



CITY OF HAVELOCK

Post Office Box 368
Havelock, NC 28532

INVITATION TO BID

Pursuant to North Carolina General Statutes §143-129 the City of Havelock invites formal bids on the following:

Bids must be submitted in accordance with the attached specifications and must include an itemized schedule of quantity, unit price and total. Bids must be sealed and clearly marked on the outside of the envelope:

“City of Havelock, Water Plant Rehabilitation”

Address Bids to: Lee Tillman, Director of Finance
City of Havelock
P.O. Box 368
1 Governmental Ave.
Havelock, NC 28532
Email: Bids@havelocknc.us

Bids will be accepted until **2:00 p.m. (EST) on Wednesday, February 3, 2021** at which time they will be reviewed in the office of the City Finance Director.

Bids on contracts for construction or repair work in the formal bidding range must be accompanied by a bid bond or deposit in the amount of not less than 5 percent of the bid. This security is held by the City of Havelock to guarantee that the successful bidder will execute the contract and provide performance and payment bonds if required. If a bidder backs out of his or her bid or refuses to enter into a contract, the City of Havelock may retain the bid deposit or seek payment under the bid bond. Bids will be considered incomplete if not accompanied by a bid bond or deposit. The bids are good for 120 days after opening. The winning bidder will be issued a Notice-To-Proceed (NTP) along with a Purchase Order. The performance period is 90 calendar days from the NTP. The work is to commence no later than 30 days after the receipt of the purchase order and the NTP. Work must be completed within the 90-day performance period.

Bidders are cautioned not to submit bids until the proposed requirements and specifications have been carefully examined. It will be considered that bidders will have satisfied themselves as to the accuracy of the specifications. No proposal will be considered unless prices are submitted for all items requested in any section. The City reserves the right to change the amount of quantities.

All bids submitted should be to the desired specifications. Any exceptions to the specifications will be evaluated based on the best interest of the City. Any deviation from specifications indicated herein must be clearly pointed out; otherwise, it will be considered that items offered are in strict compliance with these specifications, and bidder will be held responsible therefore. Deviations shall be explained in detail. The bidder shall not construe this paragraph as inviting deviation or implying that any deviation will be acceptable.

The names of certain brands or makes denote quality standard in the article desired, but do not restrict bidders to the specific brand, make or manufacturer named. They are meant to convey to prospective bidders the general style, type, character and quality of the article desired.

The successful bidder on all construction contracts will be required to conduct the operation in accordance with all Federal, State, and Municipal health and safety rules, regulations and laws applicable to the operation. The

successful bidder may be asked to provide the City with a copy of the company's safety plan prior to commencing work. For all projects over \$30,000, a general contractor's or public utilities contractor license must be furnished to the City, as necessary.

Certificate to Transact Business in North Carolina: As a condition of contract award, each out-of-State Vendor that is a corporation, limited-liability company or limited-liability partnership shall have received, and shall maintain throughout the term of The Contract, a Certificate of Authority to Transact Business in North Carolina from the North Carolina Secretary of State, as required by North Carolina law. A contract requiring only an isolated transaction completed within a period of six months, and not in the course of a number of repeated transactions of like nature, shall not be considered as transacting business in North Carolina and shall not require a Certificate of Authority to Transact Business.

The City will not sell bid packages. Plans, specifications, and addenda may be viewed and obtained online at www.havelocknc.us. Click on: "Bid on a Contract"; "Current Bids". The Bidder's List is maintained by Vendor Registry. Registration for the Bidder's List is made online at www.havelocknc.us. Click on: "Bid on a Contract"; "Vendor login/Registration".

N.C.G.S. (North Carolina General Statutes), specifically §160A-20.1(b), prohibit the City from entering into contracts with contractors and subcontractors who have not complied with the requirement of Article 2 or Chapter 64. The Contractor shall submit the E-Verify Affidavit, located in the Bid Proposal section, with their bid. Bids that do not include this Affidavit will be considered non-responsive.

N.C.G.S 147-86.42-84 requires that contractors with a North Carolina Local Government must not utilize any subcontractor found on the State Treasurer's Iran Divestment list or Companies Boycotting Israel list. The referenced lists can be found on the State Treasurer's website at the address www.nctreasurers.com and will be updated every 180 days.

The City of Havelock reserves the right to reject any or all proposals and to purchase items from the state contract in the efforts to award the contract to the bidder it deems to be for the best interest of the City.

This institution is an equal opportunity provider, and employer.

Contact person(s) for information on this bid:

For questions in regards to the bid specifications, the City requires and only responds to questions submitted in writing and sent via email to: Bids@havelocknc.us

Questions must be received by 12:00 pm (EST) on Thursday January 14, 2021. If questions are received, the City will respond no later than 2:00 pm (EST) on Wednesday January 20, 2021.

A non-mandatory site visit is scheduled for Wednesday January 13, 2021 at 527 Webb Blvd. at 11:00 am.

Today is the 21th day of December 2020.

Published: Vendor Registry December 21, 2020

CITY OF HAVELOCK

Lee W. Tillman
Director of Finance



**STATE OF NORTH CAROLINA
AFFIDAVIT
CITY OF HAVELOCK**

I, _____ (the individual attesting below), being duly authorized by and on behalf of _____ (the entity hereinafter "Employer") after first being duly sworn hereby swears or affirms as follows:

1. Employer understands that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25(5).
2. Employer understands that Employers Must Use E-Verify. Each employer, after hiring an employee to work in the United States, shall verify the work authorization of employee through E-Verify in accordance with NCGS §64-26(a).
3. Employer is a person, business entity, or other organization that transacts business in the State and that employs 25 or more employees in this State. (mark Yes or No)
 - a. YES _____
 - b. NO _____
4. Employer's subcontractors comply with E-Verify, and if Employer is the winning bidder on this project, Employer will ensure compliance with E-Verify by any subcontractors subsequently hired by Employer.

This _____ day of _____, 20_____.

Signature of Affiant: _____

Print or Type Name: _____

State of North Carolina County of _____

Signed and sworn to (or affirmed) before me, this the _____ day of _____, 20_____.

Signature of Notary Printed Name of Notary

My Commission Expires: _____

Bid Sheet

Base Bid: _____

Alternate 1 _____

Alternate 2 _____

NC Sales Tax: _____

Delivery Cost (if applicable): _____

Total Cost to City: _____

Bids must include an itemized schedule by quantity, unit price and total for each work element.

Company Name: _____

Company Address: _____

Contact Person: _____

Telephone Number: _____

NC Contractor's License Type and Number: _____

Number of Addendums Acknowledged (circle one): N/A 1 2 3 4

As of the date listed below, the vendor or bidder listed above is compliant with N.C.G.S. 147-86.42-84, the Iran Divestment Act and the Companies Boycotting Israel Act.

Authorized Signature: _____

Print Name of Authorized Signature: _____

Title: _____

Address Bid to: Lee Tillman, Director of Finance
 City of Havelock
 P.O. Drawer 368
 1 Governmental Avenue
 Havelock, NC 28532
 Bids@Havelocknc.us

Please indicate the Bid name on the outside of the envelope.

OBJECTIVE

The City of Havelock is soliciting bids to rehabilitate the Filters and Softeners at the Water Treatment Plant (WTP) (see *Figure 1*). The base bid is the complete rehabilitation of side A of the WTP as described in the scope below. Side A (see *Figure 3*) includes 3 filters and 2 softeners. Alternate 1 will be the price to rehabilitate the 3 filters on side B. The filters on side B require the replacement of larger manway gaskets and the relocation of air release valves. Alternate 2 will be the price to rehabilitate 2 softeners on side B. The softeners on side B require the replacement of larger manway gaskets. Work may require long periods of confined space entry effort. Removal of media will be affected by limited clearance between tops of vessels and ceiling above. Media and internal distributor materials to be provided by owner.

1. FILTERS

A. Filters Vessel Scope (3 filters):

Replace two 20-foot long 12-inch header pipes, from flange to flange (see *Figure 2*). Header pipe preparation and vessel exterior rehabilitation to include sandblasting, painting, welding and pit filling, and surface wash (equivalent processes for epoxy surface prep may be considered). Vessel exteriors to be painted with two coats (total 8 mil.) of two-part epoxy Tnemec paint, or equivalent. Paint color to be selected by City staff. During sandblasting the surrounding plant area to be shielded from the sandblasting work. Shielding measures need to be approved by City staff. Empty Side A filter media from vessel interiors (see *Figures 3 and 5*). Filter media to be removed from interior and hauled by contractor to approved land fill location or contractor provided dumpster. Dumpster location to be approved by City staff. Repair vessel interiors, including sandblasting, painting, welding and pit filling, and surface wash. Coat the three (3) filter vessels interior surfaces with 100% potable epoxy NSF61 (see *Figure 4*), or equivalent. After vessel interior surface work complete, replace sand valves, internal distributors, retaining screens, and graded filter media. Specific assembly to be directed by distributor supplier.

1. Filter Vessel Internal Distributors (Provided by City) (see *Figures 5 and 10*), install:

- a. Set of 5-inch square stainless steel expansive port sand valves, a total of 70 sand valves for each filter.
- b. Hub-lateral inlet distributor/waste collectors constructed of schedule 80 steel piping with threaded cast iron fittings and upturned elbows.
- c. Header-lateral air wash distributors constructed of 304 stainless steel, complete with 3 inch manifolds and 3/8 inch perforated laterals.
- d. Gravel retaining screen assemblies constructed of carbon steel support angles and flats, 8-mesh #304 stainless steel screening, and stainless steel nelson studs as required for fastening the screening to the vessel and support angles.
- e. The vessel internal assemblies shall be installed by the contractor.
- f. Valves may be encased in concrete casing/cradle, which may require removal of concrete.
- g. Distributor materials to be provided by the City.

Epoxy coatings (liquid and powder)	GC/MS (base/neutral/acid scan), bisphenol A ¹⁵ , bisphenol A-diglycidyl ether ^{9,15} , bisphenol A-diglycidyl ether ^{9,15} , bisphenol A-propoxylate ^{9,15} , epichlorohydrin ¹⁵ , VOCs, bisphenol F ¹⁵ , bisphenol F-diglycidyl ether ^{9,15} , bisphenol F-diglycidyl ether ^{9,15} , bisphenol F-propoxylate ^{9,15} , solvent and reactive diluent additives ^{10,15}
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Figure 4 – Epoxy

2. Filter Media (Provided by City), remove and replace:

- a. Remove media through manway.
- b. Graded gravel (Placed bottom to top).

Five layers of graded gravel placed in successive layers (See *Figure 5*). Each successive layer is smaller size gravel with final layer of 1/16 – 1/8 gravel. Total of 16 inch deep graded gravel support beds (151 cubic feet per filter). 3/4 - 1 1/2 gravel place first and final gravel layer is to be 1/16 – 1/8 in size.

- c. 24 inch beds of GreensandPlus (224 cubic feet per filter).

Over gravel course and screen place 24-inch layer of GreensandPlus. GreensandPlus media must be backwashed thoroughly to allow fines formed during shipment to rise to the top of the bed. These fines must be removed from the surface of the Greensand before loading the anthracite. Removal of fines, once the anthracite is loaded, is not possible or acceptable. Backwash rate must meet factory specification per onsite representative. After backwash is complete GreensandPlus must be conditioned to factory specifications. The GreensandPlus will meet the following criteria:

Specific gravity: approx. 2.4

Effective size: 0.30 – 0.35 mm

Uniformity coefficient: less than 1.6

Screen grading: 18 x 60 mesh

- d. Over GreensandPlus course and screen place 12-inch-deep bed of anthracite (112 cubic feet per filter).

The anthracite will meet the following criteria:

Specific gravity: approx. 1.6

Effective size: 0.6 – 0.8 mm

Uniformity coefficient: less than 1.6

- e. Media to be provided by City.

3. Replacement Manway Gaskets (Provided by City):

Remove and replace three (3) 14-inch x 18-inch elliptical manway gaskets. (Side A)

2. SOFTENERS

A. Softener Vessels Scope (2 softeners):

Empty Side A softener media (see *Figure 6*), repair and coat the two (2) softener vessel interior surfaces with 100% potable epoxy NSF61 (see *Figure 4*), or equivalent. Softener media to be removed from interior and hauled by contractor to approved land fill location or contractor provided dumpster. Dumpster location to be approved by City staff. Vessel interior rehab includes welding and pit filling. Vessel exterior rehabilitation to include sandblasting, painting, welding and pit filling, and surface wash

(equivalent processes for epoxy surface prep may be considered). Vessel exteriors to be painted with two coats of two-part epoxy Tnemec paint or equivalent. Paint color to be selected by City staff. During sandblasting the surrounding area is to be shielded from the sandblasting work. Shielding measures need to be approved by City staff. Install distributors, fittings, and media. Remove up rinse line and replace with 6" pipe to down flow rinse from flange to flange including, 6" DIP, DIP 90° elbow, Dezurik butterfly valve, and AUMA modulating actuator (see *Figure 7*).

1. Softener Vessel Internal Distributors (Provided by City), install:

- a. Hub-lateral inlet distributor/waste collectors constructed of schedule 80 steel piping with threaded cast iron fittings and upturned elbows (see *Figure 6*).
- b. Header-lateral brine distributors constructed of 3" schedule 80 PVC.
- c. Header-lateral underdrain distributors constructed of 3" schedule 80 PVC manifolds and laterals with orifices on 2-inch centers.

2. Softener Media (Provided by City), remove and replace:

- a. Place the following bottom to top
- b. 12 inch graded gravel support beds (79 cubic feet each softener).
- c. 42 inch beds (273 cubic feet per softener side A) of Purolite SSTC60 resin. (L-580)
- d. 46 inch beds (299 cubic feet per softener side B) of Purolite SSTC60 resin. (L-896).

3. External piping and valve, install:

- a. Remove and replace 2" PVC with 6" DIP 90° from flange to flange. Switching from up rinse to down rinse including a 6" Dezurik valve 90° elbow with modulating Auma actuator (see *Figure 7*).
- b. City will provide softener calibration of AUMA.

4. Replacement Manway Gaskets (Provided by City), install:

Remove and replace two (2) -14-inch X 18-inch elliptical gaskets.

3. ADD ALTERNATE 1

Add Alternate 1 will be the complete rehabilitation of the (3) filters on side B of the plant as described above for side A filters with the following exceptions (see *Figures 3 and 8*).

A. Replacement Manway Gaskets (Provided by City):

Remove and replace three (3) 18-inch X 24-inch elliptical manway gaskets.

B. Relocation of Air Release Valves:

Relocate air release valve from drain line to influent line; approx. 6' -7' of line will need to be replaced. (see *Figures 7 and 11*).

C. External piping and valve, install:

Replace exterior pipe: Allowing for proper up rinse to down rinse including a Dezurik valve with modulating AUMA actuator (*Figure 6*).

4. ADD ALTERNATE 2:

Add Alternate 2 will be the complete rehabilitation of the (2) softeners on side B of the plant as described above for side A softener with the following exception. The softeners on side B require the replacements of larger manway gaskets (see *Figures 3, 9*).

A. Replacement Manway Gaskets (Provided by City):

Remove and replace two (2) - 18-inch X 24-inch elliptical manway gaskets.

INSURANCE REQUIREMENTS:

Contractor's Liability and Other Insurance: The Contractor shall purchase and maintain with a company acceptable to the City and authorized to do business in the State of North Carolina, such insurance as will protect him from claims under workers' compensation laws, disability benefit laws or other similar employee benefit laws; from claims of damages because of bodily injury, occupational sickness or disease, or death of his employees; from claims for damages because of bodily injury and personal injury; and from claims for damage and destruction of tangible property, including loss of use resulting there-from – any or all of which may arise out of or result from the Contractor's operations under the Contract Documents, whether such operations be by himself or any subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be legally liable.

The insurance shall be written for not less than the limits of liability specified below.

Automobile: Bodily injury and property liability covering all owned, non-owned and hired automobiles for limits of not less than \$1,000,000 bodily injury each person, each accident and \$1,000,000 property damage, or \$1,000,000 combined single limit – bodily injury and property damage combined.

Commercial General Liability: Bodily injury and property damage liability as shall protect the Contractor and any subcontractor performing work under this Contract from claims of bodily injury or property damage which arise from operations of this Contracts, whether such operations are performed by the Contractor, any subcontractor, or anyone directly or indirectly employed by either. The amounts of such insurance shall not be less than \$1,000,000 bodily injury each occurrence/aggregate and \$1,000,000 property damage each occurrence/aggregate or \$1,000,000 bodily injury and property damage combined single limits each occurrence/aggregate. This insurance shall include coverage for products/completed operations, personal injury liability and contractual liability assumed under the indemnity provision of this Contract and broad form property damage, explosion, collapse and underground property damage (XC&U). The coverage shall be on an occurrence basis.

Workers' Compensation and Employers' Liability: Shall meet the statutory requirement of the State of North Carolina, in an amount of \$100,000 each accident and disease – each employee and \$500,000 disease policy limit providing coverage for employees and owners.

The City shall be named as an additional insured under the commercial liability insurance for operations or services rendered under this Contract.

At the time of execution of the Contract, the Contractor shall provide the City with insurance certificates certifying that the foregoing insurance is in force; and such insurance certificates shall include provisions that the insurance shall not be cancelled, allowed to expire, or be materially changed without giving the City thirty (30) days advance written notice by registered mail.

The Contractor is advised that if any part of the work under this Contract is sublet, he shall require the subcontractor(s) to carry insurance as required above. However, this will in no way relieve the Contractor from providing full insurance coverage on all phases of the Project, including any that are sublet.

MATERIALS AND EQUIPMENT STORAGE:

The Contractor shall be responsible for locating and providing storage areas for construction materials and equipment. The material and equipment storage shall comply with all local and state ordinances throughout the construction period. The Contractor shall restore the storage area to its original condition upon completion of the Project or upon such time as directed by the Public Services Director. Such restoration shall be at no additional cost to the City.

The Contractor shall be responsible for the safeguarding of materials and equipment against fire, theft and vandalism and shall not hold the City responsible in any way for the occurrences of same.

TERMINATION BY THE CITY FOR CAUSE:

The City may terminate the Contract if the Contractor:

Persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

Fails to make payment to subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the subcontractors;

Persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction;
or

Otherwise is guilty of substantial breach of a provision of the Contract Documents

When any of the above reasons exist, the City, upon certification by the Public Services Director that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the City and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

Take possession of the site and all materials, equipment, tools and construction equipment and machinery thereon owned by the Contractor;

Accept assignment of subcontracts; and

Finish the work by whatever reasonable method the City may deem expedient. Upon request of the Contractor, the City shall furnish the Contractor a detailed accounting of the costs incurred by the Owner in finishing the work.

When the City terminates the Contract for one of the reasons stated above, the Contractor shall not be entitled to receive further payment until the work is finished.

The City shall have authority to terminate the Contract without additional authorization by City Board of Commissioners.

If the unpaid balance of the Contract Sum exceeds the costs of finishing the work, including compensation for the Engineer's services and expenses made necessary thereby, and other damages incurred by the City and not expressly waived, such expenses shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the City. The amount paid to the Contractor or the City, as the case may be, shall be certified by the Engineer, upon application, and this obligation for payment shall survive the termination of the Contract.

TERMINATION BY THE CITY FOR CONVENIENCE:

The City may, at any time, terminate the Contract for the City's convenience and without cause. Upon written notice from the City of such termination for the City's convenience, the Contractor shall:

Cease operations as directed by the City in the notice;

Take actions necessary, or that the City may direct, for the protection and preservation of the work; and

Except for the work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

The City shall have authority to terminate the Contract without additional authorization by City Board of Commissioners.

In case of such termination for the City's convenience, the Contractor shall be entitled to receive payment for work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit for the completed work.

CONTRACT BONDS:

The successful bidder, within 14 calendar days after the notice of award is received, shall provide the City with a contract payment bond and a contract performance bond each in an amount equal to 100 percent of the amount of the contract. All bonds shall be in conformance with G.S. 44A-33. The corporate surety furnishing the bonds shall be authorized to do business in the State.

CONTRACT PERIOD:

The Contract Period of Performance is ninety (90) days. The Contract period will begin upon the issuance of the Notice to Proceed, and work must commence within 30 days of Notice to Proceed.

LIQUIDATED DAMAGES:

Liquidated Damages will be assessed at the rate of \$1000 per calendar day for failure to complete the Project within the Contract Period.

GENERAL PROVISIONS

- a. Contractor shall comply with all requirements of OSHA 1926.
- b. Work hours shall be 7am to 5pm, Monday through Friday. No work shall be performed on City holidays. All work to be conducted outside established work hours must be scheduled with the City 48 hours in advance and is subject to approval.
- c. Contractor will obtain all necessary permits. Permits required by City of Havelock are provided free of charge.
- d. The Contractor is to clean and remove all debris at the end of each work day.
- e. All underground utilities are to be 811 located, prior to work being started.
- f. Contractor is responsible for all damage to existing roads, driveways, drainage, or utilities that occur as a result of the construction of the project.
- g. Contractor is responsible for all damage to City property that occur as a result of the construction of the project.
- h. Contractor shall provide safety measures during entire length of the project.
- i. Contractor is responsible for the storage and safety of all materials and equipment on jobsite.
- j. Material and equipment can only be stored in location approved by City staff. (See *figure 1*)

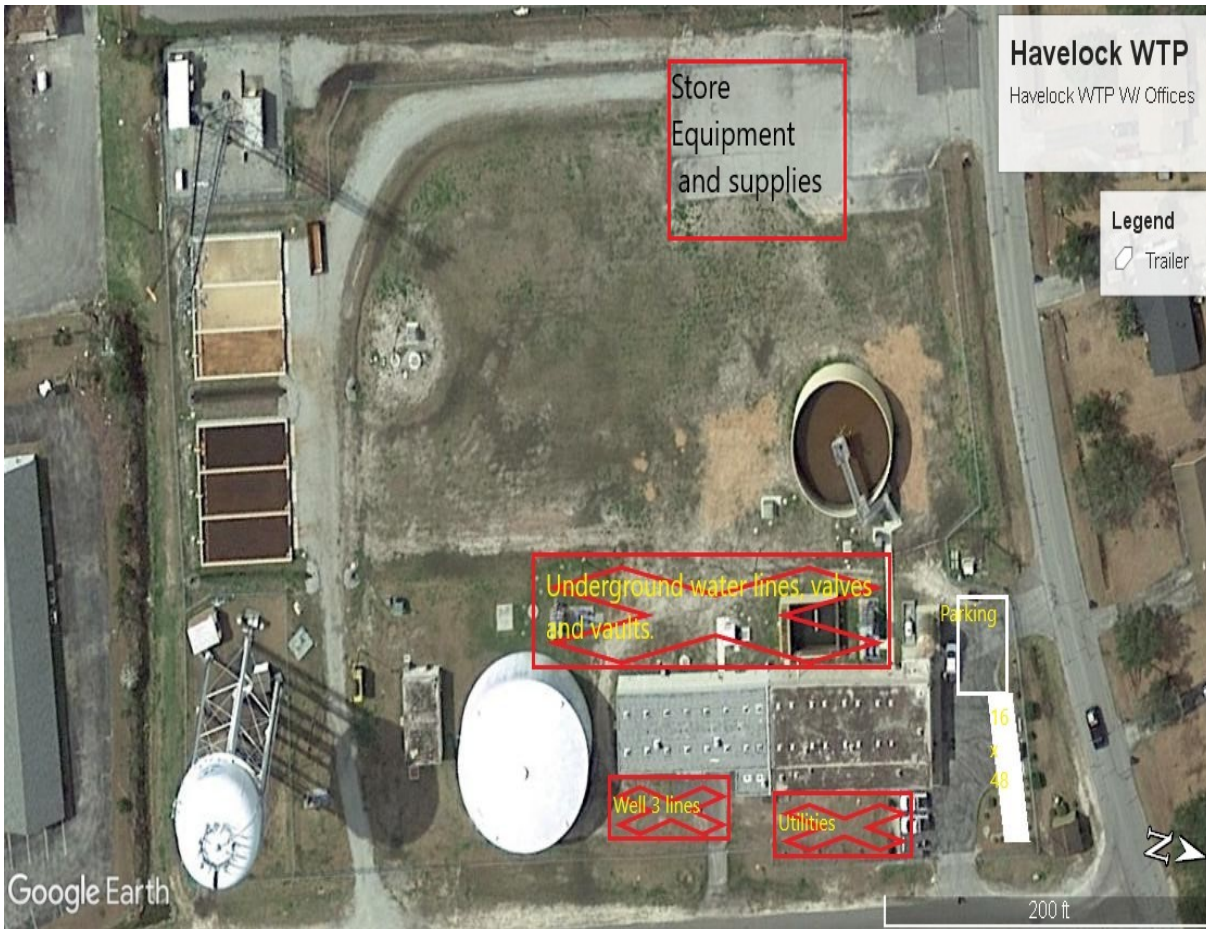


Figure 1 Equipment and Supplies Storage Location



Figure 2 New Filter Header (Side A)

Notes:
1. 7" clearance from ceiling to TT

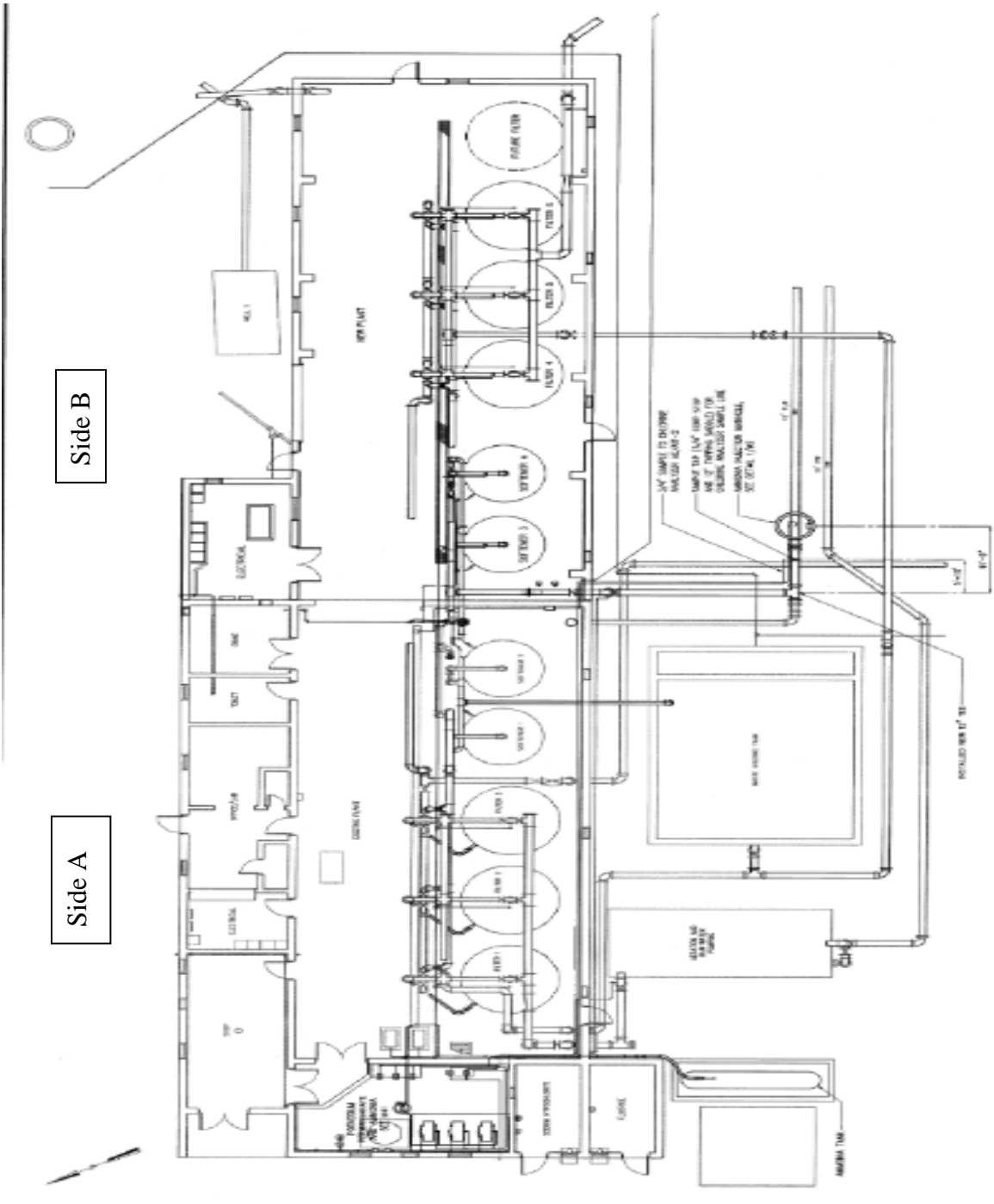


Figure 3 Plant Site Layout

123

HUNGERFORD & TERRY Inc.
CLAYTON, N. J.

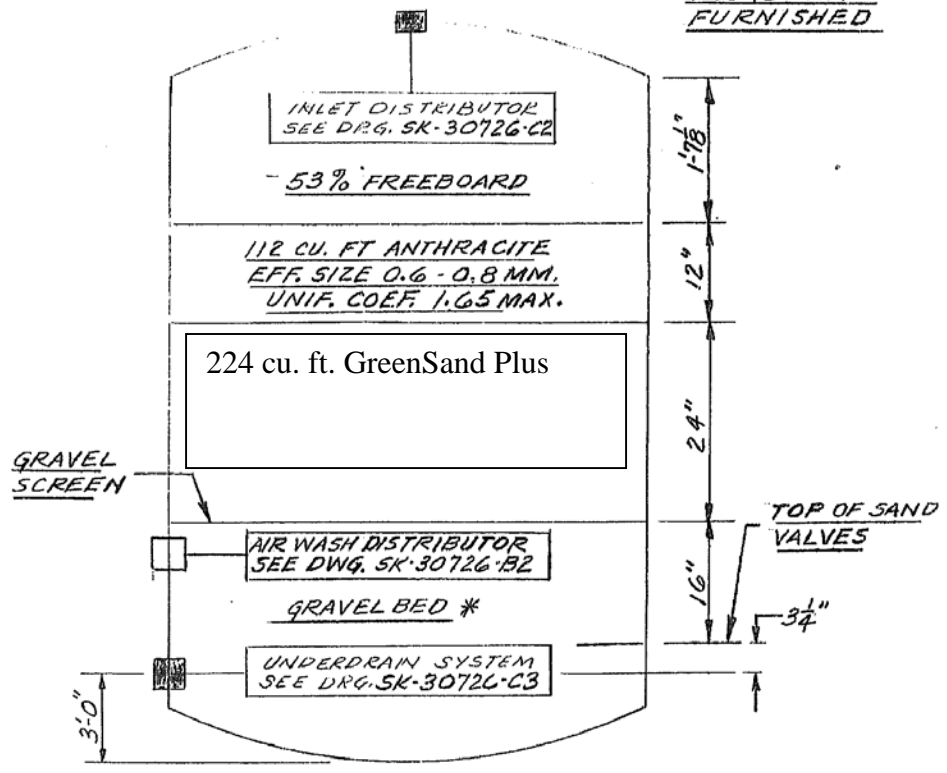
MADE BY: BAD
DATE: 1-3-90
SCALE: 1/2"
CHECKED: MMB
APPROVED: _____

TITLE: FILTER INTERIOR DETAILS

AREA = 111.92 FT²
144" OD.

Gravel Bed *	1/16 - 1/8 Gravel	4"
	1/8 - 1/4 gravel	4"
	1/4 - 1/2 gravel	2"
	1/2 - 3/4 Gravel	2"
	3/4 - 1-1/2 Gravel	4"

+ 10% EXTRA FURNISHED



* 3/4 - 1-1/2 Gravel is to be put into the tank first. Each successive layer should be of smaller size gravel until the final layer of 1/16 - 1/8 Gravel is placed.

				SK-30726-C1	
				CONT. NO. <u>L-580</u>	
NO.	REVISION	DATE	CHK'D		

FORM NO.

Figure 5 Filter Interior Side A

HUNGERFORD & TERRY Inc.

CLAYTON, N. J.

MADE BY KAD

DATE 1-3-90

SCALE NONE

CHECKED KAD

APPROVED

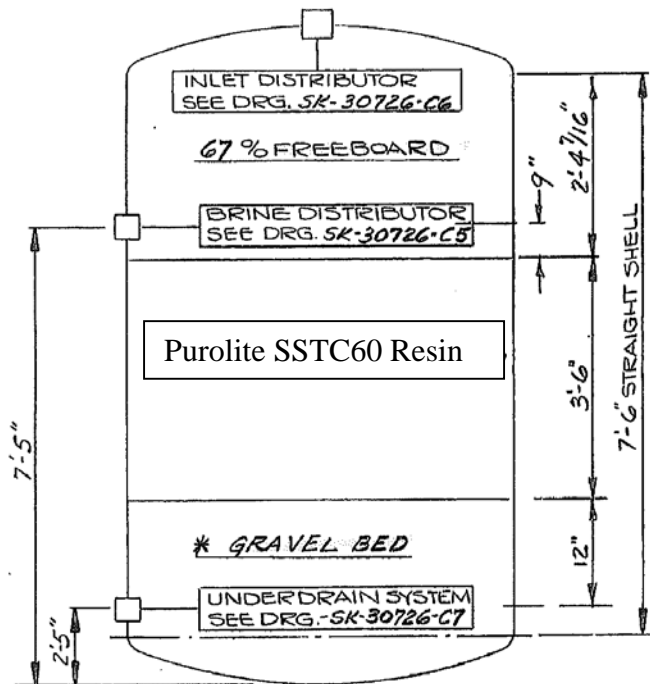
TITLE SOFTENER INTERIOR DETAILS

AREA = 77.7 FT²
120" O.D.

Gravel Bed*

1/8 - 1/16 Mesh Gravel	3	"
1/8 - 1/4 Gravel	3	"
1/4 - 1/2 Gravel	1 1/2	"
1/2 - 3/4 Gravel	1 1/2	"
3/4 - 1-1/2 Gravel	3	"

+ 10% EXTRA FURNISHED



* 3/4 - 1-1/2 Gravel is to be put into the tank first. Each successive layer should be of smaller size gravel until the final layer of 1/8 - 1/16 mesh Gravel is placed.

				SK-30726-C4	
				CONT. NO. L-580	
NO.	REVISION	DATE	CR'D		

Figure 6 Softener Interior Side A



Figure 7 Down Rinse

HUNGERFORD & TERRY Inc.
CLAYTON, N. J.

MADE BY MDL
DATE 11/29/01
SCALE 1"=16"
CHECKED BCB
APPROVED BCB

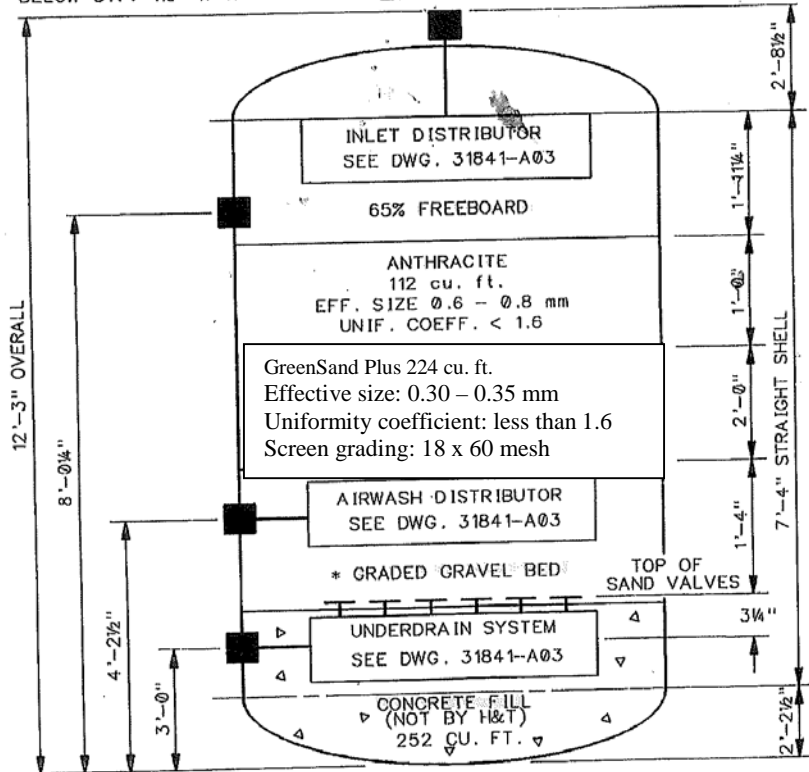
TITLE 144" GreenSand Plus

FILTER INTERIOR REF.

		DEPTH (INCHES)	VOLUME (CU. FT.)
*GRAVEL BED	1/8" x 1/8"	GRAVEL 4"	37
	1/4" x 1/8"	GRAVEL 4"	37
	1/2" x 1/4"	GRAVEL 2"	18.5
	3/4" x 1/2"	GRAVEL 2"	18.5
	1 1/2" x 3/4"	GRAVEL 4"	37
BELOW S.V.	1 1/2" x 3/4"	GRAVEL 1 1/4"	12

DIA.: 144" O.D.
AREA: 111.92 FT²
NO. REQ.: 3

FORM NO.



* 1 1/2" x 3/4" GRAVEL IS TO BE PUT INTO THE TANK FIRST. EACH SUCCESSIVE LAYER SHOULD BE OF SMALLER SIZE GRAVEL UNTIL THE FINAL LAYER OF 1/8" x 1/8" GRAVEL IS PLACED. SEE INSTRUCTION MANUAL.

				SK 31841-C02	
				CONT. NO. L-896	
NO.	REVISION	DATE	CHK'D		

Figure 8 Filter Side B

HUNGERFORD & TERRY Inc.

CLAYTON, N.J.

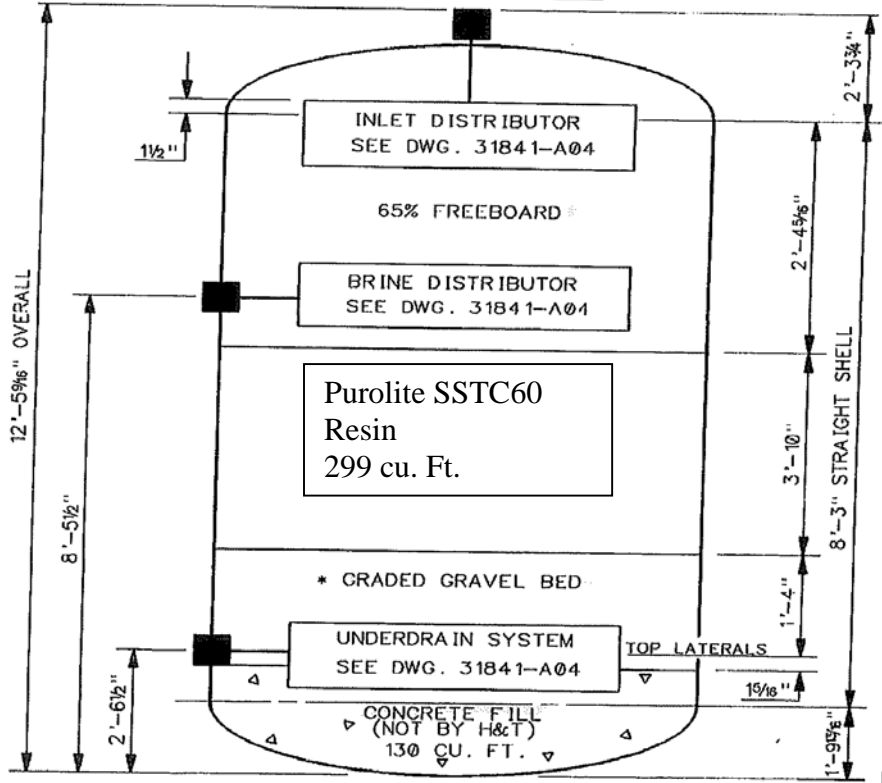
MADE BY MDL
 DATE 11/29/01
 SCALE NONE
 CHECKED RKB
 APPROVED RKB

TITLE 120" O.D. SOFTENER INTERIOR REF.

			DEPTH (INCHES)	VOLUME (CU. FT.)
*GRAVEL BED	{	1/8" x 1/16"	GRAVEL 4"	26
		1/4" x 1/8"	GRAVEL 4"	26
		1/2" x 1/4"	GRAVEL 2"	13
		3/4" x 1/2"	GRAVEL 2"	13
		1 1/2" x 3/4"	GRAVEL 4"	26
BELOW LATERALS		1 1/2" x 3/4"	GRAVEL 1 15/16"	8.5

DIA.: 120" O.D.
 AREA: 77.89 FT²
 NO. REQ.: 2

FORM NO.



FORM NO.

* 1 1/2" x 3/4" GRAVEL IS TO BE PUT INTO THE TANK FIRST. EACH SUCCESSIVE LAYER SHOULD BE OF SMALLER SIZE GRAVEL UNTIL THE FINAL LAYER OF 1/8" x 1/16" GRAVEL IS PLACED. SEE INSTRUCTION MANUAL.

1	REVISED GRADED GRAVEL TABLE	5/24/02	RKB	SK 31841-C03
NO.	REVISION	DATE	CK'D	CONT. NO. L-896

Figure 9 Softener Side B



Figure 10 Filter Inlet Distributor Arms



Figure 11 Air Release Valve (Side B only)