

November 3, 2017

Via Electronic Mail and Federal Express

Todd Anthony Bianco, PhD, EFSB Coordinator
RI Energy Facility Siting Board
89 Jefferson Boulevard
Warwick, RI 02888

**Re: Invenergy Thermal Development LLC's Application to Construct and Operate the
Clear River Energy Center in Burrillville, Rhode Island
Docket No.: SB-2015-16**

Dear Dr. Bianco:

On behalf of Invenergy Thermal Development LLC and the Clear River Energy Center Project ("Invenergy"), please find enclosed an original and three (3) copies of Invenergy's Supplemental response to the Town of Burrillville's Data Request, No. 36-2.

Please let me know if you have any questions.

Very truly yours,



ALAN M. SHOER
ashoer@apslaw.com

Enclosures

cc: Service List

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

IN RE: Application of Invenergy Thermal
 Development LLC's Proposal for
 Clear River Energy Center

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S SUPPLEMENTAL RESPONSES TO
THE TOWN OF BURRILLVILLE'S 36th SET OF DATA REQUESTS, NO 36-2**

Request 36-2 Please provide the details of all testing that has been performed for the installation of an onsite septic system and related appurtenances and provide the results of all drilling, soil sampling, or other testing performed in connection with the same, including, but not limited to, percolation tests, if any.

Response 36-2 A program of test holes was performed in areas considered for the siting of the onsite wastewater treatment system ("OWTS") leach field, with a number of locations selected for further evaluation. Soil evaluations were then conducted at the site and witnessed by the Rhode Island Department of Environmental Management ("RIDEM"). The RIDEM-witnessed test holes were first performed on February 7, 2017 and leach field siting and design was performed as part of an OWTS Application submission. Since then, design modifications required that the leach field be relocated; as such, additional test holes were performed and witnessed by RIDEM on August 2, 2017 and September 14, 2017 to evaluate subsurface conditions at potential alternative leach field locations.

Site evaluation forms documenting the soil evaluations were submitted to RIDEM under OWTS Application No. 1703-0050. Copies of these forms are attached as **Exhibit A**. Note that in accordance with the RIDEM OWTS Regulations, dry weather soil evaluations were used to determine the seasonal high groundwater table and soil conditions for leach field sizing and design. Percolation testing was not performed, as allowed in the RIDEM OWTS Regulations.

**SUPPLEMENTAL
RESPONSE** The results of the soil evaluations performed on September 14, 2017 were used in the siting and design of a bottomless sand filter ("BSF") for the onsite wastewater treatment system ("OWTS") proposed for the Clear River Energy Center. A revised OWTS permit application package incorporating this BSF was submitted to the RIDEM on October 13, 2017 and is attached hereto.

RESPONDENT: Brandon M. Blanchard, P.E., Pare Corporation

DATE: November 3, 2017

INVENERGY THERMAL DEVELOPMENT LLC
By its Attorneys,

/s/ Alan M. Shoer

Alan M. Shoer, Esq. (#3248)

Richard R. Beretta, Jr. Esq. (#4313)

Nicole M. Verdi, Esq. (#9370)

ADLER POLLOCK & SHEEHAN, P.C.

One Citizens Plaza, 8th Floor

Providence, RI 02903-1345

Tel: 401-274-7200

Fax: 401-351-0607

Dated: November 3, 2017

CERTIFICATE OF SERVICE

I hereby certify that on November 3, 2017, I delivered a true copy of the foregoing supplemental response to the Town of Burrillville's 36th Set of Data Requests via electronic mail to the parties on the attached service list.

/s/ Alan M. Shoer



Engineers | Scientists | Planners

PARECORP.COM



October 13, 2017

Mr. Kyle Ferreira
Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade Street
Providence, Rhode Island 02908

Re: **Clear River Energy Center**
New Construction Onsite Wastewater Treatment System
Burrillville, Rhode Island
OWTS Permit No. 1703-0050
Pare Project No. 15166.04

Dear Mr. Ferreira:

On behalf of Clear River Energy, LLC, Pare Corporation (Pare) has revised the design of the proposed Onsite Wastewater Treatment System (OWTS) for the Clear River Energy Center (Site) in Burrillville, RI. The design has been revised due to a required relocation of the bottomless sand filter (BSF) proposed for the Site. In addition to relocating the BSF, it has been made slightly larger due to the soil conditions at the new BSF location. Tank sizing and Orenco Advantex Treatment system design remain unchanged.

Enclosed please find four copies of revised OWTS drawings, new Soil Evaluation Forms for test holes performed on September 14, 2017, and an updated Orenco Advantex Treatment System Review Letter. Per our recent telephone correspondence, it is our understanding that a new application form and payment of a second application fee is not required.

Please contact the undersigned at (401) 334-4100 should you have any questions or require additional information.

Sincerely,

Brandon M. Blanchard, P.E.
Managing Engineer

BMB/abv

Enclosures

cc: Mr. John Niland, Invenergy LLC
Mr. Amit Nadkarni, Invenergy LLC
Ms. Lisa Goyer, P.E., Pare Corporation (w/o attachments)

Z:\JOBS\15 Jobs\15166.04 Invenergy-Consulting Services-RI\Task 001-OWTS Design and Permitting\Corresp\RIDEM Letter - OWTS Resubmission October 2017.doc





STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program



Site Evaluation Form

Part A – Soil Profile Description

Application Number 1703-0050

Property Owner: Invenenergy Thermal Development, LLC
 Property Location: Route 100, Wallum Lake Road, Burrillville, RI AP 137 Parcel 002
 Date of Test Hole: 09-14-2017
 Soil Evaluator: DiOrio, Alfred W. License Number: D4004
 Weather: Clr. /Ptly. Cldy. Shaded: Yes ☒ No ☐ Time: 11:00

| TH 8A Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
|------------------|--------|--------------------|------|-------------|-----------------|--------|-----------|---------|-----------|-------------|---------------|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. | S. Contr. | | | | |
| Ap | 0-5" | a | s | 10YR3/4 | None | | None | sl | 1 sbk | fr | 3 |
| Bw1 | 5-20" | g | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| Bw2 | 20-27" | a | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| C | 27-96" | - | - | 10YR6/3 | 7.5YR5/8 | C | 2 P | g sl | 0m | fi | 8m |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| TH 8B Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. | S. Contr. | | | | |
| Ap | 0-3" | a | s | 10YR3/4 | None | | None | sl | 1 sbk | fr | 3 |
| Bw1 | 3-18" | a | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| Bw2 | 18-22" | a | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| C | 22-96" | - | - | 10YR6/3 | 7.5YR5/8 | C | 2 P | g sl | 0m | fi | 8m |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

TH 8A Soil Class D/A Total Depth 96" Impervious/Limiting Layer Depth None (og) GW Seepage Depth None SHWT 22" (og)
 TH 8B Soil Class D/A Total Depth 96" Impervious/Limiting Layer Depth None (og) GW Seepage Depth 66" SHWT 19" (og)

Comments:

Part B





Site Evaluation – to be completed by Soil Evaluator or Class II or III Designer

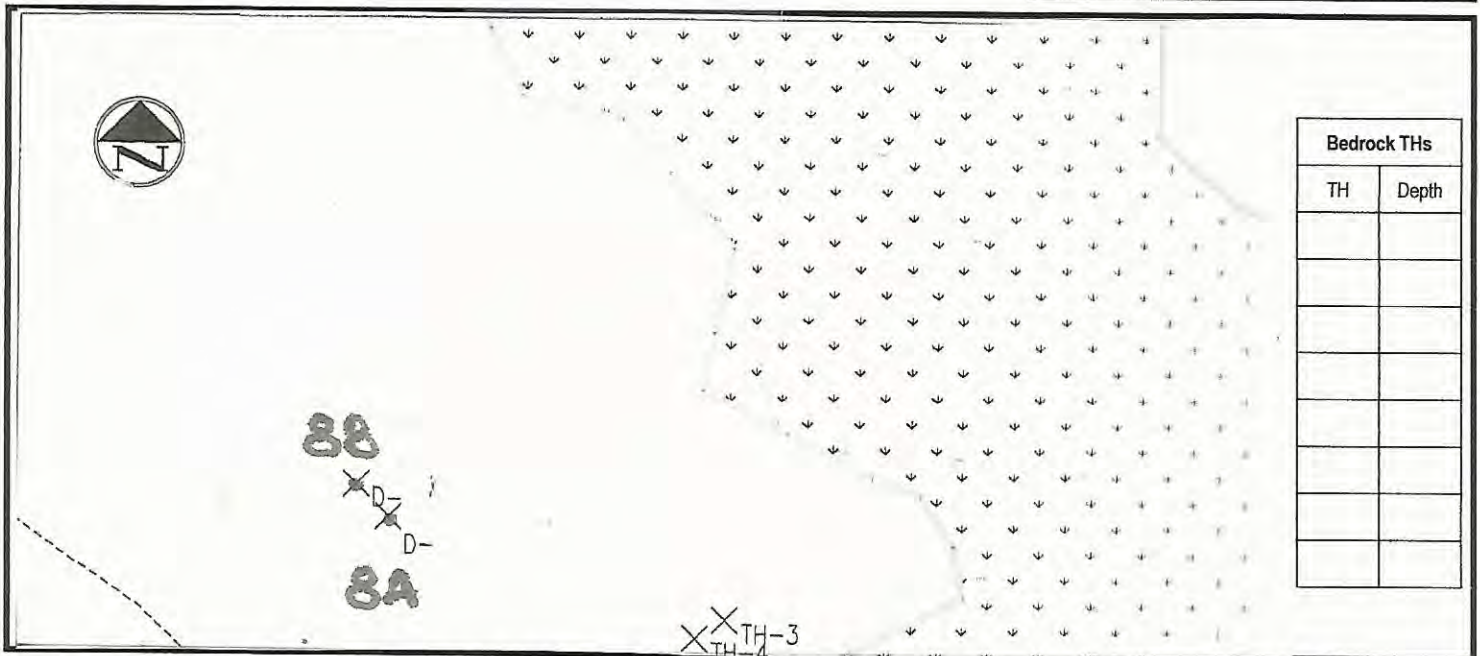
Please use the area below to locate:

1. Test holes and bedrock test holes,
2. Approximate direction of due north,
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.*

***OFFSETS MUST BE SHOWN**

Key:

-  Approximate location of test holes
-  Approximate location of bedrock test holes
-  Estimated gradient and direction of slope
-  Approximate direction of due north



| Bedrock THs | |
|-------------|-------|
| TH | Depth |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

1. Relief and Slope: Elev=567+/- (by others). Slope=0-5%

2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch.

NO ☐ YES ☒

3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above.

NO ☒ YES ☐

4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch.

NO ☒ YES ☐

5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch.

NO ☒ YES ☐

6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 38?

NO ☒ YES ☐

7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch.

NO ☒ YES ☐

8. Site's potential for flooding or ponding: NONE ☐ SLIGHT ☒ MODERATE ☐ SEVERE ☐

9. Landscape position: Backslope

10. Vegetation: Specimen vegetation w/moderate understory

11. Indicate approximate location of property lines and roadways.

12. Additional comments, site constraints or additional information regarding site: For use with OWTS only.

Certification

The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: Alfred W. DiOrio
Signature

D4004
License #

Part B prepared by: Alfred W. DiOrio
Signature

D4004
License #

DO NOT WRITE IN THIS SPACE

Witnessed Soil Evaluation Decision:

Concur ☐

Inconclusive ☐

Disclaim ☐

Unwitnessed Soil Evaluations Decision:

Accept ☐

Inconclusive ☐

Disclaim ☐

Wet Season Determination required ☐

Additional Field Review Required ☐

Explanation: _____

Signature Authorized Agent

Date



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program



Site Evaluation Form

Part A - Soil Profile Description

Application Number 1703-0050

Property Owner: Invenergy Thermal Development, LLC

Property Location: Route 100, Wallum Lake Road, Burrillville, RI AP 137 Parcel 002

Date of Test Hole: 09-14-2017

Soil Evaluator: DiOrio, Alfred W.

License Number: D4004

Weather: Clr./Ptly. Cldy.

Shaded: Yes ☒ No ☐ Time: 11:00

| TH 15-1 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
|--------------------|--------|--------------------|------|-------------|-----------------|--------|-----------|---------|-----------|-------------|---------------|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. | S. Contr. | | | | |
| Ap | 0-3" | a | s | 10YR3/4 | None | | None | sl | 1 sbk | fr | 3 |
| Bw1 | 3-17" | g | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| Bw2 | 17-33" | a | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| C | 33-96" | - | - | 10YR5/6 | 7.5YR5/8 | C | 2 P | g sl | 0m | fi | 8 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| TH 15-2 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. | S. Contr. | | | | |
| Ap | 0-6" | a | s | 10YR3/4 | None | | None | sl | 1 sbk | fr | 3 |
| Bw1 | 6-24" | g | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| Bw2 | 24-50" | a | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| C | 50-96" | - | - | 10YR5/6 | 7.5YR5/8 | C | 2 P | g sl | 0m | fi | 8 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

TH 15-1 Soil Class D/A Total Depth 96" Impervious/Limiting Layer Depth None (og) GW Seepage Depth None SHWT 19" (og)

TH 15-2 Soil Class D/A Total Depth 96" Impervious/Limiting Layer Depth None (og) GW Seepage Depth None SHWT 19" (og)

Comments:

Part B

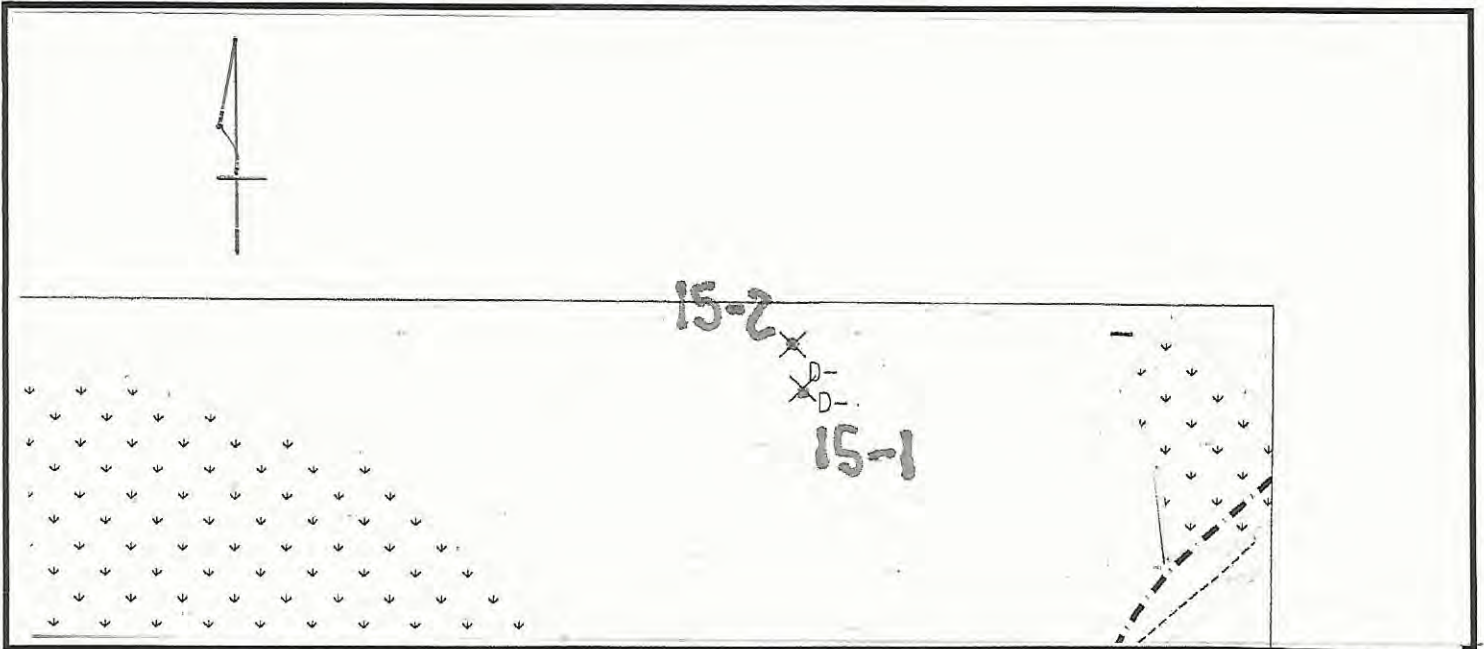
Site Evaluation – to be completed by Soil Evaluator or Class II or III Designer

Please use the area below to locate:

1. Test holes and bedrock test holes,
2. Approximate direction of due north,
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.*

***OFFSETS MUST BE SHOWN**

| Key: | |
|------|--|
| | Approximate location of test holes |
| | Approximate location of bedrock test holes |
| | Estimated gradient and direction of slope |
| | Approximate direction of due north |



1. Relief and Slope: Elev=547+/- Slope=0-5%
2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch. NO ☐ YES ☒
3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above. NO ☒ YES ☐
4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 38? NO ☒ YES ☐
7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch. NO ☒ YES ☐
8. Site's potential for flooding or ponding: NONE ☐ SLIGHT ☒ MODERATE ☐ SEVERE ☐
9. Landscape position: Backslope
10. Vegetation: Specimen vegetation w/moderate understory
11. Indicate approximate location of property lines and roadways.
12. Additional comments, site constraints or additional information regarding site: For use with OWTS only.

Certification

The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: Alfred W. DiOrio D4004 Part B prepared by: Alfred W. DiOrio D4004
Signature License # Signature License #

DO NOT WRITE IN THIS SPACE

Witnessed Soil Evaluation Decision: Concur ☐ Inconclusive ☐ Disclaim ☐
Unwitnessed Soil Evaluations Decision: Accept ☐ Inconclusive ☐ Disclaim ☐

Wet Season Determination required ☐ Additional Field Review Required ☐

Explanation: _____

Signature Authorized Agent

Date



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program



Site Evaluation Form

Part A - Soil Profile Description

Application Number 1703-0050

Property Owner: Invenergy Thermal Development, LLC

Property Location: Route 100, Wallum Lake Road, Burrillville, RI AP 137 Parcel 002

Date of Test Hole: 09-14-2017

Soil Evaluator: DiOrio, Alfred W.

License Number: D4004

Weather: Clr./Ptly. Cldy.

Shaded: Yes ☒ No ☐ Time: 11:00

| TH 5-1 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
|-------------------|--------|--------------------|------|-------------|-----------------|--------|-----------|---------|-----------|-------------|---------------|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. | S. Contr. | | | | |
| Ap | 0-5" | a | s | 10YR3/4 | None | | None | sl | 1 sbk | fr | 3 |
| Bw | 5-44" | g | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| C | 44-96" | - | - | 10YR5/6 | 7.5YR5/8 | C | 2 P | g sl | 0m | fi | 8m |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| TH 5-2 Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. | S. Contr. | | | | |
| Ap | 0-4" | a | s | 10YR3/4 | None | | None | sl | 1 sbk | fr | 3 |
| Bw1 | 4-17" | g | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| Bw2 | 17-26" | a | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| Bw3 | 26-56" | a | s | 10YR5/6 | 7.5YR5/8 | C | 2 P | f sl | 1 sbk | fr | 3 |
| C | 56-98" | - | - | 10YR5/6 | 7.5YR5/8 | C | 2 P | g sl | 0m | fi | 8m |
| | | | | | | | | | | | |

TH 5-1 Soil Class D/A Total Depth 96" Impervious/Limiting Layer Depth None (og) GW Seepage Depth None SHWT 22" (og)

TH 5-2 Soil Class D/A Total Depth 98" Impervious/Limiting Layer Depth None (og) GW Seepage Depth None SHWT 24" (og)

Comments:

Part B





Site Evaluation – to be completed by Soil Evaluator or Class II or III Designer

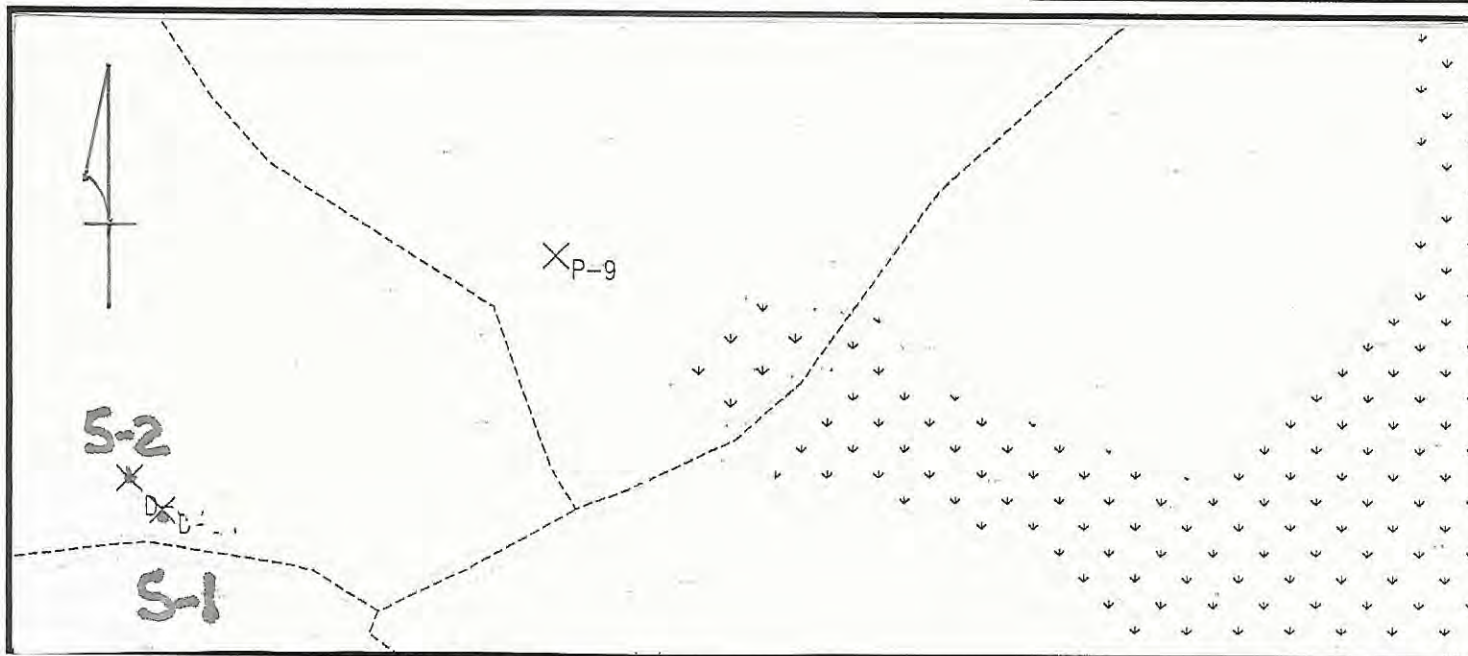
Please use the area below to locate:

1. Test holes and bedrock test holes,
2. Approximate direction of due north,
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.*

***OFFSETS MUST BE SHOWN**

Key:

-  Approximate location of test holes
-  Approximate location of bedrock test holes
-  Estimated gradient and direction of slope
-  Approximate direction of due north



1. Relief and Slope: Elev=574+/- Slope=0-5%

2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above. NO ☒ YES ☐
4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch. NO ☒ YES ☐
6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 38? NO ☒ YES ☐
7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch. NO ☒ YES ☐

8. Site's potential for flooding or ponding: NONE ☐ SLIGHT ☒ MODERATE ☐ SEVERE ☐

9. Landscape position: Backslope

10. Vegetation: Specimen vegetation w/moderate understory

11. Indicate approximate location of property lines and roadways.

12. Additional comments, site constraints or additional information regarding site: For use with OWTS only.

Certification

The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: Alfred W. DiOrio D4004
Signature License #

Part B prepared by: Alfred W. DiOrio D4004
Signature License #

DO NOT WRITE IN THIS SPACE

Witnessed Soil Evaluation Decision: Concur ☐ Inconclusive ☐ Disclaim ☐

Unwitnessed Soil Evaluations Decision: Accept ☐ Inconclusive ☐ Disclaim ☐

Wet Season Determination required ☐ Additional Field Review Required ☐

Explanation:

Signature Authorized Agent

Date

15-2
15-1

88
8A

5-2
5-1

Xp-7

Xp-6

X_{TH}-3

Xp-4

Xp-2

Xp-9



SCALE ADJUSTMENT GUIDE
0' 1"
BAR IS ONE INCH ON
ORIGINAL DRAWING

OWTS TEST PIT LOCATIONS
CLEAR RIVER ENERGY CENTER
BURRILLVILLE, RI
SCALE: 1"=100'



INSPECTION REPORT

| | | | | | |
|---|--|-----------------------------|--|------------------------|--|
| APPLICATION NUMBER: 1703-0050 | | Route 100, Wallum Lake Road | | Pittman | |
| STREET: Burrillville | | INSPECTOR: | | 09/14/2017 | |
| CITY/TOWN: 137 002 | | 95 | | INSPECTION DATE: / | |
| PLAT/LOT: No Installer XXXXX | | POLE NO: Designer: D3101 | | ARRIVAL TIME: 1230 | |
| OWTS INSTALLER: | | 0 | | WEATHER CONDITIONS: 2V | |
| PHONE NO: | | INSPECTION NUMBER: | | | |
| TYPE OF INSPECTION: Inspection for Soil | | | | | |
| scheduled @ 12:00 PM | | | | | |

FINDINGS/COMMENTS

- CONCUR TH P15-1 + P15-2 19" W.T. Basal Till
- CONCUR TH P5-1 22" W.T. > Basal
- CONCUR TH P5-2 24" W.T. > Till
- CONCUR TH P8-A 22" W.T. > Basal
- CONCUR TH P8-B 19" W.T. > Till
- * Wetland

RESULTS OF INSPECTION/ACTION REQUIRED

☐ CONSTRUCTION - DESIGNER MUST INSPECT/APPROVE PRIOR TO DEM INSPECTION

- ☐ Bottom inspected
- ☐ Cover inspected
- ☐ Correct items listed
- ☐ (RFA) Address items listed and call for re-inspection.
- ☐ (ASB) Designer must submit As-Builts
- ☐ (RPREQ) Redesign required. Submit new application.
- ☐ (RFAD) Stop Construction. Contact OWTS office. DO NOT CONTINUE.
- ☐ (COC) Designer submit COC
- ☐ (O&M) O&M agreement and permit must be recorded in Land Evidence Records.
- ☐ (Fee) A \$100.00 fee is required before re-inspection.
- ☐ Inspection waived

☐ SITE TESTING

- ☐ Soil Evaluation - Concur
- ☐ Soil Evaluation - Do not concur
- ☐ Soil Evaluation - Inconclusive
- ☐ Alteration Test Hole - Verified
- ☐ Alteration Test Hole - Unacceptable
- ☐ Ledge Test
- ☐ Fill Tests
- ☐ Repair Test Hole

Signature of Inspector _____

CLEAR RIVER ENERGY CENTER ON-SITE WASTE WATER TREATMENT SYSTEM (OWTS) BURRILLVILLE, RHODE ISLAND



SCALE: 1"=800'

OWNER/APPLICANT:

Invenergy

INVENERGY
ONE SOUTH WACKER DRIVE
SUITE 1800
CHICAGO, IL 60606

CIVIL ENGINEER:



PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
8 BLACKSTONE VALLEY PLACE
LINCOLN, RI 02865
401-334-4100



April 2017
Revised October 2017

INDEX OF DRAWINGS

| SHEET No. | DRAWING No. | DESCRIPTION |
|-----------|-------------|--------------------|
| 1 | - | COVER SHEET |
| 2 | C1.0 | GENERAL NOTES |
| 3 | C2.0 | SITE PLAN |
| 4 - 6 | C3.1 - C3.3 | DETAILS Nos. 1 - 3 |

GENERAL NOTES:

1.

ALL DESIGN, CONSTRUCTION, AND MAINTENANCE REQUIREMENTS TO BE IN CONFORMANCE WITH THE RHODE ISLAND "RULES ESTABLISHING MINIMUM STANDARDS RELATING TO LOCATION, DESIGN, CONSTRUCTION AND MAINTENANCE OF ONSITE WASTEWATER TREATMENT SYSTEMS", LATEST EDITION (OWTS REGULATIONS), AND, GUIDELINES FOR THE DESIGN, USE, AND MAINTENANCE OF PRESSURIZED DRAINFIELDS, NOVEMBER 2013 ADDITION. CONSTRUCTION OF OWTS SHALL BE PERFORMED BY A LICENSED OWTS INSTALLER IN ACCORDANCE WITH THE OWTS REGULATIONS.
2.

THE WORK SHOWN ON THESE DRAWINGS IS FOR A "NEW CONSTRUCTION" ON-SITE WASTEWATER TREATMENT SYSTEM (OWTS) FOR THE PROPOSED CLEAR RIVER ENERGY CENTER. THE OWTS SHALL SERVE THE FACILITY'S PROPOSED ADMINISTRATION BUILDING. THE SITE OF THE CLEAR RIVER ENERGY CENTER WILL BE SUBDIVIDED FROM A.P. 137, LOT 002.
3.

PRIOR TO BEGINNING WORK CONTRACTOR SHALL VISIT THE SITE TO VERIFY FIELD CONDITIONS. NOTED DISCREPANCIES BETWEEN DRAWINGS AND ACTUAL FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.
4.

THIS SITE IS NOT LOCATED WITHIN A RIDEM DESIGNATED CRITICAL RESOURCE AREA.
5.

ANY DAMAGE TO UTILITIES OR OTHER SITE CONSTRUCTION CAUSED BY THE CONTRACTOR SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND COSTS FOR REPAIRS OR REPLACEMENT OF SUCH DAMAGES SHALL BE BORNE BY THE CONTRACTOR.
6.

PRIOR TO THE START OF CONSTRUCTION, ALL NECESSARY EROSION AND SEDIMENTATION CONTROLS SHALL BE INSTALLED AND MAINTAINED TO MITIGATE EROSION AND SEDIMENTATION OF DOWN GRADIENT AREAS, WETLANDS, WATER COURSES, ETC. EROSION CONTROLS SHALL BE MAINTAINED AND REPLACED AS NECESSARY UNTIL DISTURBED SURFACES ARE STABILIZED AND/OR RETURNED TO THEIR ORIGINAL CONDITION.
7.

CONTRACTOR SHALL PROVIDE ENGINEER WITH ELECTRONIC COPY OR FOUR (4) HARDCOPIES OF SUBMITTALS FOR REVIEW AND APPROVAL OF ALL MATERIALS AND EQUIPMENT PROPOSED TO BE USED FOR THE OWTS. CONTRACTOR SHALL PROVIDE ENGINEER A MINIMUM OF 10 BUSINESS DAYS TO REVIEW AND PROCESS SUBMITTALS, UNLESS OTHERWISE AGREED UPON BETWEEN ENGINEER AND CONTRACTOR. WORK PERFORMED BY CONTRACTOR PRIOR TO APPROVAL OF ALL REQUIRED SUBMITTALS IS DONE AT CONTRACTOR'S OWN RISK.
8.

MANHOLES ON TANKS SHALL BE BROUGHT TO FINISHED GRADE. FINISHED GRADE SHALL SLOPE AWAY FROM MANHOLE COVERS. TANK ACCESS COVERS SHALL BE TAMPER RESISTANT AND MECHANICALLY FASTENED AND SHALL BE AFFIXED WITH A LABEL INDICATING "ENTRANCE INTO THE TANK COULD BE FATAL".
9.

CLEAR ALL TREES AND STUMPS WITHIN 10' OF SYSTEM.
10.

CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY MEANS AND METHODS TO CONSTRUCT ALL EXCAVATIONS FOR THIS PROJECT IN ACCORDANCE WITH APPLICABLE OSHA SAFETY REQUIREMENTS. CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL MATTERS RELATED TO SITE SAFETY AND FOR COMPLYING WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL RULES AND REGULATIONS. OPEN EXCAVATIONS SHALL BE PROTECTED AT ALL TIMES AND NO EXCAVATIONS OR OPEN BELOW GRADE STRUCTURES SHALL BE LEFT OPEN OVERNIGHT.
11.

CONTRACTOR SHALL PROVIDE THE ENGINEER WITH THREE (3) COPIES OF THE MANUFACTURER'S OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT. THE OWNER SHALL BE PROVIDED WITH A COMPLETE SYSTEM OPERATION AND MAINTENANCE MANUAL IN ACCORDANCE WITH RIDEM REGULATIONS.
12.

CONTRACTOR SHALL MAINTAIN A RECORD DRAWING WHICH SHALL BE SUBMITTED TO THE ENGINEER AT THE COMPLETION OF THE PROJECT. ENGINEER SHALL PREPARE CERTIFICATE OF CONSTRUCTION FOR SUBMITTAL TO RIDEM.
13.

CONTRACTOR CONSTRUCTING OWTS SHALL BE RESPONSIBLE TO RESTORE ALL DISTURBED AREAS TO THEIR ORIGINAL CONDITION OR PROPOSED FINAL CONDITION AS APPROPRIATE. THE LIMITS OF ALL DISTURBANCE SHALL BE KEPT TO A MINIMUM WITHIN THE PROPOSED AREA OF CONSTRUCTION. ALL AREAS DISTURBED OUTSIDE THE PROJECT LIMITS BY THE CONTRACTOR SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR PROPOSED FINAL CONDITION AS APPROPRIATE AT NO EXTRA COST TO THE OWNER.
14.

CONTRACTOR SHALL RESTORE PAVED ROADS AND PARKING LOTS THAT HAVE BEEN DISTURBED AS PART OF THE WORK WITH PERMANENT PAVEMENT PATCHES. CONTRACTOR SHALL MINIMIZE DISTURBANCE OF ALL PAVED AREAS TO THE DEGREE FEASIBLE AND SHALL STAGE THE WORK ACCORDINGLY. ALL OTHER AREAS SHALL BE RESTORED TO MATCH PROPOSED FINAL SITE CONDITIONS.
15.

ONLY SANITARY WASTEWATER SHALL BE DISCHARGED TO THE PROPOSED SYSTEM. CHEMICALS AND ALL OTHER NON-SANITARY WASTEWATER SHALL NOT BE DISCHARGED INTO THE OWTS.
16.

PRESSURIZED SEWER PIPE SHALL BE INSTALLED WITH A MINIMUM OF 4' OF COVER UNLESS OTHERWISE INDICATED ON THESE DRAWINGS.
17.

EXCESS SOIL, CONSTRUCTION MATERIALS, AND DEBRIS SHALL NOT BE STOCKPILED OR DISPOSED OF WITHIN ANY RHODE ISLAND REGULATED WETLAND.
18.

GARBAGE GRINDERS ARE PROHIBITED FROM USE WITH THIS SYSTEM.
19.

NO WELLS, EXISTING OR PROPOSED, ARE LOCATED WITHIN 300' OF SYSTEM. SITE TO BE SERVED BY A NEW PRIVATE WELL PROPOSED APPROXIMATELY 1,600' FROM BSF.
20.

NO WATER COURSES ARE LOCATED WITHIN 50' OF SYSTEM.
21.

SEPARATION OF 25' BETWEEN DRAINS AND SEWER HAS BEEN MAINTAINED ACROSS THE SITE TO THE DEGREE FEASIBLE. WHERE THIS SETBACK CANNOT BE MET, THE GRAVITY OR PRESSURIZED SEWER PIPE SHALL BE SLEEVED WITHIN AN APPROPRIATELY SIZED PIPE UNTIL THE 25' SETBACK CAN BE MET. ALL TANKS ARE PROPOSED A MINIMUM OF 25' FROM DRAINS.
22.

NO VEHICULAR TRAVEL OR PAVEMENT OVER BSF WILL BE PERMITTED.
23.

NO PUBLIC WELLS (EXISTING OR PROPOSED) ARE LOCATED WITHIN 500' OF ANY COMPONENT OF PROPOSED SYSTEM.
24.

ELEVATIONS BASED ON A DATUM PLANE OF NAVD 88.
25.

CONTRACTOR SHALL CONTACT "DIG SAFE" (TEL. #1-888-DIG-SAFE) A MINIMUM OF 72-HOURS PRIOR TO STARTING WORK UNDERGROUND. ALSO, ALL OTHER UTILITY COMPANIES KNOWN TO HAVE UTILITIES IN THE AREA SHALL BE CONTACTED BY CONTRACTOR AT THIS TIME PRIOR TO CONSTRUCTION. UNDERGROUND TELEPHONE, WATER, ELECTRIC, GAS, AND DRAINAGE ARE KNOWN TO BE IN THE VICINITY OF THE PROJECT AREA.
26.

CONTRACTOR SHALL NOTIFY ENGINEER A MINIMUM OF 72-HOURS PRIOR TO STARTING WORK SO THAT ENGINEER CAN NOTIFY RIDEM THAT CONSTRUCTION ON THE OWTS IS STARTING.

BOTTOMLESS SAND FILTER (BSF) NOTES:

1.

DURING THE CLEARING AND GRUBBING PROCESS IN THE AREA DESIGNATED FOR THE BSF THE "A" AND "B" HORIZON SOILS SHALL BE STRIPPED AND REMOVED AND A LAYER OF NON WOVEN FILTER FABRIC INSTALLED. AREA DESIGNATED FOR BSF, AS WELL AS ESTABLISHED FILL PERIMETER SHOWN ON DETAILS, CAN BE FILLED WITH COMMON BORROW FILL MATERIAL, SPECIFIED BY OTHERS, LIKE REMAINDER OF SITE. AT THE TIME OF THE BSF INSTALLATION, THIS FILL MATERIAL SHALL BE EXCAVATED AND REMOVED ALONG WITH INSTALLED NON WOVEN FILTER FABRIC WITHIN BSF FOOTPRINT AND SURROUNDING FILL PERIMETER. THE "C" HORIZON SOIL SHALL BE SCARIFIED AND MIXED WITH BANK RUN GRAVEL TO A DEPTH OF 3-INCHES. AREA OF BSF SHALL BE BACKFILLED WITH BANK RUN GRAVEL UP TO BOTTOM ELEVATION OF BSF.
2.

THE PROPOSED BSF LOCATION SHALL BE STAKED OUT IMMEDIATELY FOLLOWING FILLING AND ROUGH GRADING OF SITE AND PROTECTED PRIOR TO ADDITIONAL SITE PREPARATION ACTIVITIES.
3.

BSF SHALL NOT BE BURIED, COVERED BY TOPSOIL, OR COVERED WITH ANY OTHER MATERIAL SINCE THAT MAY LIMIT GAS/OXYGEN MOVEMENT INTO AND OUT OF THE FILTER OR INTERFERE WITH PROPER MAINTENANCE.
4.

PROVIDE A MINIMUM BUFFER OF TEN (10)-FEET BETWEEN THE BSF AND NEIGHBORING TREES AND SHRUBS. TREE CANOPY SHALL NOT EXTEND OVER ANY PART OF THE BSF.
5.

UNDER NO CIRCUMSTANCES SHOULD HEAVY EQUIPMENT, VEHICLES, OR IMPERMEABLE SURFACES/MATERIALS BE ALLOWED OVER THE FINISHED BSF.
6.

PROVIDE MINIMUM 3- FEET OF SEPARATION BETWEEN SEASONAL HIGH GROUNDWATER TABLE (SHGW) AND TOP OF SAND LAYER AT BSF.

BSF TREATMENT SYSTEM COMPONENT MAINTENANCE:

1.

LATERALS – TO REMOVE ACCUMULATED SOLIDS IN LATERALS, FIRST OPEN THE LATERAL END BALL VALVE OR THREADED END CAP, ENGAGE THE PUMP AND FLUSH OUT ANY SOLIDS. A BOTTLE BRUSH (APPROPRIATELY SIZED FOR THE LATERAL) ATTACHED TO A PLUMBERS SNAKE IS THEN PUSHED DOWN EACH LATERAL TO UNPLUG THE ORIFICES. WITH THE BOTTLE BRUSH REMOVED, THE PUMP SHOULD AGAIN BE MANUALLY ENGAGED AND EACH LATERAL LINE FLUSHED OUT THROUGH THE LATERAL END ONTO THE PEASTONE. (PARTICULARLY DIRTY OR MAINTENANCE-NEGLECTED LATERALS SHOULD BE FLUSHED DIRECTLY INTO A BUCKET BY USING A GARDEN HOSE AND THREADED FITTING ASSEMBLY. THIS WASTE MATERIAL IS THEN DUMPED INTO THE INLET END OF THE SYSTEM SEPTIC TANK). ALTERNATIVELY, A PRESSURE POWER WASHER WITH APPROPRIATELY SIZED TUBING CAN ALSO BE SENT DOWN EACH LATERAL TO FLUSH ACCUMULATED SOLIDS. USUALLY A BSF IN CONTINUOUS USE WILL REQUIRE LATERAL FLUSHING/ BOTTLE BRUSH TREATMENT ONCE PER YEAR. BSF'S OPERATING ABOVE THEIR DAILY DESIGN FLOW MAY REQUIRE MORE FREQUENT LATERAL FLUSHING. THIS FREQUENCY CAN BE BASED UPON THE RESULTS OF THE DISTAL LATERAL HEAD PRESSURE TEST. SEASONALLY-USED BSF'S MAY NOT NEED YEARLY LATERAL FLUSHING, BUT THEIR LATERAL HEAD (PRESSURE) SHOULD BE CHECKED ONCE PER YEAR, AND MAINTENANCE PERFORMED AS NEEDED.
2.

FILTER SURFACE – THE PEASTONE SURFACE OF ALL BSF'S SHOULD BE KEPT FREE OF DEBRIS, WEEDS, AND GRASSES. THIS SURFACE CAN BE LIGHTLY RAKED TO REMOVE ANY LEAVES. WEEDS AND GRASSES SHOULD BE REMOVED WHEN THEY FIRST APPEAR.
3.

ELECTRICAL COMPONENTS – ONCE A YEAR ALL ELECTRICAL COMPONENTS SHOULD BE CHECKED FOR FUNCTIONALITY. ALL FLOAT SWITCHES SHOULD BE ACTIVATED AND PUMP RUN TIMERS SHOULD BE CHECKED FOR CONSISTENT OPERATION. ALL FLOAT SWITCHES SHOULD BE HOSED DOWN TO PREVENT SCUM ACCUMULATION. ALL WIRING SHOULD BE NEATLY BUNDLED AND PLACED OUT OF THE OPERATING PATH OF THE FLOAT SWITCHES.
4.

TANK AND CHAMBER MAINTENANCE – TANKS AND PUMP CHAMBERS SHOULD BE CHECKED ANNUALLY AND MEASURED FOR SLUDGE AND SCUM ACCUMULATION NO LESS THAN EVERY 3 YEARS. THIS CAN EASILY BE DONE AS PART OF THE ANNUAL MAINTENANCE. IF SLUDGE AND SCUM LEVELS WARRANT, TANKS SHALL BE PUMPED AND ACCUMULATIONS REMOVED.
5.

IF FIBERGLASS OR POLYETHYLENE TANKS ARE USED, IT IS IMPORTANT TO MONITOR GROUND WATER LEVELS BEFORE PUMPING SEPTAGE OR TO SCHEDULE PUMPING OF TANKS FOR LATE SUMMER OR EARLY FALL TO AVOID TANKS FLOATING (THIS TIME PERIOD MAY DIFFER DEPENDING UPON WEATHER CONDITIONS). PUMPING CONCRETE TANKS DURING PERIODS OF HIGH GROUNDWATER MAY ALSO CAUSE TANK FLOATATION PROBLEMS. THE YEARLY INSPECTION PROCESS WILL FACILITATE THE SCHEDULING OF TANK PUMPING TO AVOID EMERGENCY PUMPING SITUATIONS. ALL TANKS SHOULD BE FILLED WITH TAP WATER IMMEDIATELY AFTER SEPTAGE PUMPING IS COMPLETED.
6.

SEPTIC TANK EFFLUENT FILTER SHALL BE REMOVED AND HOSED OFF BACK INTO TANK AT TIME OF ANNUAL TANK INSPECTION. OWNER MAY CLEAN OFF EFFLUENT FILTER MORE FREQUENTLY IF CONDITIONS WARRANT.
7.

FOR PROPER PERFORMANCE, TANKS SHOULD BE INSPECTED AT LEAST ONCE PER YEAR OR AT A GREATER FREQUENCY IN ACCORDANCE WITH THE SYSTEM OPERATION AND MAINTENANCE MANUAL. TANKS SHOULD BE PUMPED WHEN THE TOTAL DEPTH OF SCUM AND/OR SOLIDS EXCEEDS ⅓ LIQUID DEPTH OF THE TANK.
8.

ENTRY INTO ANY TANK COULD BE FATAL AND SHALL NEVER BE PERFORMED. ALL INSPECTION AND MAINTENANCE SHALL BE PERFORMED FROM GROUND SURFACE.

CONCRETE STRUCTURE SPECIFICATIONS:

CONCRETE: CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 5,000 PSI IN 28 DAYS.

REINFORCING STEEL: REINFORCING STEEL SHALL CONFORM TO ASTM DESIGNATION A615, GRADE 60.

BITUMINOUS COATING: ALL STRUCTURES SHALL BE PROVIDED WITH A BITUMINOUS WATERPROOF COATING.

PIPE PENETRATIONS: PIPE PENETRATIONS AND OTHER OPENINGS SHALL BE AS SHOWN ON THE DRAWINGS AND AS REQUIRED. CONNECTIONS OF PIPES TO STRUCTURES SHALL BE MADE BY THE USE OF A FLEXIBLE WATERTIGHT SEAL. SEAL SHALL CONSIST OF NEOPRENE BOOT INSTALLED IN THE STRUCTURE OPENING USING A STAINLESS STEEL EXPANSION SLEEVE AND STAINLESS STEEL CLAMP FOR CONNECTION TO PIPE. SEALS SHALL BE MANUFACTURED BY KOR-N-SEAL OR APPROVED EQUAL FOR GRAVITY CONNECTIONS. MECHANICAL SEALS SHALL BE LINKSEALS AS MANUFACTURED BY THUNDERLINE, INC. FOR PRESSURE CONNECTIONS.

SEWER MANHOLES: SEWER MANHOLES SHALL BE 4" INSIDE DIAMETER WITH 30" DIAMETER HEAVY DUTY CAST IRON STRUCTURAL COVER SET TO GRADE. IF REQUIRED FOR GRAVITY SEWER ALIGNMENT (E.G. VERTICAL ELEVATION CHANGE). MANHOLES SHALL MEET THE REQUIREMENTS OF RIDOT STANDARD 4.2.0. MANHOLES ARE NOT ANTICIPATED TO BE REQUIRED.

ACCESS MANHOLES: EACH SEPTIC TANK SHALL BE FURNISHED WITH TWO (2) 24-INCH DIAMETER MANHOLE OPENINGS AS SHOWN ON THE DRAWINGS. ALL ACCESS MANHOLES SHALL BE SET TO GRADE AS SHOWN ON THE DRAWINGS.

BUOYANCY: ANTI-FLOTATION BUOYANCY PROTECTION SHALL BE PROVIDED WHERE REQUIRED AS SHOWN ON THESE DRAWINGS. GIVEN THE PROPOSED FINISHED SITE ELEVATIONS, BUOYANCY OF TANKS IS NOT ANTICIPATED.

CONCRETE STRUCTURE INSTALLATION NOTES:

LOCATION: ALL TANKS AND MANHOLES SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THE DRAWINGS, BUT NO LESS THAN 5' FROM ANY BUILDING. TANKS SHALL BE H-20 RATED IF INSTALLED IN LOCATIONS SUBJECT TO VEHICLE TRAFFIC. TANK INVERT ELEVATION SHALL BE MAINTAINED WITHIN 10' OF SEPTIC TANK.

BASE PREPARATION: BASE PREPARATION SHALL BE AS SHOWN ON THE DRAWINGS AND SHALL CONFORM TO THE SPECIFICATIONS OF THE PRECAST STRUCTURE MANUFACTURER.

PIPING: ALL INFLUENT AND EFFLUENT PIPING SHALL BE INSTALLED AT THE LOCATION AND TO THE ELEVATION SHOWN ON THE DRAWINGS, AND ALL PENETRATIONS SHALL BE MADE WATERTIGHT.

BACKFILL: THE FINISH GRADE SHALL BE SLOPED TO DIVERT SURFACE WATER AWAY FROM MANHOLE COVERS.

TESTING: EXCEPT AS OTHERWISE DIRECTED, ALL TANKS SHALL BE SUBJECT TO AN INFILTRATION AND EXFILTRATION TEST TO PROVE THAT THEY ARE WATERTIGHT. ALL TESTING SHALL BE SCHEDULED WITH THE ENGINEER TO ALLOW FOR ENGINEER TO WITNESS TEST.

INFILTRATION TEST: TANK INTERIOR SHALL BE VISUALLY INSPECTED. THE TANK SHALL BE CONSIDERED ACCEPTABLE WHEN NO INFILTRATION OF GROUNDWATER IS OBSERVED ON THE INTERIOR OF THE TANK OVER A 24-HOUR PERIOD.

EXFILTRATION TEST: EACH TANK SHALL BE FILLED TO A LEVEL ONE (1) FOOT ABOVE THE HIGHEST JOINT AND WILL BE CONSIDERED ACCEPTABLE IF WATER LEVEL IN TANK HAS NOT DROPPED OVER A 24-HOUR PERIOD. ALTERNATIVELY, TANKS MAY BE VACUUM TESTED AT 10-INCHES OF MERCURY FOR A PERIOD OF 2-MINUTES.

SPECIFICATIONS OF SEWER PIPE:

GRAVITY SEWER PIPE: GRAVITY SEWER PIPE BETWEEN BUILDING AND TANKS SHALL BE 4" DIAMETER, SOLVENT WELDED SDR 35 PVC, AS NOTED ON THE DRAWINGS.

PRESSURE SEWER PIPE: PRESSURIZED SEWER PIPE SHALL BE SDR 21 PVC W/ RUBBER GASKETS OR POLYETHYLENE 200 PSI CTS. SEWER FORCE MAIN SHALL BE 1-¹/₂" NOMINAL DIMENSION. FITTINGS SHALL BE SDR 21 PVC W/ RUBBER GASKETS OR BRASS WITH APPROPRIATE ADAPTERS.

INSTALLATION: CONTRACTOR SHALL BEND PRESSURIZED PIPE TO ALLOWABLE RADIUS RECOMMENDED BY MANUFACTURER, OR INSTALL BEND (45 DEGREES OR LESS). GRAVITY SEWER PIPE SHALL BE INSTALLED WITH BENDS (45 DEGREES OR LESS) WHERE DIRECTIONAL CHANGES ARE REQUIRED. NO VERTICAL BENDS ON GRAVITY SEWER PIPE IS ALLOWED. PIPE SHALL BE LAID ON COMPACTED BEDDING AND COVERED WITH BEDDING MATERIAL AS SHOWN ON DETAILS.

BACKFILL: BACKFILL OF EXCAVATION SHALL BE PERFORMED WITH SUITABLE MATERIAL OR REFILLS FROM SITE EXCAVATION WITH NO PARTICLE LARGER THAN 6 INCHES, AND COMPACTED IN ACCORDANCE WITH AASHTO T 180 METHOD D TO A MINIMUM DRY DENSITY OF 90% IN 12 INCH LIFTS, UNLESS MORE STRINGENT COMPACTION STANDARDS ARE STIPULATED ELSEWHERE FOR OTHER WORK PROPOSED AT THE SITE. UNSUITABLE MATERIALS (I.E. PEAT, CLAY, ORGANIC MATTER, DEBRIS) SHALL BE REMOVED OFF SITE FOR DISPOSAL.

WATER & DRAIN CROSSINGS: SEWER PIPE SHALL CROSS 18" BENEATH WATER AND DRAIN LINES WHEN POSSIBLE, OR SHALL BE SLEEVED INSIDE AN AWWA C-900 PVC PIPE OF APPROPRIATE DIAMETER FOR SEWER PIPE TO BE INSERTED, FOR A DISTANCE OF 10' ON EACH SIDE OF WATER LINE CROSSINGS AND 25' EACH SIDE OF DRAIN CROSSINGS. EACH END OF SLEEVE SHALL BE SEALED WATERTIGHT WITH RUBBER COUPLING WITH STAINLESS STEEL CLAMPS. CONTRACTOR MAY ALSO ELECT TO ENCASE PIPE IN CONCRETE 10 FEET TO EACH SIDE OF A CROSSING.

TESTING: CONTRACTOR SHALL PERFORM A CLEAR WATER TEST ON SEWER FORCE MAIN AT 30 PSI FOR 1-HOUR.

DESIGN DATA:

THE PROPOSED FACILITY IS DESIGNED FOR A TOTAL OF 23 EMPLOYEES PER INFORMATION PROVIDED BY INENERGY. IT WILL OPERATE 24 HOURS/DAY BUT TYPICALLY THERE WILL NEVER BE ANY MORE THAN 15 EMPLOYEES AT THE FACILITY AT A GIVEN TIME. DESIGN FLOW TO BE BASED ON A TOTAL OF 23 PEOPLE PER DAY.

DESIGN FLOW:

DAILY FLOW TO BE BASED ON THE FOLLOWING:

- FACILITY/INDUSTRIAL PLANT (WITHOUT CAFETERIA): 15 GPD/PERSON
- SHOWERS: 10 GPD/PERSON
- TOTAL: 25 GPD/PERSON

TOTAL DAILY DESIGN FLOW = 23 PEOPLE x 25 GPD/PERSON = 575 GPD

TEST PITS 8A & 8B

WATER TABLE DEPTH: 19 INCHES (BASED ON TH-8B)

SOIL CATEGORY: 8M

BOTTOMLESS SAND FILTER SIZING REQUIREMENTS

PROPOSED ADVANTEX AX-20 TREATMENT SYSTEM IS A CATEGORY 1 SYSTEM. HOWEVER, SIZING OF BSF HAS BEEN BASED ON CATEGORY 2 LOADING RATE TO PROVIDE A CONSERVATIVE DESIGN.

LOADING RATE: 1.3 GAL/SQ. FT./DAY

MINIMUM BSF AREA REQUIRED: 575 GPD/1.3 = 442.3 SQ. FT.

BSF AREA PROPOSED: 36-FT (L) x 14-FT (W) = 504 SQ. FT

BSF: NUMBER OF ORIFICES & DOSING VOLUME

USE 7 LATERALS SPACED 2-FT APART ON CENTER. ORIFICES TO BE SPACED EVERY 2-FT ALONG 34' LONG LATERALS (BSF SHALL EXTEND 1 FOOT TO ALL SIDES OF LATERALS). THERE WILL BE 18 ORIFICES PER LATERAL.

18 ORIFICES/LATERAL x 7 LATERALS = 126 TOTAL ORIFICES

PUMP DESIGN POINT : 62.8 GPM AT 31.9 FT TDH

SET MAXIMUM DOSE/ORIFICE TO 0.19 GAL/ORIFICE

DOSE VOLUME = 126 ORIFICES x 0.19 GAL/ORIFICE = 23.9 GAL/DOSE

575 GPD / 23.9 GAL/DOSE = 24 DOSES/DAY AT DESIGN FLOW RATE

PUMP CHAMBER DESIGN:

SET TIME DOSING FOR 24 DOSES/DAY

24 HOURS/DAY / 24 DOSES/DAY = 1.0 HRS/DOSE (60 MINUTES BETWEEN DOSES)

DOSE TIME: [23.9 GALLONS (DOSE) + 18.3 GALLONS (PIPE VOLUME)] / 62.8 GPM = 0.67 MINUTES/DOSE (40 SECONDS PER DOSE)

SEPTIC TANK CAPACITY:

SEPTIC TANK SHALL BE SIZED FOR MINIMUM 48-HOUR DETENTION TIME FOR COMMERCIAL USE.

REQUIRED TANK VOLUME: 575 GPD x 2 DAYS = 1,150 GALLONS

USE 1,500 GALLON TWO COMPARTMENT PRECAST CONCRETE SEPTIC TANK

TREATMENT SYSTEM:

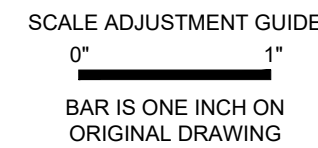
TWO AX-20 ADVANTEX PODS TO BE USED WITH 1,000 GALLON SINGLE COMPARTMENT PRECAST CONCRETE RECIRCULATION TANK. RECIRCULATION PUMPS TO BE TIME DOSED ACCORDING TO MANUFACTURER'S REQUIREMENTS.

TREATMENT SYSTEM SELECTION BASED ON RESIDENTIAL STRENGTH WASTEWATER, AVERAGE DAY FLOW UP TO 1,000 GPD, AND PEAK DAILY FLOW UP TO 2,000 GPD. DESIGN FLOW FOR SYSTEM IS 575 GPD.

SEPTIC TANK EFFLUENT EXPECTED TO BE CONSISTENT WITH SEPTIC TANK EFFLUENT FROM SIMILAR FACILITIES AND USES. THEREFORE, SEPTIC TANK EFFLUENT IS ASSUMED TO BE AS FOLLOWS:

- BOD: 150 mg/L
- TSS: 50 mg/L
- FOG: 20 mg/L

BASED ON THESE ASSUMED EFFLUENT CHARACTERISTICS, THE EXPECTED EFFLUENT QUALITY FROM THE SYSTEM (FOR DISPOSAL IN THE BSF) IS ANTICIPATED TO BE 20 mg/L FOR BOD AND 20 mg/L FOR TSS.



CLEAR RIVER ENERGY CENTER
ON-SITE WASTE WATER TREATMENT SYSTEM (OWTS)
BURRILLVILLE, RHODE ISLAND

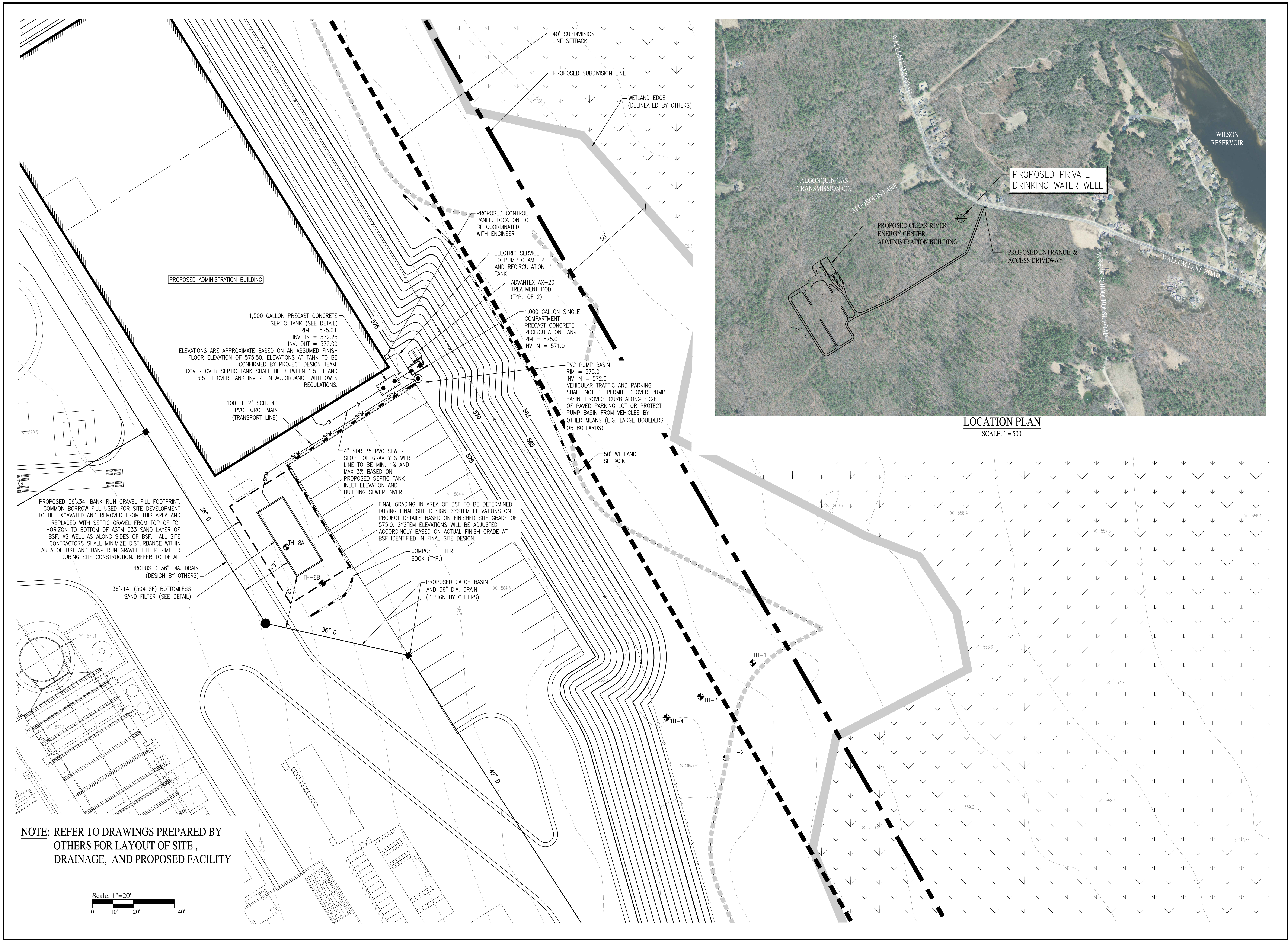


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| DATE: | APRIL 2017 |
| SCALE: | AS SHOWN |
| DESIGNED BY: | TCJ/BMB |
| CHECKED BY: | BMB |
| DRAWN BY: | TCJ |
| APPROVED BY: | LMG |
| DRAWING TITLE: | |

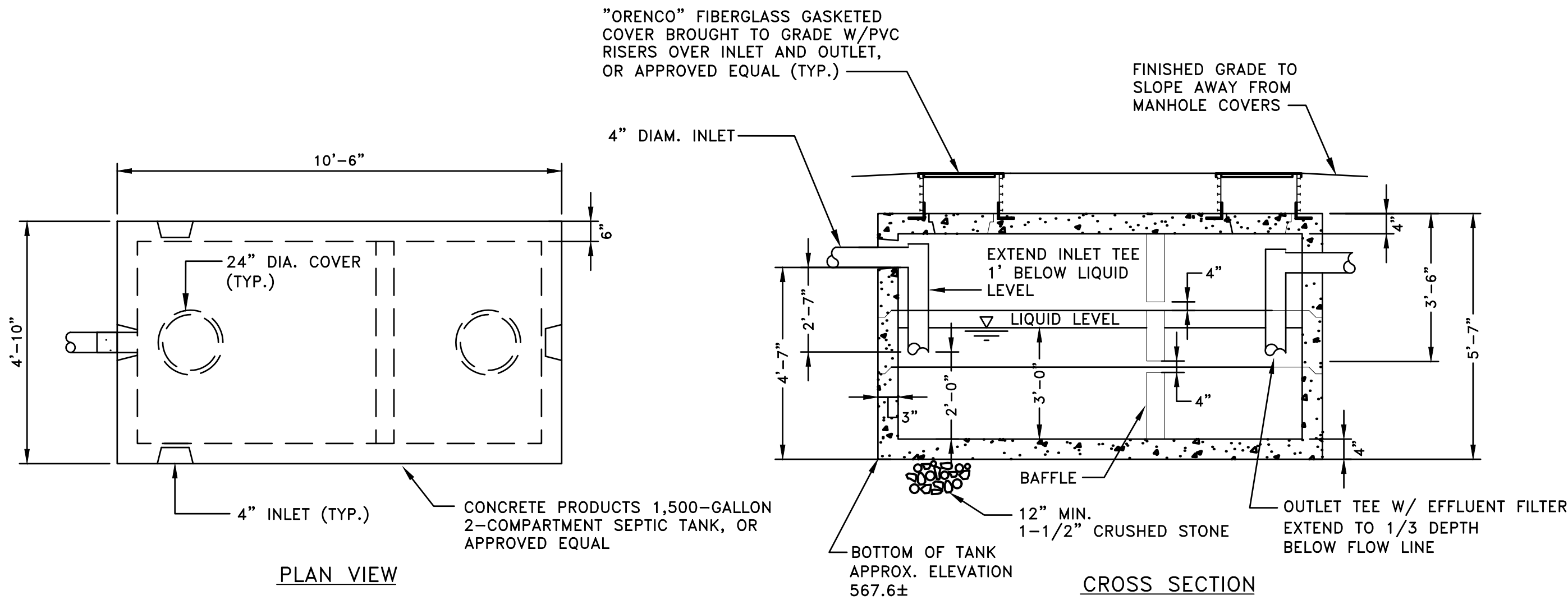
GENERAL NOTES

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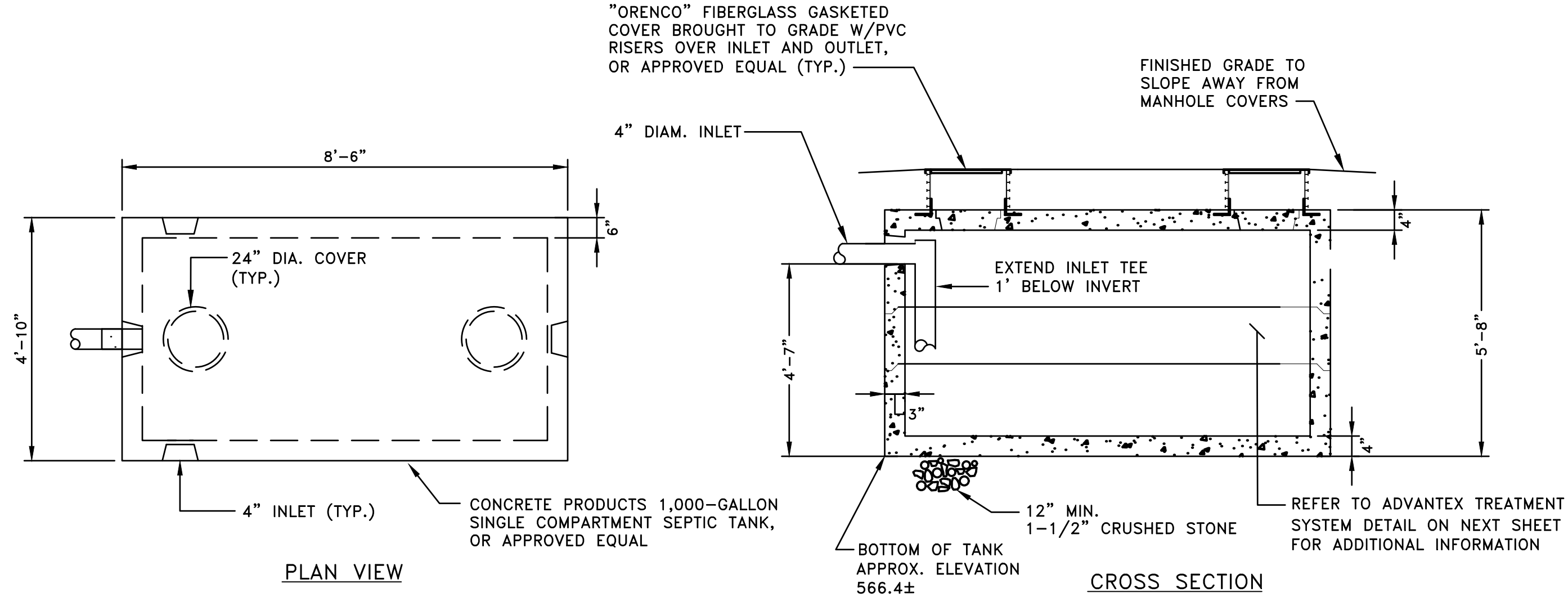
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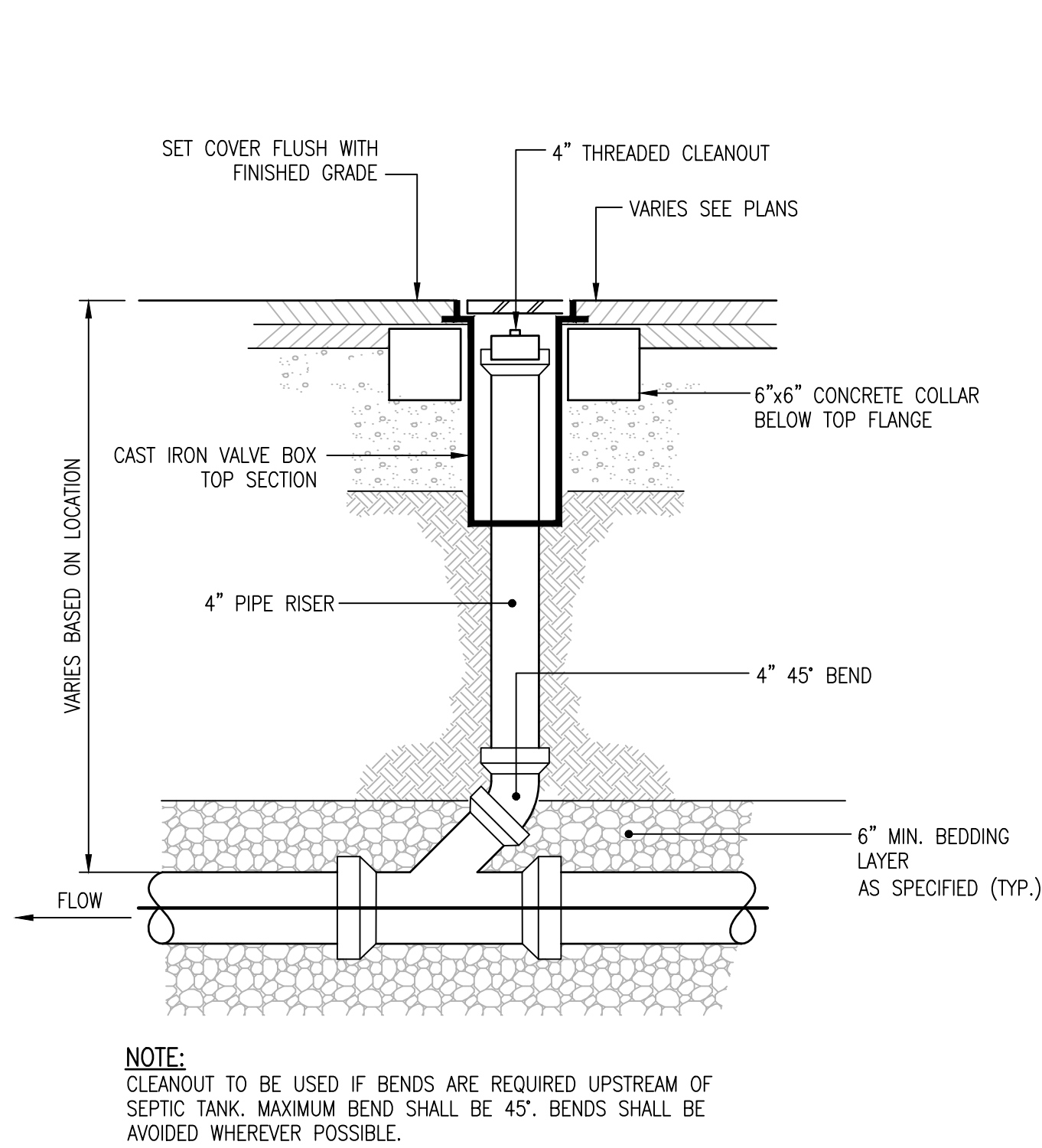
- NOTES:
1. CONCRETE - 5,000 PSI MINIMUM STRENGTH @ 28 DAYS
 2. EACH TANK COVER SHALL BE AFFIXED WITH A PRINTED LABEL OF NON-CORROSIVE MATERIAL INDICATING THAT ENTRY INTO THE SEPTIC TANK COULD BE FATAL
 3. JOINTS SHALL BE SEALED WITH BUTYL RUBBER SEALANT
 4. EARTH COVER - 0 TO 4 FEET
 5. TANK MANUFACTURED BY CONCRETE PRODUCTS INC., OR APPROVED EQUAL

TYPICAL TWO-COMPARTMENT 1,500-GALLON SEPTIC TANK
NOT TO SCALE

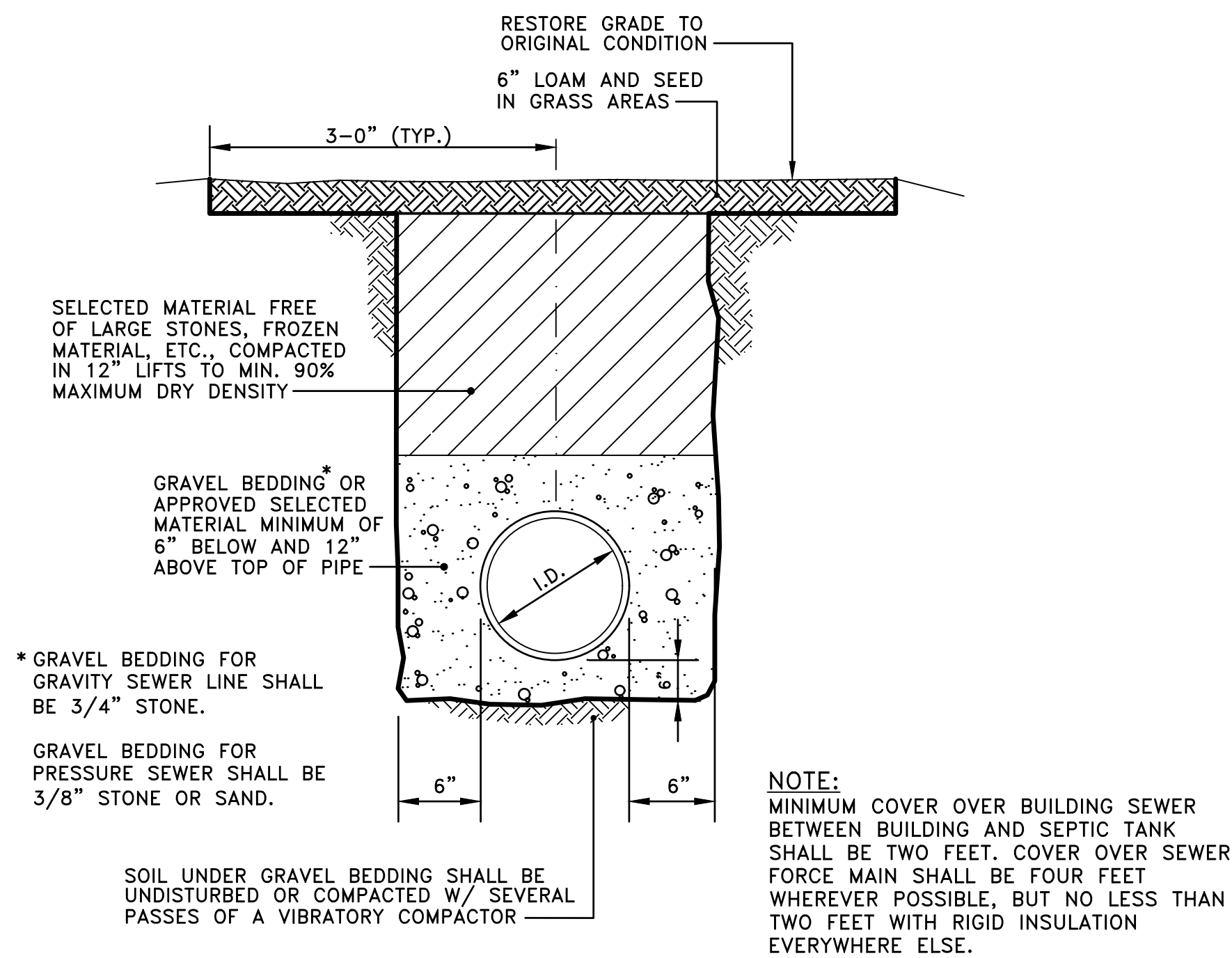


- NOTES:
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 4. EARTH COVER - 0 TO 4 FEET
 5. TANK MANUFACTURED BY CONCRETE PRODUCTS INC., OR APPROVED EQUAL

TYPICAL SINGLE COMPARTMENT 1,000-GALLON CONCRETETANK
NOT TO SCALE

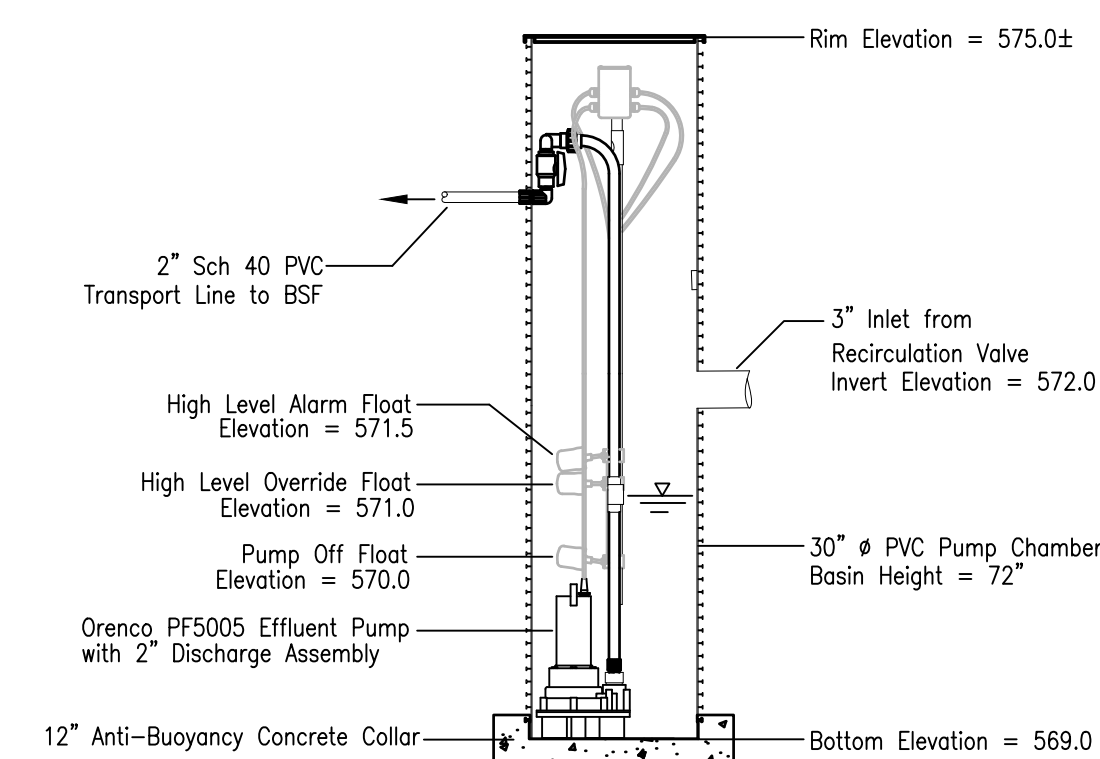
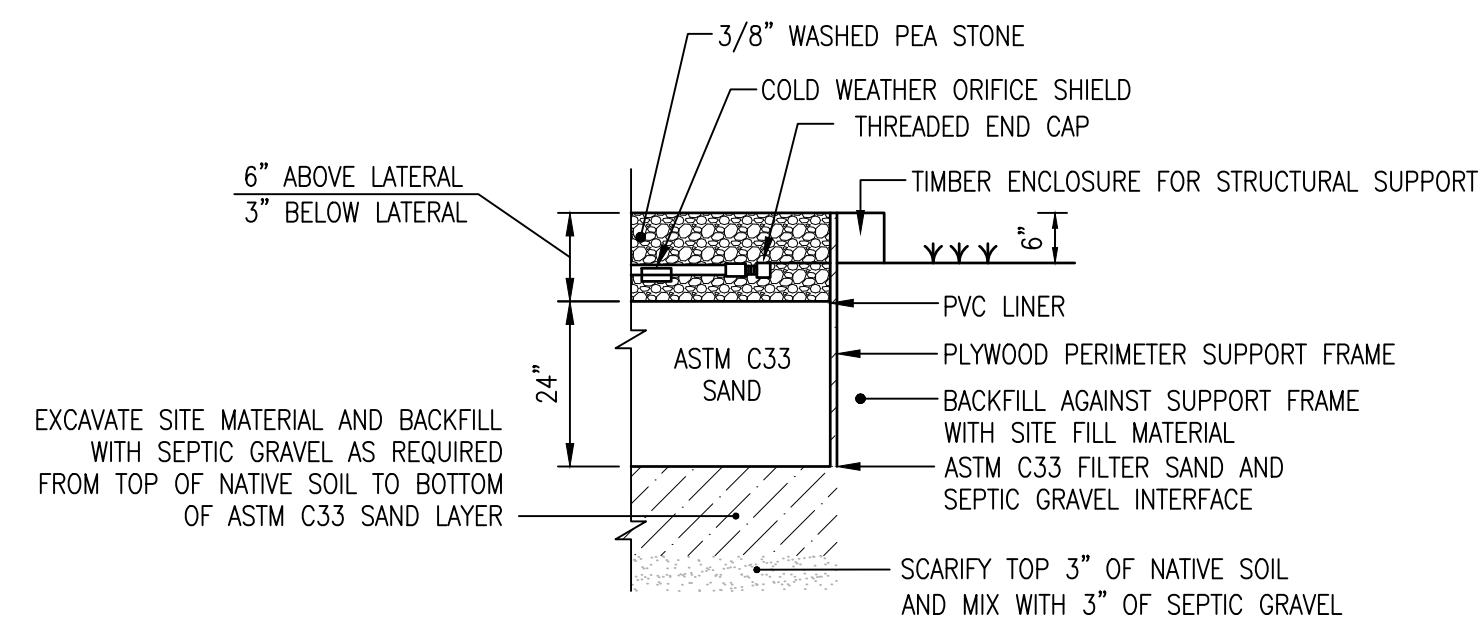


SEWER CLEANOUT DETAIL
NOT TO SCALE



TYPICAL TRENCH DETAIL
NOT TO SCALE

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| 1 | 10/2017 | RELOCATE BSF |
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NOTE: PUMPING TO BSF WILL BE TIME-DOSED PER DOSING SCHEDULE ON SHEET C1.0 "PUMP CHAMBER DESIGN" NOTES. HIGH LEVEL OVERRIDE FLOAT TO BE PROVIDED TO PREVENT PUMP BASIN FROM OVERFLOWING.

PUMP BASIN DETAIL

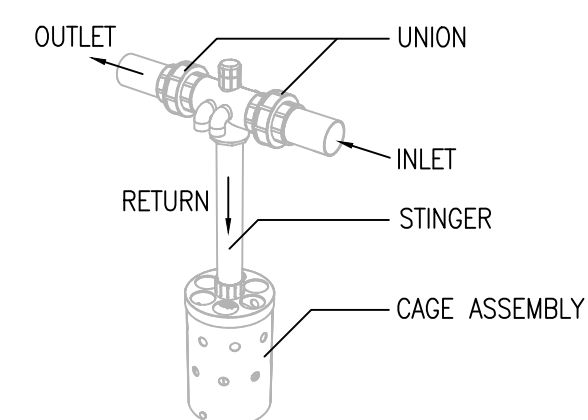
NOT TO SCALE



1. ALL LATERALS SHALL BE PITCHED AT 0.005 FT/FT AWAY FROM THE MANIFOLD.
2. A SERIES OF 1/8-INCH DIAMETER HOLES (ORIFICES) SHALL BE DRILLED IN THE LATERALS AND SPACED 24-INCHES APART.
3. THERE SHALL BE (3) THREE HOLES DRILLED ON THE TOP OF EACH LATERAL LOCATED APPROXIMATELY 1/4, 1/2, AND 3/4, RESPECTIVELY, THE DISTANCE OF EACH LATERAL PIPE.
4. ALL ORIFICES SHALL BE EQUIPPED WITH A COLD WEATHER SHIELD TOP AND BOTTOM. ALL ORIFICES SHALL BE FREE DRAINING.
5. ALL LATERALS SHALL BE SPACED 2' O.C. AND 1' FROM EDGE OF BSF ENCLOSURE.

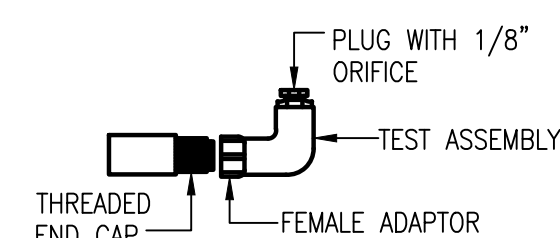
BOTTOMLESS SAND FILTER DETAIL

NOT TO SCALE



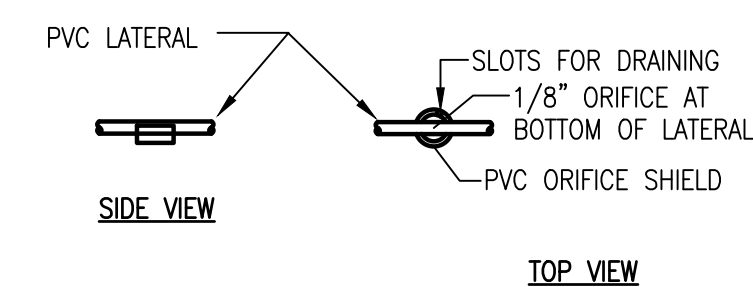
RECIRCULATING SPLITTER VALVE DETAIL

NOT TO SCALE



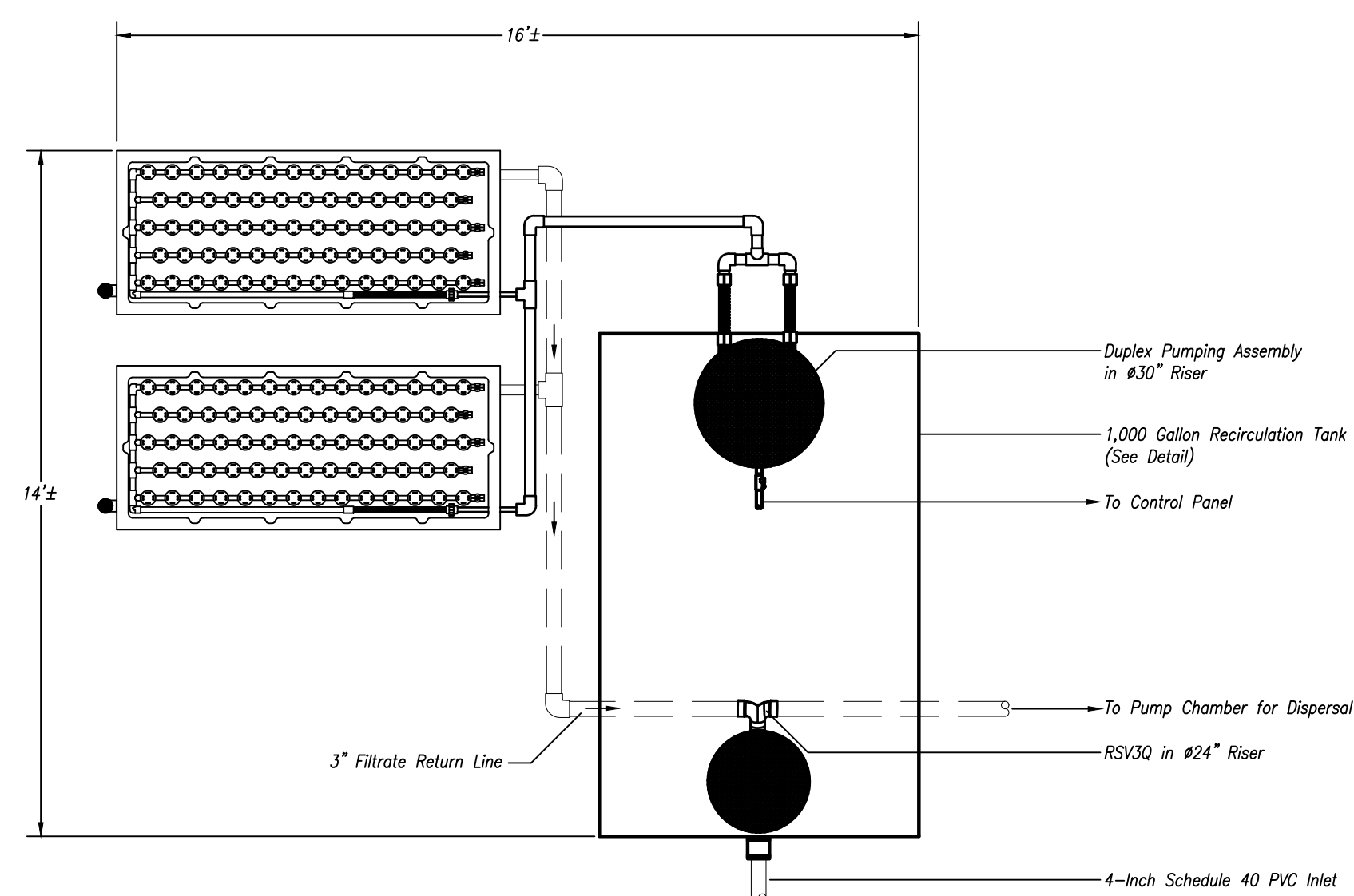
THREADED END CAP DETAIL

NOT TO SCALE

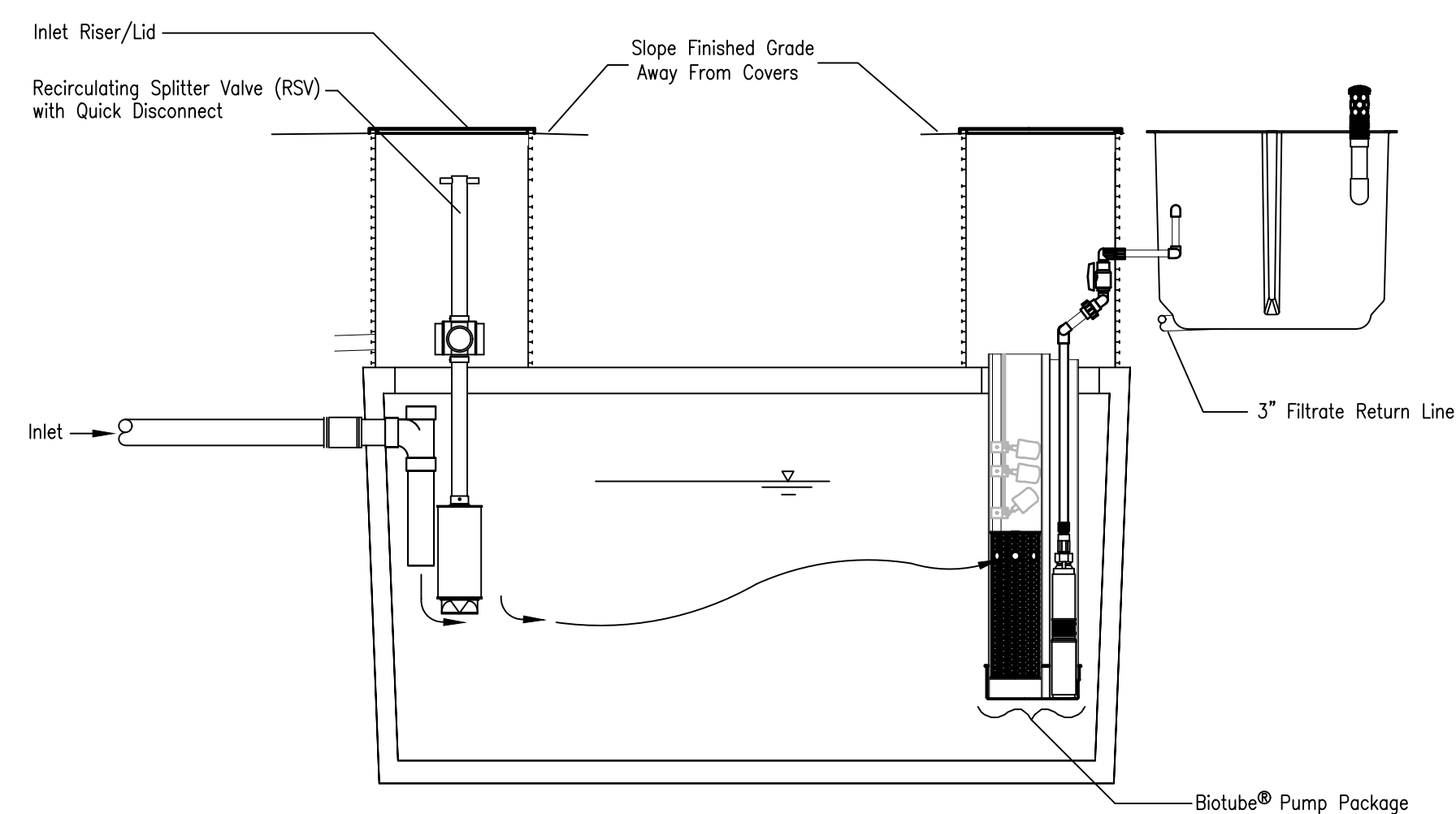


COLD WEATHER ORIFICE SHIELD DETAIL

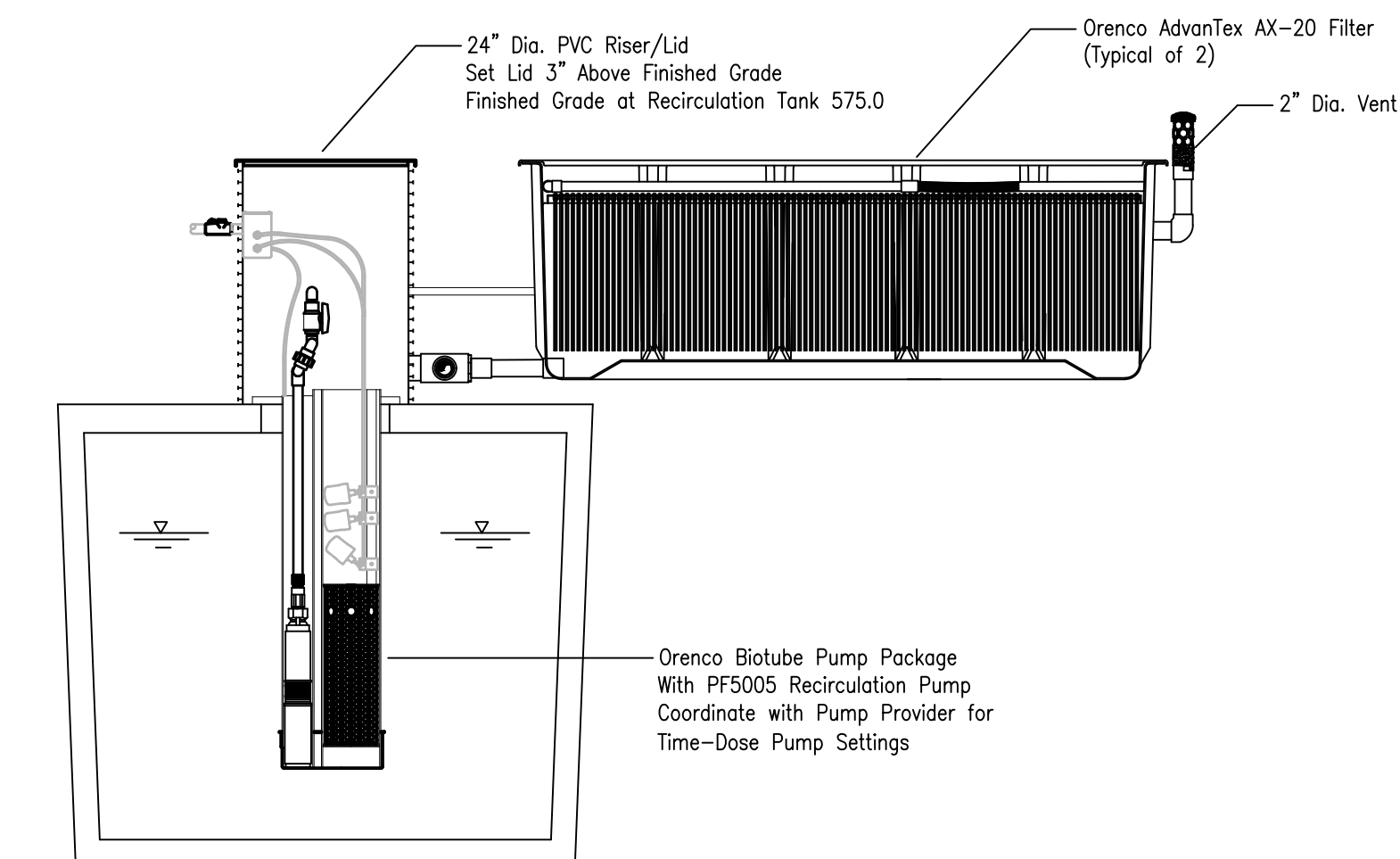
NOT TO SCALE



PLAN VIEW



SIDE VIEW

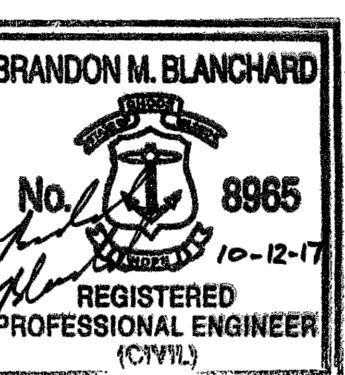


END VIEW

ADVANTECH AX-20 TREATMENT SYSTEM

NOT TO SCALE

ON-SITE WASTE WATER TREATMENT SYSTEM (OWTS)
CLEAR RIVER ENERGY CENTER
BURRELLVILLE, RHODE ISLAND

REVISIONS:[illegible]

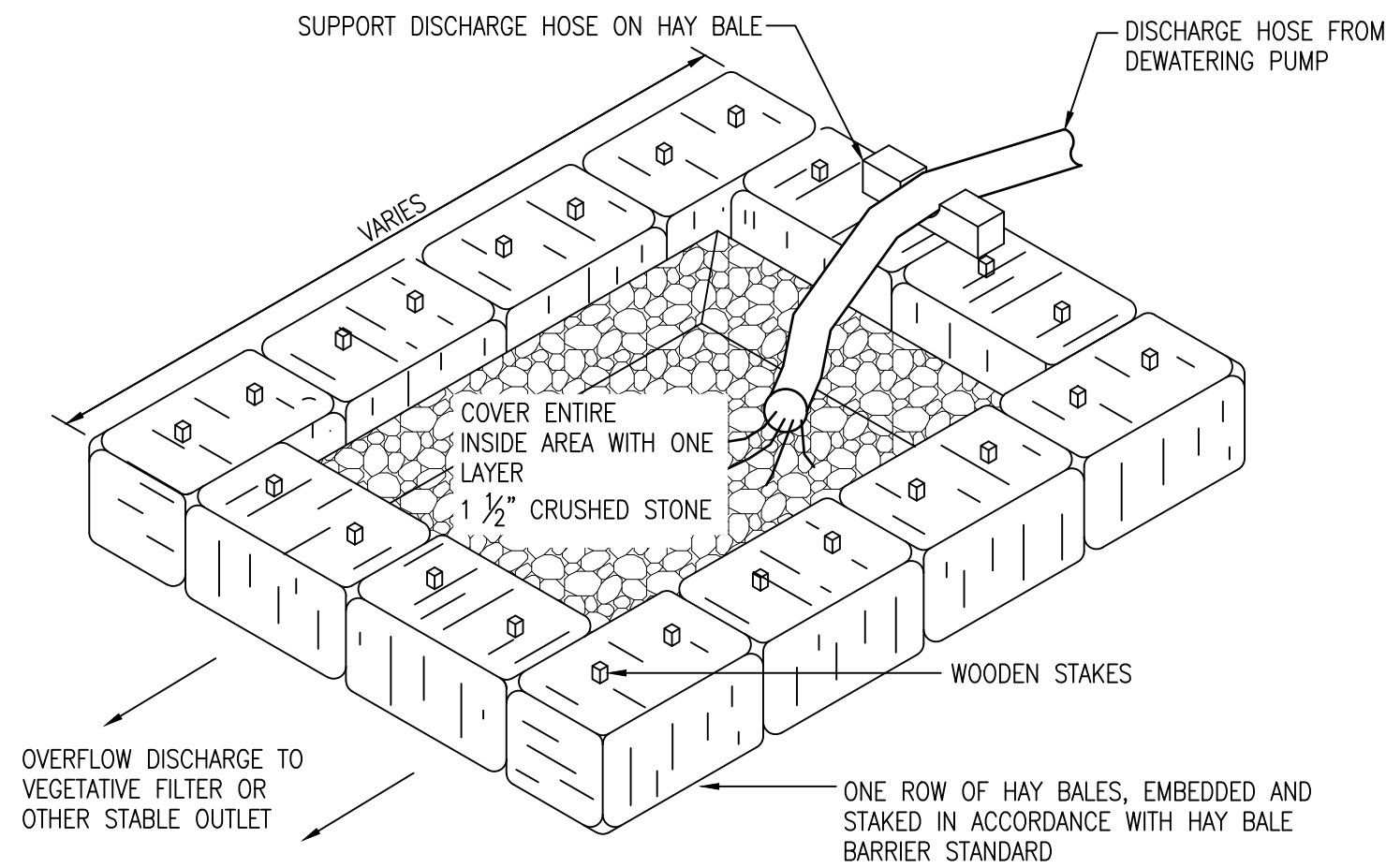
| | |
|----------------|------------|
| PROJECT NO.: | 15166.04 |
| DATE: | APRIL 2017 |
| SCALE: | AS NOTED |
| DESIGNED BY: | TCJ/BMB |
| CHECKED BY: | BMB |
| DRAWN BY: | TCJ |
| APPROVED BY: | LMG |
| DRAWING TITLE: | |

DETAILS No.2

DRAWING NO.:

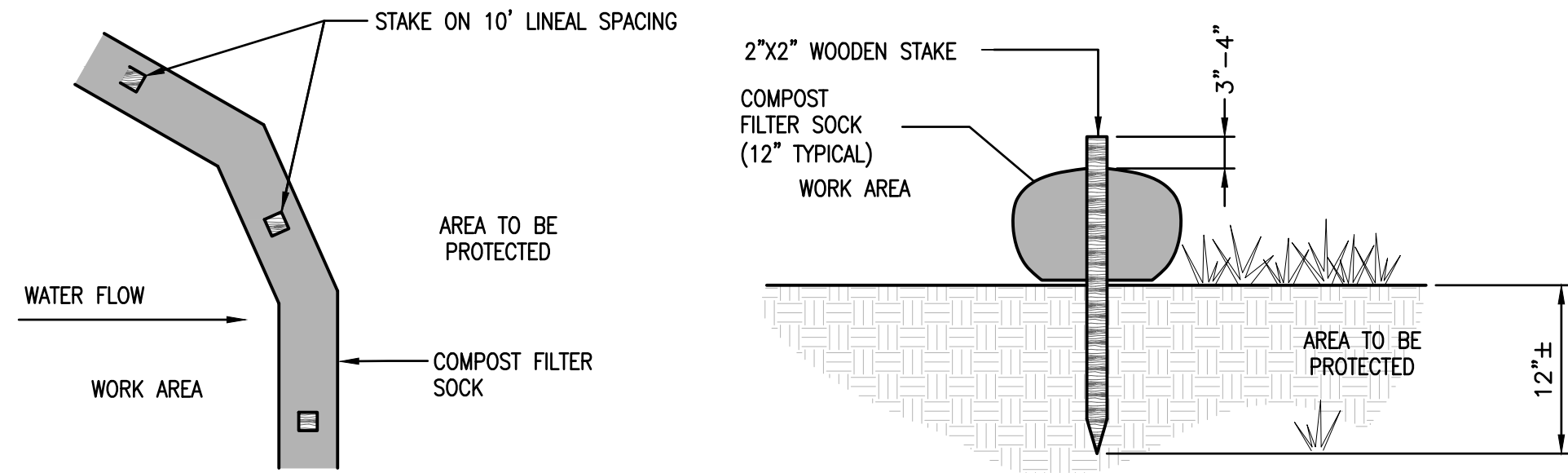
C3.2

SHEET NO. 5 OF 6



- NOTES:
1. REQUIRED SIZE OF FILTER BASIN TO BE DETERMINED BY CONTRACTOR TO ENSURE DISCHARGE IS CLEAR OF SEDIMENT.
 2. FILTER FABRIC SHALL BE USED TO LINE THE INSIDE OF THE HAY BALE BASIN AND ANCHORED BY THE WOODEN STAKES.

TYPE 1 PUMPING SETTLING BASIN
NOT TO SCALE



- NOTES:
1. COMPOST/ SOIL/ ROCK/ SEED FILL TO MEET APPLICATION REQUIREMENTS.
 2. COMPOST MATERIAL TO BE REMOVED OR DISPERSED ON SITE AS DETERMINED BY ENGINEER.

COMPOST FILTER SOCK DETAIL
NOT TO SCALE

| REVISIONS: | | |
|------------|---------|--------------|
| 1 | 10/2017 | RELOCATE BSF |
| | | |
| | | |
| | | |
| | | |
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| | | |
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| | | |
| | | |
| | | |

PROJECT NO.: 15166.04
DATE: APRIL 2017
SCALE: AS NOTED
DESIGNED BY: TCJ/BMB
CHECKED BY: BMB
DRAWN BY: TCJ
APPROVED BY: LMG
DRAWING TITLE:

DETAILS No.3

Sheet 1 of 3
STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Environmental Management
Office of Water Resources
Onsite Wastewater Treatment System Program

Site Evaluation Form
Part A - Soil Profile Description
Application Number 1703-0050

Property Owner: Invenergy Thermal Development, LLC
Property Location: Route 100, Wallum Lake Road, Burrillville, RI AP 137 Parcel, 002
Date of Test Hole: 09-14-2017
Soil Evaluator: DiOrio, Alfred W.
Weather: Chr./Pdy. Cldy.
License Number: D4004
Shaded: Yes ☒ No ☐ Time: 11:00

| TH 8A Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
|------------------|--------|--------------------|------|-------------|-----------------|---------------|--|---------|-----------|-------------|---------------|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. S. Contr. | | | | | |
| Ap | 0-5" | a | s | 10YR3/4 | None | None | | sl | 1 sbk | fr | 3 |
| Bw1 | 5-20" | g | s | 10YR5/6 | 7.5YR5/8 | C 2 P | | f sl | 1 sbk | fr | 3 |
| Bw2 | 20-27" | a | s | 10YR5/6 | 7.5YR5/8 | C 2 P | | f sl | 1 sbk | fr | 3 |
| C | 27-96" | - | - | 10YR6/3 | 7.5YR5/8 | C 2 P | | g sl | 0m | fi | 8m |

| TH 8B Horizon | Depth | Horizon Boundaries | | Soil Colors | | Re-Dox | | Texture | Structure | Consistence | Soil Category |
|------------------|--------|--------------------|------|-------------|-----------------|---------------|--|---------|-----------|-------------|---------------|
| | | Dist | Topo | Matrix | Re-Dox Features | Ab. S. Contr. | | | | | |
| Ap | 0-3" | a | s | 10YR3/4 | None | None | | sl | 1 sbk | fr | 3 |
| Bw1 | 3-18" | a | s | 10YR5/6 | 7.5YR5/8 | C 2 P | | f sl | 1 sbk | fr | 3 |
| Bw2 | 18-22" | a | s | 10YR5/6 | 7.5YR5/8 | C 2 P | | f sl | 1 sbk | fr | 3 |
| C | 22-96" | - | - | 10YR6/3 | 7.5YR5/8 | C 2 P | | g sl | 0m | fi | 8m |

TH 8A Soil Class D/A Total Depth 96" Impervious/Limiting Layer Depth None (og) GW Seepage Depth None SHWT 22" (og)
TH 8B Soil Class D/A Total Depth 96" Impervious/Limiting Layer Depth None (og) GW Seepage Depth 66" SHWT 19" (og)

Comments:

Revised 1/31/14

Part B
Site Evaluation - to be completed by Soil Evaluator or Class II or III Designer
Please use the area below to locate:
1. Test holes and bedrock test holes.
2. Approximate direction of due north.
3. Offsets from all test holes to fixed points such as street, utility pole, or other permanent, marked object.
*OFFSETS MUST BE SHOWN

Key:
Approximate location of test holes
Approximate location of bedrock test holes
Estimated gradient and direction of slope
Approximate direction of due north

Bedrock THs

| TH | Depth |
|----|-------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

1. Relief and Slope: Elev=567 +/- (by others). Slope=0-5%
2. Presence of any watercourse, wetlands or surface water bodies, within 200 feet of test holes? If yes, locate on above sketch.
3. Restrictive Layer or Bedrock within 4' below original ground within 25 feet of test hole? Provide all test hole locations & depths above.
4. Presence of existing or proposed private drinking water wells within 200 feet of test holes? If yes, locate on above sketch.
5. Public drinking water wells within 500 feet of test holes? If yes, locate on above sketch.
6. Is site within the watershed of a public drinking water reservoir or other critical area defined in Rule 38?
7. Has soil been excavated from or fill deposited on site? If yes, locate on above sketch.
8. Site's potential for flooding or ponding: NONE ☐ SLIGHT ☒ MODERATE ☐ SEVERE ☐
9. Landscape position: Backslope
10. Vegetation: Specimen vegetation w/moderate understory
11. Indicate approximate location of property lines and roadways.
12. Additional comments, site constraints or additional information regarding site: For use with OWTS only.

Certification
The undersigned hereby certifies that all information on this application and accompanying forms, submittals and sketches are true and accurate and that I have been authorized by the owner(s) to conduct these necessary field investigations and submit this request.

Part A prepared by: Alfred W. DiOrio D4004 License #
Part B prepared by: Alfred W. DiOrio D4004 License #

DO NOT WRITE IN THIS SPACE
Witnessed Soil Evaluation Decision: Concur ☐ Inconclusive ☐ Disclaim ☐
Unwitnessed Soil Evaluations Decision: Accept ☐ Inconclusive ☐ Disclaim ☐
Wet Season Determination required ☐ Additional Field Review Required ☐
Explanation:
Signature Authorized Agent Date

Revised 1/31/14

Pump Selection for a Pressurized System
Clear River Energy Center / New Construction OWTS

Parameters

| | | |
|----------------------------|------|--------|
| Discharge Assembly Size | 2.00 | inches |
| Transport Length | 1.05 | feet |
| Transport Pipe Class | 40 | |
| Transport Size | 2.00 | inches |
| Distributing Valve Model | None | |
| Manifold Length | 5 | feet |
| Manifold Pipe Class | 12 | feet |
| Manifold Pipe Size | 40 | |
| Number of Lateral per Cell | 7 | |
| Lateral Length | 34 | feet |
| Lateral Pipe Class | 40 | |
| Lateral Pipe Size | 1.00 | inches |
| Orifice Size | 16 | inches |
| Orifice Spacing | 2 | feet |
| Residual Head | 6.5 | feet |
| Flow Meter | None | inches |
| Add-on Friction Losses | 0 | feet |

Calculations

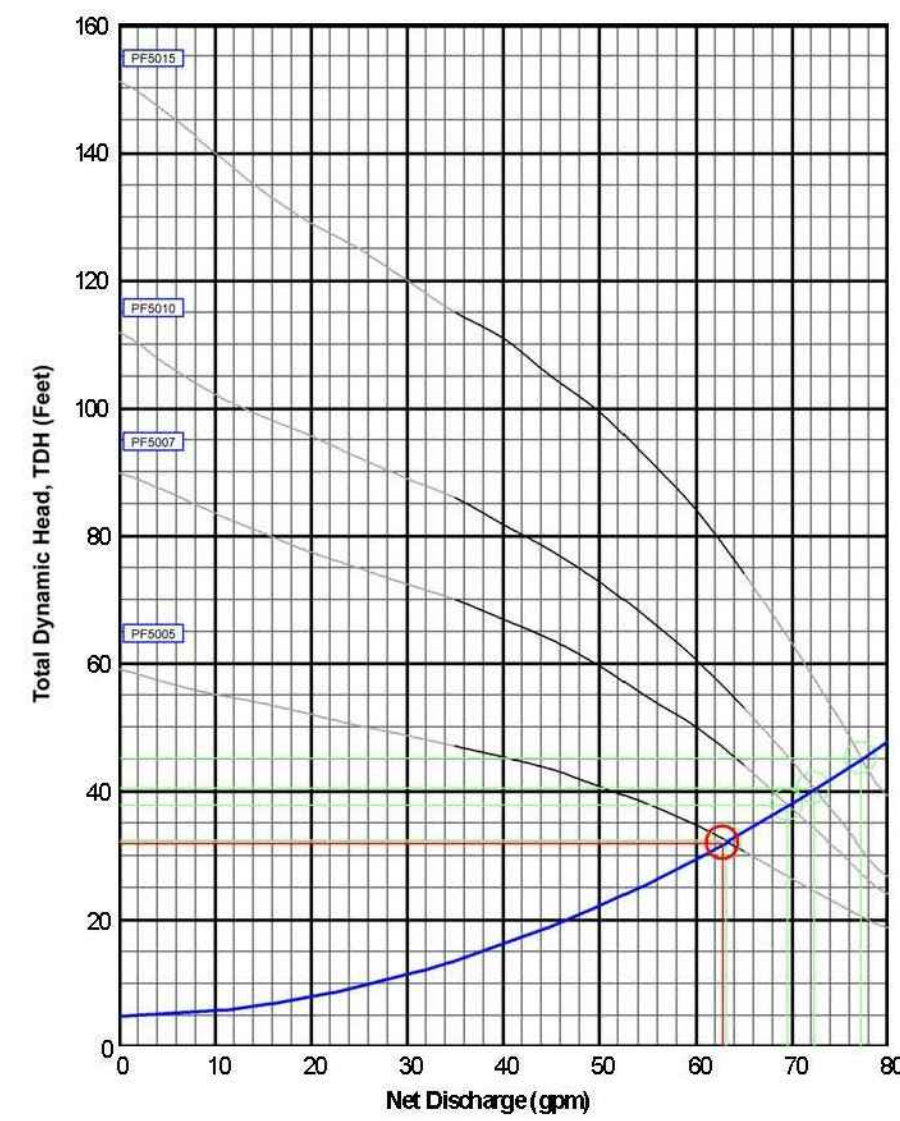
| | | |
|-----------------------------------|------|------|
| Minimum Flow/Friction Coefficient | 0.48 | gpm |
| Number of Orifices per Zone | 136 | |
| Total Flow/Friction Coefficient | 62.8 | gpm |
| Number of Lateral per Zone | 7 | |
| % Flow/Differential Inlet/Outlet | 3.9 | % |
| Transport Velocity | 8.0 | ft/s |

Frictional Head Losses

| | | |
|------------------------|-----|------|
| Lateral Discharge | 7.9 | feet |
| Lateral Transport | 6.4 | feet |
| Lateral Valve | 0.0 | feet |
| Lateral Manifold | 6.5 | feet |
| Lateral Lateral | 0.0 | feet |
| Lateral Flow Meter | 0.0 | feet |
| Add-on Friction Losses | 0.0 | feet |

Pipe Volumes

| | | |
|-----------------------|-----|------|
| Void Transport Line | 183 | gals |
| Void Manifold | 0.5 | gals |
| Void Lateral per Zone | 107 | gals |
| Total Volume | 285 | gals |



Minimum Pump Requirements

| | | |
|--------------------|------|------|
| Design Flow Rate | 628 | gpm |
| Total Dynamic Head | 31.9 | feet |

Pump Data

| | |
|--------------------------------|----------------------------|
| PF 500 High Head Effluent Pump | 50 GPM, 1/2 HP |
| 150 GPM, 1/2 HP | 200/100 Hz, 200/200/300 Hz |
| PF 500 High Head Effluent Pump | 50 GPM, 3/4 HP |
| 200/100 Hz, 200/200/300 Hz | |
| PF 500 High Head Effluent Pump | 50 GPM, 1 HP |
| 200/100 Hz, 200/200/300 Hz | |
| PF 500 High Head Effluent Pump | 50 GPM, 1 1/2 HP |
| 200/100 Hz, 200/200/300 Hz | |

Legend

| | |
|--------------------|------------|
| System Curve | Blue line |
| Pump Curve | Black line |
| Pump Optimal Range | Green line |
| Operating Point | Red dot |
| Design Point | Red circle |



October 13, 2017

Bob Johnson
Atlantic Solutions, Ltd.
2417 East Main Road
Portsmouth, RI 02871

Subject: Final Design Review of Clean River Energy Center

Bob Johnson,

Orenco Systems, Inc. (“Orenco”) has received the Plans with all required fields completed (attached to this letter), a copy of the plan set showing the designed site layout and configuration plans, and other documents that comprise the Final Design for the Clean River Energy Center. Orenco staff reviews the Final Design of all wastewater collection and treatment systems for commercial applications to ensure that the design is compliant with the most current version of the system’s applicable design criteria published by Orenco for the specified parameters provided by the system’s designer in the Plans. The findings and conclusions of my review of this Final Design are as follows:

Design Basis

The system has been designed for an office building application. Influent flow and constituent concentrations and effluent constituent concentration requirements have been provided by the system’s designer on the Plans and were used in my review of the Final Design. The influent flow on the Plans were not extrapolated from the metered flows from the subject site, but in our experience, they are consistent with influent flows from other, similar office building systems that Orenco has previously observed. As such, I have no reason to doubt the accuracy of the designer’s findings and assumptions as to the influent flow, and find that it was reasonable for the designer to use them as the design basis for the system.

System Design

The proposed Final Design of the system consists of the building waste flowing to one (1) 1,500 U.S. gallon concrete primary tank, one (1) 1,000 U.S. gallon concrete recirculation tank, and two (2) AX-20 pods. AX20s will discharge treated effluent through a PVC pump basin to a bottomless sand filter for final discharge.

Design Criteria

The applicable design criteria for this system, which I used to conduct the review of its Final Design, is revision 6.0 of document NDA-ATX-1, titled *Orenco® AdvanTex® Design Criteria, Commercial Treatment Systems*, which was published by Orenco in July 2017. A copy of the design criteria can be downloaded from Orenco’s online document library at www.orenco.com/corporate/doclibrary.cfm.

Findings

The findings of my review as to whether the Final Design complies with Orenco's design criteria for treating wastewater to the effluent constituent concentration requirements provided in the plans are as follows:

Primary Treatment

The Final Design specifies the use of one (1) 1,500 U.S. gallon concrete tank for primary treatment. Using the flow data specified on the Plans the hydraulic retention times for primary treatment calculate as follows:

| Primary Tank(s) Hydraulic Retention Time (HRT) | | | | |
|--|------------------------|--------------------------|----------------|-----------------|
| Design Average Flow (gpd) | Design Peak Flow (gpd) | Effective Combined (gpd) | Avg HRT (days) | Peak HRT (days) |
| 288 | 575 | 1500 | 5.2 | 2.6 |

¹ Design Peak Flow is the maximum daily flow a facility is expected to receive no more than one day within any week's time.

The Primary Tank Sizing Recommendations states that the recommended primary tankage for a Type 5 application system should be sized to at a minimum of 3 days of hydraulic retention time (HRT) at the Design Max Day Flow. The primary treatment tank specified is less than 3 days Max Day HRT but are considered acceptable based on HRT of the Design Average Day Flow. Therefore, the configuration and specifications of the primary treatment tank in the Final Design satisfy Orenco's minimum design criteria for this office application.

Recirculation Tank – Standard Stage

The Final Design further specifies the use of one (1) U.S. 1,000 gallons concrete tank for recirculation and blending of the AdvanTex-treated effluent with primary tank effluent. Using the flow data specified on the Plans the tank is sized to be equal to 174% of the Maximum Day Design Flow.

According to the Recirculation-Blend Tankage Requirements in the applicable design criteria, the tank should be sized to equal at least 75% of the Design Peak Flow. Therefore, the specifications of the recirculation-blend tank in the Final Design satisfy Orenco's minimum design criteria.

Hydraulic Load – Standard Stage

The Final Design specifies the use of two (2) AX20s, which contain a nominal surface area of 40 square feet of treatment media. Using the flow data specified on the Plans the hydraulic loading rate for the system calculates as follows:

| Hydraulic Loading Rate (HLR) | | | | |
|------------------------------|------------------------|--------------------------------|------------------------------------|---------------------------------|
| Design Average Flow (gpd) | Design Peak Flow (gpd) | Nominal Textile Area (sq. ft.) | Average HLR (gal. per day/sq. ft.) | Peak HLR (gal. per day/sq. ft.) |
| 288 | 575 | 40 | 7.2 | 14.4 |

According to the AdvanTex System Loading Chart in the applicable design criteria, the standard AdvanTex treatment system (Stage 1) should not be hydraulically loaded more than 25 gpd/square foot at Design Average Flow or 50 gpd/square foot at Design Max Day Flow. Therefore, the specified type and number of AdvanTex pods in the Final Design satisfy Orenco's design criteria to achieve the effluent quality listed in the design criteria at a 95% confidence level for this office building application.

Organic Load – Standard Stage

The following influent characteristics provided on the Plans were estimated and not derived from direct sampling. Even though the influent characteristics were not derived from direct sampling, the values provided are consistent with values we have seen in other, similar office building applications.

| Average Influent (Primary Tank Effluent) Characteristics | | | |
|--|-----------------------------|--------------------|----------------|
| Average BOD ₅ (mg/L) | Max BOD ₅ (mg/L) | Average TSS (mg/L) | Max FOG (mg/L) |
| 150 | — | 50 | 25 |

Based on the average influent biochemical oxygen demand (BOD₅) concentration and flow data specified on the Plans, the system will receive approximately 0.5 pounds of BOD₅ per day at Design Average Flow, and 0.8 pounds of BOD₅ per day at Maximum Day Design Flow. Using this information, the organic loading rate of the system calculates as follows:

| Organic Loading Rate (OLR) | | | | |
|--|--|---|-------------------------------------|--------------------------------------|
| Average Organic Load (lbs BOD ₅ /day) | Max Organic Load (lbs BOD ₅ /day) | Treatment Media Area (ft ²) | Avg OLR (lbs BOD ₅ /day) | Peak OLR (lbs BOD ₅ /day) |
| 0.36 | 0.72 | 40 | 0.009 | 0.018 |

According to the Organic Load Requirements in the applicable design criteria, an AdvanTex Treatment System should not be organically loaded more than 0.04 lbs BOD₅/ft² at Design Average Flow or 0.08 lbs BOD₅/ft² at Design Peak Flow. Therefore, the specified type and number of AdvanTex pods in the Final Design satisfy Orenco's minimum design criteria to achieve the effluent quality listed in the design criteria at a 95% confidence level.

Conclusions

I have reviewed the Final Design of the Clean River Energy Center wastewater treatment system and have found that the design is compliant with the most current version of the system's applicable design criteria published by Orenco for the specified parameters provided by the system's designer in the Plans. In addition, I noted no anomalies in the site layout or configuration of the system during my review.

| Compliance Table — Meets Minimum Design Standards | |
|---|----------------|
| | Standard Stage |
| Recirc Tank Size | Yes |
| Hydraulic Load | Yes |
| Organic Load | Yes |

As such, the system as designed satisfactorily complies with Orenco's design criteria to meet the following effluent limits specified in the Plans at a 95% confidence level, provided that all influent flows and constituent concentrations specified in the Plans are not exceeded:

| Expected Effluent Quality | |
|---------------------------|---------|
| Constituent | Average |
| BOD ₅ | 20 |
| TSS | 20 |

It is important to note that even though the AdvanTex Treatment System has the capability to meet or exceed the required treatment parameters, there is no way that Orenco can guarantee that a particular system will be operated or maintained in a manner consistent with the Final Design reviewed. Once the facility is placed into operation, the influent flows and constituent concentrations to the facility should be monitored, and if flow or any of the influent constituent concentrations exceed those listed in the Commercial Project Questionnaire, measures should be taken to reduce the flow or constituent concentration to those listed. However, if additional treatment capacity becomes necessary, the system is designed to have the capability to expand to account for the new flow or constituent concentration.

Please also note that disposing of toxics or chemicals into the system is strictly prohibited. Examples of toxics include restaurant degreasers, cleansers, wax strippers for linoleum, carpet shampoo, waste products, or any other toxins. Furthermore, water softener brine discharge is prohibited from being discharged into the AdvanTex Treatment System. Failure to adhere to these policies will void Orenco's limited product warranties.

If you have any questions about my review process, findings, or conclusions, please feel free to call or e-mail me.

Sincerely,



Jessy Cugley
Systems Engineer
Orenco Systems, Inc.
814 Airway Avenue
Sutherlin, OR 97479
P: (800) 348-9843
jcugley@orencosystems.com