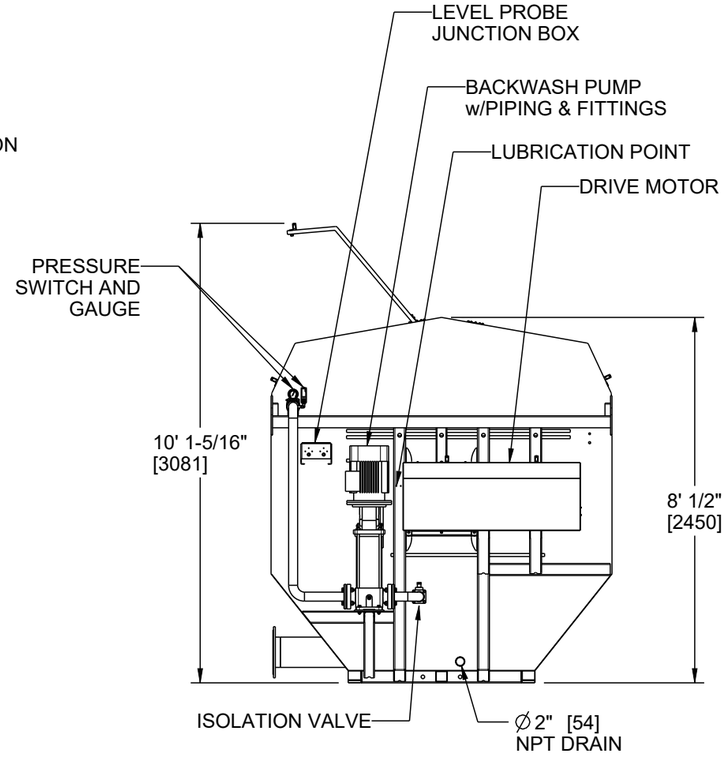


4X TYP DISCFILTER BASE FRAME ANCHOR









NOTES :
1. ALL FLANGE CONNECTIONS: BOLT PATTERN ANSI B16.5. PLATE FLANGES: GALVANIZED.
2. DIMENSIONS IN [ ] ARE MM.
3. RECOMMENDED PLATFORM ELEVATION. PLATFORM TO BE SELF SUPPORTING AND MAY NOT BE ATTACHED TO THE FILTER. LOADS MAY NOT BE TRANSFERRED TO THE FILTER. PLATFORMS DESIGNED/PROVIDED BY OTHERS UNLESS STATED OTHERWISE.
4. RECOMMENDED MAINTENANCE CLEARANCES: 24" AT FRONT & REAR OF FRAME (NEAR DRIVE, PUMP), 36" WIDE WALKWAY (SPRAY HEADER SIDE), 6" FRAME TO SIDEWALL.
5. FOLLOW ANCHOR MANUFACTURERS GUIDELINES FOR SPECIFIC INSTALLATION REQUIREMENTS INCLUDING ANCHOR EMBEDMENT AND EDGE DISTANCE. ALL ANCHORS AND FASTENERS TO BE STAINLESS STEEL. APPLY ANTI-SEIZE TO ALL CONNECTIONS. ALL ANCHOR BOLTS SHOWN SHALL UTILIZE HILTI HIT-HY 200 ADHESIVE ANCHORING SYSTEM PER ICC ESR-3187.
6. ALL GAPS BETWEEN FILTER BASE FRAME AND PAD LARGER THAN 1/8" SHALL BE SHIMMED/GROUTED OR SHAVED/CUT DOWN.
7. TOP OF FILTER EQUIPMENT PAD CONCRETE (AT FOUR CORNERS) TO BE WITHIN +/- 1/8" OF STATED DRAWING ELEVATION TO ENSURE LEVELNESS.
8. EFFLUENT WEIR ELEVATION TO BE WITHIN +/- 1/16" OF THE HYDRAULIC PROFILE ELEVATION. SHIM/GROUT TANK FILTERS. ON MULTI-UNIT LAYOUT, ALL EFFLUENT WEIRS SHALL BE WITHIN 1/8" OF ONE ANOTHER.
9. UNLESS OTHERWISE STATED IN CONTRACT DOCUMENTS, ALL FASTENERS, ANCHOR BOLTS, AND APPURTENANCES FOR PIPING AND EQUIPMENT TO BE SUPPLIED BY INSTALLATION CONTRACTOR.
10. ELEVATION DIFFERENCE BETWEEN LEFT AND RIGHT SIDES OF WEIR SHALL NOT DEVIATE MORE THAN 1/8". SHIM TANK FILTERS OR ADJUST WALL MOUNTED WEIRS AS NEEDED.
11. SHIPPING WEIGHT: 4,630 LBS, OPERATIONAL WEIGHT: 19,181 LBS.

REV	DESCRIPTION	DRAWN	APPR	DATE
C	REVISED PLATFORM HEIGHT TO 3'-6"	CDP	DSD	03.21.22
B	REMOVED BACKWASH VALVE, REVISE NOTES	DSD	CDP	02.17.21
A	PRELIMINARY RELEASE	CDP	JCC	10.24.17

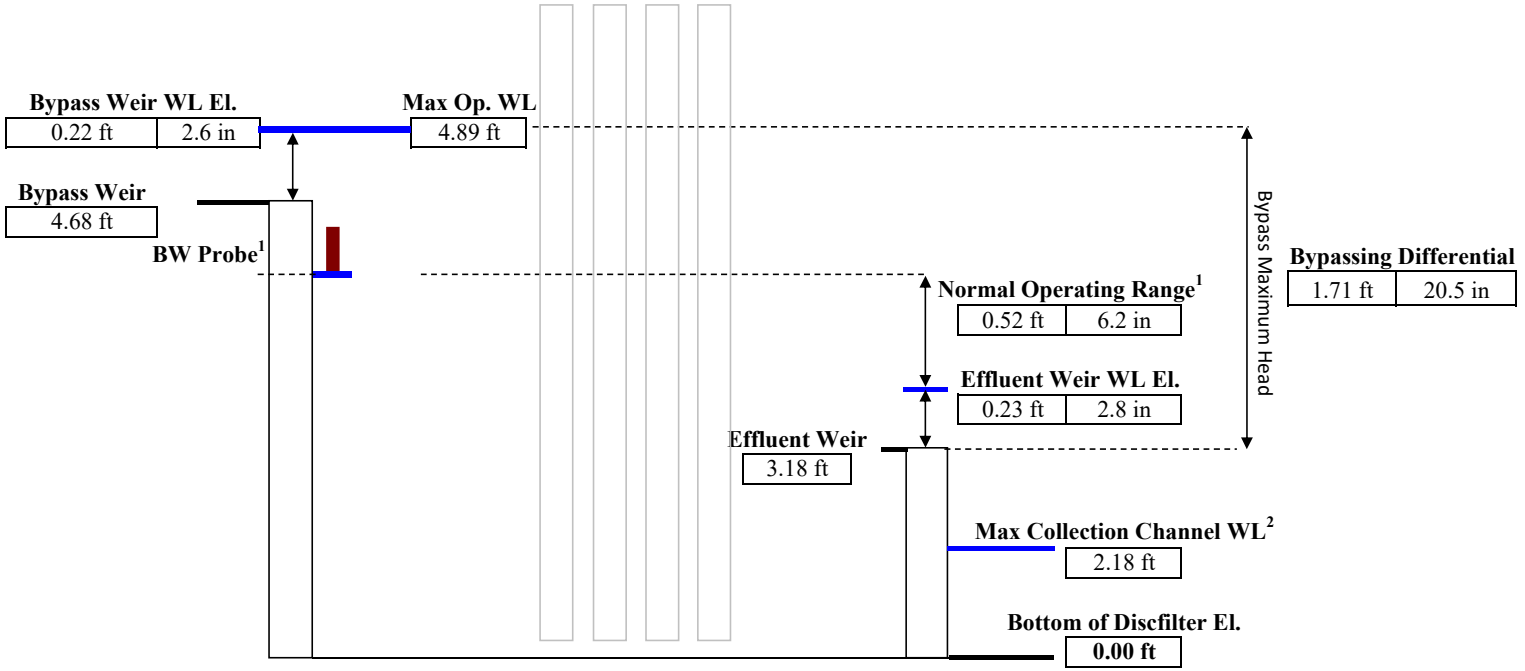
VEOLIA
KRUGER
4001 WESTON PKWY CARY, NC 27513 | (919) 677-8310

DISCFILTER
HSF2202-1C, MIXING BYPASS
UNIT DRAWING

-
STANDARD PRODUCT

SCALE	DRAWING NO	SHEET	REV
1:40	1C.2202.M.8.8	1 of 1	C

Date:	08/30/2023
Project City:	Grassy Branch (Union Co)
Project State:	NC
Project Number:	5703133907
Model:	HSF2202-1C
Total Flow:	0.47 MGD
Units in Service:	1
Flow per unit:	0.47 MGD



	mm	ft	in	elevation
Inlet Bypass Water Elevation	1,491 mm	4.89 ft	58.7 in	4.89 ft
Bypass Weir	1,425 mm	4.68 ft	56.1 in	4.68 ft
Effluent Water Elevation	1,040 mm	3.41 ft	40.9 in	3.41 ft
Effluent Weir	970 mm	3.18 ft	38.2 in	3.18 ft
Bottom of Unit	0 mm	0.00 ft	0.0 in	**0.00 ft**

NOTE: The above diagram is indicative of hydraulic profile only and should not be interepreted as a display of treatment flow path.

[1] - The exact placement of the backwash probe is based on operating observations during installation and startup.

[2] - Please contact Kruger if downstream hydraulic conditions are such that the water level in the effluent collection channel exceeds levels indicated.

Veolia Water Technologies, Inc.
dba Kruger
4001 Weston Parkway
Cary, NC 27513
Tel: (919) 677-8310
www.veoliawatertech.com

9. AIS STATEMENT

Hydrotech Discfilter equipment is considered mechanical equipment under the American Iron and Steel Act and thus, is not required to meet the requirements of the Act. Refer to the EPA website for more information, including Item 22 of the EPA Memorandum, 'American Iron and Steel Requirement Guidance', dated March 20, 2014 which clarifies implementation of said Act. (https://www.epa.gov/cwsrf/american-iron-and-steel-requirement-guidance-and-questions-and-answers)

10. SAMPLE CERTIFICATION OF INSURANCE

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 12/29/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Marsh USA, Inc. 540 W. Madison Street Chicago, IL 60661 Attn: Veolia.CertRequest@marsh.com | Fax: 212-948-5053 VWT Cary	**CONTACT NAME:** **PHONE (A/C, No, Ext):** **FAX (A/C, No):** **E-MAIL ADDRESS:**
INSURED Veolia Water Technologies, Inc. 4001 Weston Parkway Cary, NC 27513	

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Everest National Insurance Company	10120
INSURER B : Everest Premier Insurance Company	16045
INSURER C : N/A	N/A
INSURER D : Berkshire Hathaway Specialty Insurance	22276
INSURER E : National Fire & Marine Insurance Co	20079
INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** CHI-009773857-21 **REVISION NUMBER:** 8

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY			RM5GL00068-231 (All Other)	01/01/2023	01/01/2024	EACH OCCURRENCE	$ 5,000,000
A	CLAIMS-MADE X OCCUR			RM5GL00067-231 (Utility Operations)	01/01/2023	01/01/2024	DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 1,000,000
							MED EXP (Any one person)	$ 10,000
							PERSONAL & ADV INJURY	$ 5,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 5,000,000
	X POLICY PRO-JECT LOC						PRODUCTS - COMP/OP AGG	$ 5,000,000
	OTHER:							$
A	**AUTOMOBILE LIABILITY**			RM5CA00066-231 (AOS)	01/01/2023	01/01/2024	COMBINED SINGLE LIMIT (Ea accident)	$ 5,000,000
A	X ANY AUTO			RM5CA00065-231 (MA)	01/01/2023	01/01/2024	BODILY INJURY (Per person)	$
A	OWNED AUTOS ONLY / SCHEDULED AUTOS			RM5CA00064-231 (Utility Operations)	01/01/2023	01/01/2024	BODILY INJURY (Per accident)	$
	HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY			(DE, ID, NY, NJ, PA, RI)			PROPERTY DAMAGE (Per accident)	$
								$
	UMBRELLA LIAB OCCUR						EACH OCCURRENCE	$
	EXCESS LIAB CLAIMS-MADE						AGGREGATE	$
	DED RETENTION $							$
B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** Y / N			RM5WC00092-231 (AOS)	01/01/2023	01/01/2024	X PER STATUTE OTH-ER	
B	ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? N	N / A		RM5WC00094-231 (FL,ME,NJ)	01/01/2023	01/01/2024	E.L. EACH ACCIDENT	$ 1,000,000
B	**(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below			RM5WC00095-231 (WI,MA)	01/01/2023	01/01/2024	E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000
E	CPL - SIR: $1,000,000			42-CPL-326094-01	01/01/2023	01/01/2024	Occurence/Aggregate	5,000,000
D	E&O - SIR: $5,000,000			42-CNP-313450-03	01/01/2023	01/01/2024	Per Claim/Aggregate	5,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER	CANCELLATION
Veolia Water Technologies, Inc. 4001 Weston Parkway Cary, NC 27513	**SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.** AUTHORIZED REPRESENTATIVE *Marsh USA Inc.*

ORDER SELECTION

Please review Veolia's offer of the Hydrotech Discfilter scope as described herein and acknowledge your acceptance of this order with authorized signature below. Once we have received signoff on this order, Veolia will return a signed copy.

Veolia Water Technologies, Inc.	
Supplier	Customer (Company Name)
Signature	Signature
Name & Title	Name & Title
Date	Date

UV Disinfection System

ENVIRONMENTAL, INC.
7245 Pineville-Matthews Rd., Suite 100, Charlotte, NC 28226
(704) 542-2444 FAX (704) 542-7003

To All Bidding Contractors,

EW2 is pleased to propose the following:

TROJAN UV
3020 Gore Road
London, Ontario N5V 4T7
1-888-220-6118
Tel: (519) 457-3400 / Fax: (519) 457-3030
www.trojanuv.com

Trojan System UV3000^{TM}PTP
Municipal Wastewater Disinfection Equipment

Union County Water Grassy Branch WRF UV Disinfection

Spec Section 46 66 00

Date: May 28 2024

UV SYSTEM DESIGN PARAMETERS		GUARANTEED PERFORMANCE	
Peak Design Flow	0.47MGD(US)	Validated UV Dose	30 mJ/cm^2
UV Transmittance	65 %, minimum	Disinfection Limit	400 Fecal Coliform, 7 Day Average
TSS Concentration	30 mg/L (30, grab sample)		

EQUIPMENT DETAILS **3400K *Model Number***

- 1 Complete UV system supplied with Type 304 Stainless Steel Channel, Module Support Rack, Level Control Weir, Transition Boxes, Monitoring System, Spare Parts Package, Operators Kit and Maintenance Rack.
- 8 Type 316 Stainless Steel Modules supplied, containing 4 UV lamps each module– Total of 32 UV lamps in the UV system
- Each UV module weighs 38 lbs and is easily handled by one person
- Each UV module has a standard 120V plug and 10 ft (3.0 m) weatherproof cable for connection to GFI receptacle
- 4 Outdoor-rated GFI Power Distribution Receptacles supplied (one for 2 modules)
- Each lamp consumes 88 Watts – Total system power requirement of 1.40 Kilowatts (12.70 amps)
- Lamp on/off status indicated on each UV module using LED indicators
- Monitoring System provided for local indication of UV intensity, lamp age and alarms
- Remote indication of UV intensity and low UV intensity alarm available
- Monitoring System requires 120V, single phase, 2 wire plus ground, 5 amp power supply, 60 Hz
- Please refer to the enclosed drawings and specifications for full design details and requirements
- Stainless steel channel to have 12" freeboard

COMMERCIAL DETAILS

- Comprehensive Lamp Warranty: Full replacement (non pro-rated) up to 12,000 hours or thirty-six (36) calendar months from shipment, whichever comes first
- System Warranty: 24 months after equipment substantial completion or 48 months after shipment, whichever occurs first
- Copies of Shop Drawings and O&M Manuals will be supplied
- Equipment Delivered 3-5 weeks after release for fabrication (approved shop drawings)
- Prices do not include any duties or taxes that may be applicable
- Prices are FOB factory, freight paid to jobsite
- Start-up and Training provided by Trojan-certified local service provider (1 trip, 1 day)

Selling Price $ 100,613 USD

Rep Name: Shane Eckley	Phone: 704-996-0894
Rep Company: EW2	Email: seckley@ew2.net

May 3, 2024

Equipment Limited Warranty

The following terms and conditions will govern the equipment warranty provided by Trojan Technologies to the Owner/Operator:

Period of Coverage: Trojan Technologies ("Trojan") warrants to the Owner/Operator noted above (the "Customer") that if within 24 calendar months from equipment Substantial Completion or 48 calendar months from the date of delivery (the "Warranty Period"), whichever comes first, equipment manufactured by Trojan (the "Equipment") will be free from defects in material and workmanship and will function in accordance with the specifications agreed to by Trojan for the Equipment.

> "Substantial Completion" is the date on which the Equipment commissioning and start-up is sufficiently completed such that the Equipment is capable of being put into operation such that the Owner can utilize the Equipment for its intended disinfection use.

Customer must notify Trojan in writing within 5 days of the date of any Equipment failure. This notification shall include a description of the problem, a copy of the operator's log, a copy of the Customer's maintenance record and any analytical results detailing the problem. If Customer has not maintained the operator's log and maintenance record in the manner directed in the Operation and Maintenance manual, or does not notify Trojan of the problem as specified above, this warranty may, in Trojan's discretion, be invalid.

If a defect occurs, Trojan will, at its option, repair or replace the defective component free of charge, provided that:

1. Customer fully cooperates with Trojan, in the manner requested by Trojan, in attempting to diagnose and resolve the problem by way of telephone support. If the problem can be diagnosed and verified by telephone support and a replacement part is required, Trojan will either ship at Trojan's expense, a repaired, reworked or new part to the Customer, who will install such part as directed by Trojan, or direct Customer to acquire, at Trojan's expense, such part from a third party and to install such part as directed by Trojan;
2. In the event that Trojan determines that the problem cannot be resolved by way of telephone support and/or shipment by Trojan, or acquisition by the Customer of a replacement part for installation by the Customer, Trojan will send one or more persons to make an onsite inspection of the problem. If an onsite visit is made, Trojan personnel will evaluate the problem and repair or replace any Equipment determined to be in breach of this warranty. If the problem is not attributable to a breach of this warranty, Trojan reserves the right to invoice the Customer for this service; and
3. The Equipment is covered and the failure occurs within the Warranty Period

Trojan will, at its option, use new and/or reconditioned parts in performing warranty repair. Trojan has the right to use parts or products of original or improved design in the repair or replacement.

The products or general components replaced or repaired free of charge under the Equipment Limited Warranty are warranted only for the *remaining* portion of the original Equipment Limited Warranty Period.

Limitations: This warranty shall not apply to any failure or defect which results from:

- the Equipment not being operated and maintained in strict accordance with instructions specified in the Operation and Maintenance manual or Product Bulletin or which results from mishandling, misuse, neglect, improper storage, improper operation of the Equipment with other equipment furnished by the Customer or by other third parties or from defects in designs or specifications furnished by or on behalf of the Customer by a person other than Trojan.
- Equipment that has been altered or repaired after start-up by anyone except: (a) authorized representatives of Trojan, or (b) Customer acting under specific written instructions from Trojan.
- Use of parts not supplied or approved by Trojan

This warranty does not cover:

- Equipment components manufactured by third parties but furnished to Customer by Trojan are warranted by the original manufacturer, only to the extent of the original manufacturer's warranty
- Normal wear and tear of the product
- Consumable components including but not limited to wiper seals, cleaning chemical, batteries
- Trojan supplied components that are the subject of a separate warranty
- Costs related to removal, installation, or troubleshooting of a component
- Physical damage
- Improper installation
- Acts of God, terrorism, biological infestations, or input voltage that create operating conditions beyond the minimum or maximum limits listed in the Operations Manual including high input voltage from generators and lightening strikes
- Damage caused by improper return packaging
- Taxes, duties or brokerage fees (if any)

This warranty is the exclusive remedy for all claims based on a failure of or defect in the Equipment, whether the claim is based on contract (including fundamental breach), tort (including negligence), strict liability or otherwise. This warranty is in lieu of all other warranties whether written, oral, implied or statutory. Without limitation, no warranty of merchantability or fitness for a particular purpose shall apply to the Equipment.

Trojan does not assume any liability for personal injury or property damage caused by use or misuse of the Equipment. Trojan shall not in any event be liable for special, incidental, indirect or consequential damages including, without limitation, lost profits, lost business opportunities, lost revenue or loss or depreciation of goodwill, even if it has been advised of the possibility thereof. Trojan's liability shall, in all instances, be limited to repair or replacement of Equipment in breach of this warranty and shall not exceed the cost of such repair or replacement. This liability with respect to repair or replacement will terminate upon the expiration date of this warranty.

In addition to the foregoing, in no event shall Trojan's liability relating to the Equipment, or the agreement between Trojan and the Customer relating to the Equipment, exceed that portion of the purchase price for the Equipment which is actually paid to Trojan.

TrojanUV - A Division of Trojan Technologies Group ULC
3020 Gore Road, London, Ontario, Canada N5V 4T7 T 519.457.3400 F 519.457.3030 www.trojanuv.com

ENVIRONMENTAL, INC.
7245 Pineville-Matthews Rd., Suite 100, Charlotte, NC 28226

EW2 ENVIRONMENTAL, INC.
Standard Terms And Conditions of Purchase

This Standard Terms And Conditions Of Purchase agreement is between EW2 Environmental, Inc. (hereinafter referred to as the "Buyer"), and _____ (hereinafter referred to as the "Seller") for _____ (hereinafter referred to as the "Project") which along with the EW2 Purchase Order, constitutes the terms and conditions of the purchase order to buy Seller's Product(s).

1. **Applicable Terms.** The purchase of goods and related services (if any) hereunder (collectively, the "Product(s)") is limited to and made expressively conditional on Seller's acceptance of the terms and conditions of purchase as defined within this document and EW2's Purchase Order, which will control over any inconsistent or additional terms or conditions proposed or issued by Seller or Buyer.

2. **Prices and Payment Terms.** Seller agrees that the prices listed within the EW2 Purchase Order are firm. The prices quoted within the Purchase Order do not include any federal, state, county, local or other taxes levied on the equipment, its use or sale, or on this agreement by any jurisdiction either within or outside the United States. Such taxes, where required by law that the Seller collect them, whether designated as sales tax, use tax, gross receipts tax, occupation tax, etc., will be invoiced by the Seller based upon the law in effect at the time of delivery. Buyer, if exempt from any of these types of taxes, must provide a proper tax Certificate of Exemption at the time of the submitting the Purchase Order or before delivery of the equipment. Invoices for the purchase of the Product(s) will be issued upon shipment of the Product(s). Where the purchase price is to be paid in progress payments, invoices will be issued pursuant to the payment schedule set forth in Buyer's documentation. Seller agrees to provide Buyer a Bill of Laden with the Product(s) invoice. Buyer agrees to make payment within thirty (30) days of receipt of both the invoice and Bill of Laden.

3. **Changes To Purchase Order.** Buyer reserves the right to make changes to the original Purchase Order submitted to the Seller due to changes in specifications and/or design for the Product(s) by providing to Seller a Purchase Change Order. Buyer agrees to reimburse the Seller for any additional costs attributable to the requested change based upon the Seller's standard price in effect at the time the Purchase Change Order is approved.

4. Delivery And Risk Of Loss

Delivery Dates. Seller will make all reasonable efforts to meet delivery dates. Timely delivery is subject to prompt receipt by the Seller of accurate and complete technical and shipping information from the Buyer. Seller may make partial deliveries of a Product(s), invoices for which will be due and payable in accordance with the payment terms specified in Item 2, Prices and Payment Terms noted above.

Shipment. Shipping terms are F.O.B. from Seller's location to the Ship To Address noted by the Buyer within the EW2 Purchase Order. Buyer must provide to the Seller specific written instructions as to Buyer's preferred method of shipment or common carrier. In the absence of such instructions from the Buyer, the method of shipment will be at the Seller's discretion. All Shipping, handling and insurance costs are to be paid by the Buyer.

Title And Risk Of Loss. Whether or not installation services are performed by Seller, title and risk of loss will pass to Buyer at the time that the Product(s) are placed with a common carrier for shipment to location designated by Buyer unless specified in the Buyer's documentation. Claims for damages, loss, or delay in transit should be made immediately by Buyer directly to the carrier. In the event Buyer requests a postponement of delivery beyond the date specified in the Buyer's purchase order, Seller may invoice the Buyer and title and risk of loss will pass to Buyer at such time as Product(s) are made available for shipment, but in no event earlier than the delivery date originally specified in Buyer's documentation. If delivery is postponed by Buyer beyond the delivery date specified in Buyer's documentation, Seller will endeavor, but will not have the obligation, at Buyer's expense to either store the Product(s) or secure a storage location based upon terms and conditions agreeable to both parties. Product(s) must be stored by Buyer in accordance with the storage instructions that may be a part of Seller's instructions for Product(s) installation, maintenance and care.

5. **Product(s) Acceptance**. Buyer reserves the right to inspect the Product(s) upon receipt at the shipping destination. Unless Product(s) are subject to an Acceptance Test as specified below, the Buyer must inspect the Product(s) and give written notice to Seller of any alleged defects or nonconformity within ten (10) days after receipt at the shipping destination. Failure by the Buyer to do so will constitute Buyer's irrevocable acceptance of the Product(s) delivered.

   If Buyer's documentation provides that the Product(s) are subject to specific acceptance testing ("The Acceptance Test") in order to verify Product(s) performance in accordance with agreed specifications, the Seller agrees that the Product(s) will be deemed fully accepted when they have satisfied the requirements of The Acceptance Test.

6. **Installation And/Or Start Up Services**. The Seller agrees to supply instructions and drawings necessary for the Product(s) to be installed, operated, and maintained for the

Product(s) supplied within the Purchase Order. It is the responsibility of the Buyer to ensure site preparation is completed according to the Seller's site specifications. Buyer will ensure that labor for unpacking and locating the equipment is provided and assumes responsibility for compliance with local laws, ensuring that any permits for installation and use are obtained. If the Buyer's scope of purchase includes Seller completing the installation and/or start up services, Buyer agrees to give Seller, by the agreed upon notification period, the required notification of the date Seller's personnel will be required on site to perform such services.

7. **Cancellation**. The Seller agrees that Buyer may cancel its purchase order by providing written notice of cancellation to the Seller and making payment to the Seller of reasonable and proper charges incurred by Seller in connection with the performance of the contract up to the date of cancellation. The Seller, if so requested by the Buyer, will complete the manufacturing of the Product(s), provide an invoice to the Buyer for the completed Product(s), and hold the delivery of the equipment, of which the Buyer assumes all risk and expense, subject to terms of payment stated in Item 2, Prices and Payment Terms.

8. **Warranty.** Seller warrants the Product(s) against defects in materials and workmanship for a period of eighteen (18) months from the date in which title has passed to Buyer or twelve (12) months from the date of installation of the Product(s)s, whichever occurs first. Buyer acknowledges that the Seller MAKES NO WARRANTY, EXPRESS OR IMPLIED, INCLUDING A WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO SUCH Product(s)S OR COMPONENTS. The Buyer also acknowledges that THE WARRANTIES SET FORTH HEREIN, IF ANY, ARE MADE EXPRESSLY IN LIEU OF OTHER WARRANTIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, AND ANY IMPLIED WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, EVEN IF THAT PURPOSE IN KNOWN BY SELLER, IS HEREBY EXPRESSLY EXCLUDED. Upon examination of the Product(s) to the satisfaction of both the Buyer and the Seller, Seller agrees to repair or replace any Product(s) or components thereof that proves to be defective. Buyer agrees that any alteration, disassembly, storage or use of the Product(s) not in accordance with Seller's instructions will void the warranty. Buyer assumes full responsibility in the event Buyer uses the Product(s) in combination with other goods or in any manner not stated in Buyer's specifications provided in the Purchase Order.

9. **Indemnification.** Buyer and Seller will each defend, indemnify, and hold the other harmless from and on account of bodily injury and property damage claims asserted by third parties as a result of the other's negligent acts or omissions. To the extent that both Buyer and Seller are determined by a finder of fact to be negligent and the negligence of both is a proximate cause of a claim by a third party against either Buyer or Seller, then in such an event, Buyer and Seller will be responsible for a portion of the liability, including costs and expenses attributable to its comparative share of the total negligence.

Seller agrees to indemnify and hold harmless Buyer against any third party claim alleging that the Product(s)s infringe upon a valid and enforceable United States patent, provided Buyer gives Seller written notice immediately when such claim is asserted, directly or indirectly. The Seller, once receiving the written notification of infringement of patent, will perform one of the following at Seller's expense; (1) procure the right for the Buyer to continue using said Product(s); (2) replace said Product(s) with non-infringing Product(s); (3) complete modifications to existing Product(s) so that it becomes non-infringing; or (4) remove said Product(s) and refund purchase price to Buyer. Notwithstanding the foregoing, Seller will have no liability to Buyer if any patent infringement or claim thereof is based upon or arises out of (a) compliance with designs, plans or specification furnished by or on behalf of Buyer; (b) use of the Product(s) in a manner for which the Product(s) were neither designed nor contemplated; or (c) the claimed infringement of any patent in which the Buyer or any affiliate or subsidiary of Buyer has any direct or indirect interest by license or otherwise.

10. **Limitation of Liability.** The Seller will not be liable for delays in delivery which are due to Force Majeure. All additional costs of performance incurred by Seller as a result of a Force Majeure event will be bourne by the Buyer. Force Majeure herein will mean any act, event or condition to the extent that it materially and adversely affects Seller's ability to perform its obligations in accordance with the terms hereof if such acts, event or condition is beyond Seller's reasonable control and is not the result of Seller's willful neglect, error, omission or failure to exercise reasonable due diligence. Force Majeure acts, events or conditions will include, but not limited to (1) an act of God, landslide, earthquake, fire, flood, hurricane, explosion, bombing, war, act of terrorism, blockade, riot or similar occurrence; (2)a change in applicable law, including a change in regulations resulting in Seller's increased cost of compliance; (3) strikes, lockouts, work stoppages or labor disputes affecting Seller or any subcontractor of Seller; (4) the inability to obtain or delays in obtaining permits or other private or governmental approvals; or (5) the failure of any government agency or private utility to provide and maintain utilities required by Seller in order to perform its obligations hereunder. In such event, Seller will be required to resume performance upon termination of the Force Majeure and will have reasonable additional time for performance.

11. **Default And Termination.** The substantial failure of either party to comply with the terms of this contract will constitute default hereunder. Upon default by one party, the other party will provide written notice clearly specifying the nature of the default. The defaulting party will have thirty (30) days to cure the default. If the default is capable of being cured within thirty (30) days and is not cured within thirty (30) days, this contract may be terminated. In the case of default that cannot be cured within thirty (30) days, this contract will not be terminated so long as the defaulting party has given written notice of extension to the other party and the defaulting party has commenced and is diligently pursuing a cure. In the event of any termination, Buyer will be responsible for payment to the Seller for Product(s)s delivered and services rendered (including Product(s) specifically manufactured/assembled for the Buyer that has yet to be supplied) through the date of termination.

12. **Intellectual Property.** Unless exception is noted in writing by the Buyer, all devices, equipment, designs (including drawings, plans and specifications), estimates, prices, notes electronic data and other documents or information prepared or disclosed by the Buyer to the Seller becomes the Seller's exclusive property. Seller will retain sole ownership of all discoveries, improvements, inventions, patents, trademarks, copyrights, know-how, trade secrets, or other intellectual property rights associated in any way with Product(s).

13. **Software.** The Seller agrees to grant the right of use for any software required for implementation of the Product(s) being purchased by the Buyer. The Buyer is not allowed to duplicate any software supplied unless duplication is for producing a backup file copy. Buyer agrees that software use is only allowed for the implementation of the Product(s) purchased for which the software was intended for. Buyer agrees that it is not allowed to assign the use of such software for any other use than the requirements of implementing the purchased Product(s).

14. **Miscellaneous Provisions.** These general terms and conditions, along with any specified terms and conditions noted within the EW2 Purchase Order constitute the entire purchase contract between the Buyer and the Seller and supersede all prior or contemporaneous communications, representations, understandings or agreements, whether written or oral, unless such documentation states that it intends to modify this contract and is signed by both parties. No modification of this contract (including changes in scope, specifications, price or delivery schedule) will be of any force or effect unless pursuant to a writing signed by both parties. Should any provision of this contract for any reason be declared invalid or void, such declaration will not affect the remaining provisions of this contract, which will remain in full force and effect. Seller may not assign or permit any other transfer of this contract without Buyer's prior written consent. The Buyer will strictly comply with and refrain from exporting or re-exporting the Product(s) purchased in violation of, United States' laws regarding trade restrictions and embargos, as such laws may be amended from time to time. This contract is entered into solely between Seller and Buyer, and this contract will not be deemed to create any rights in third parties, including customers of the Buyer, or to create any obligations to any such third parties. These terms and conditions will be governed by and construed in accordance with the laws of North Carolina.

EW2 Environmental, Inc.
Principal: _____

Signature: _____ Signature: _____

Date: _____ Date: _____