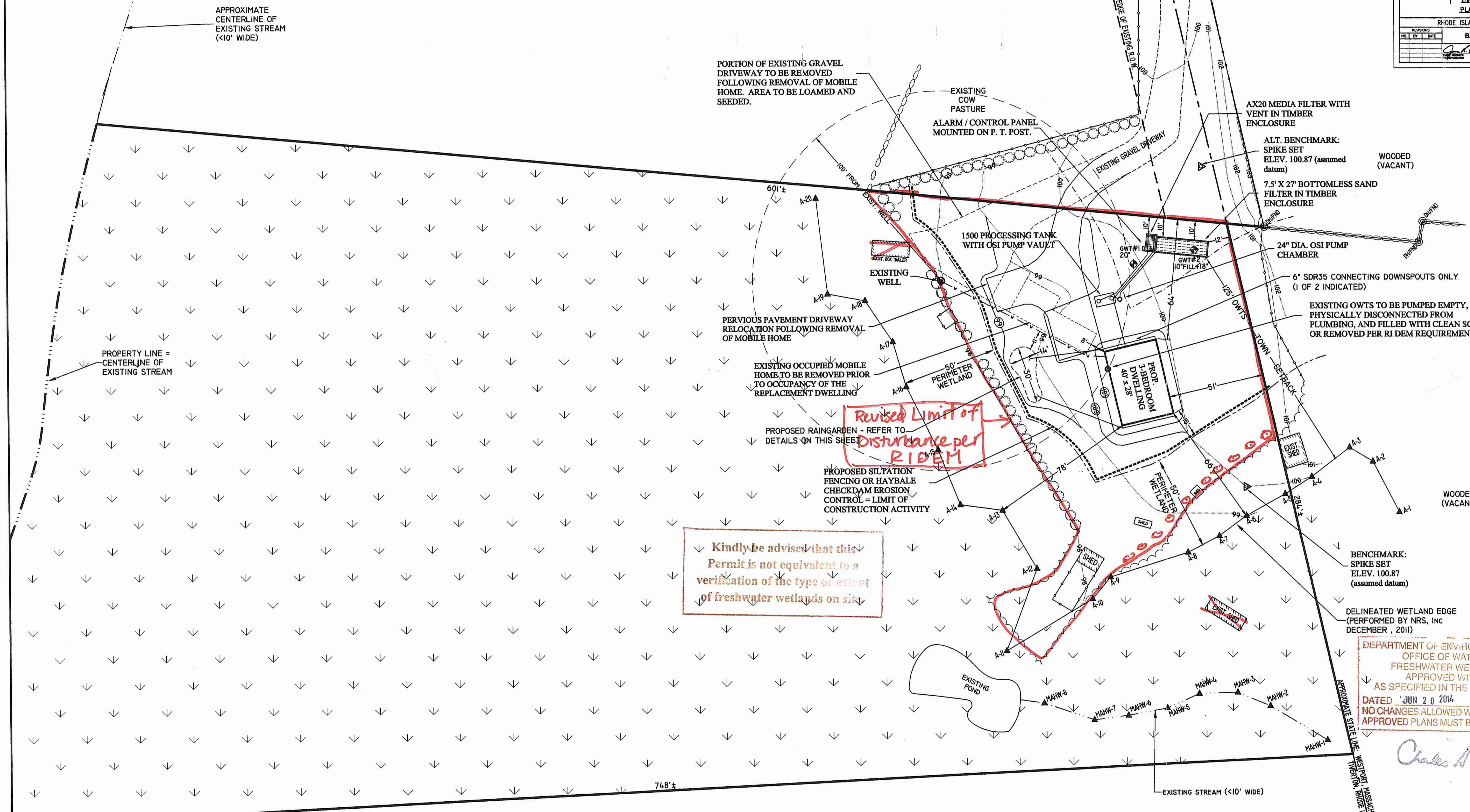
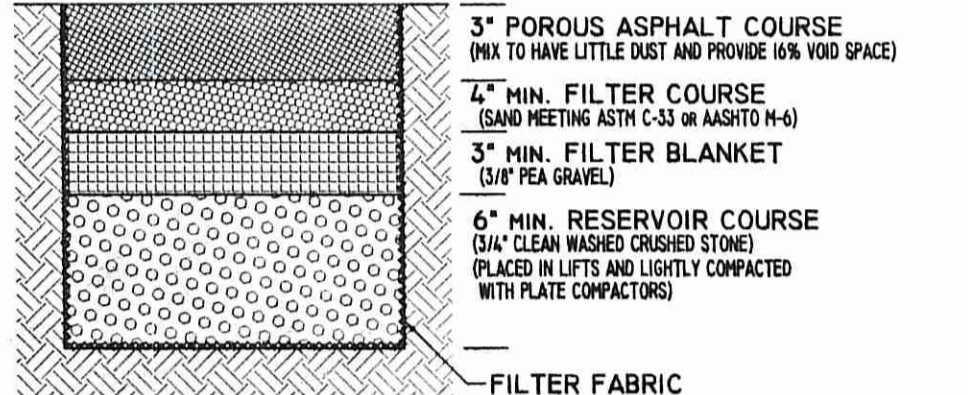
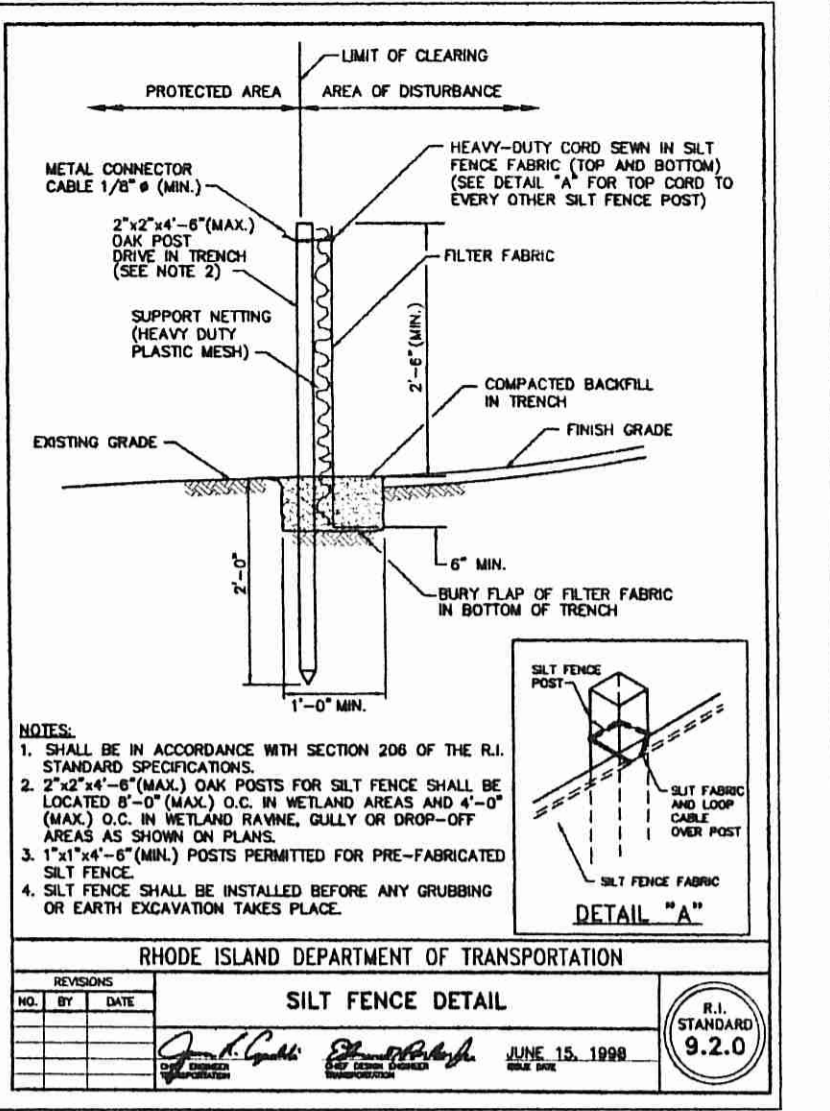
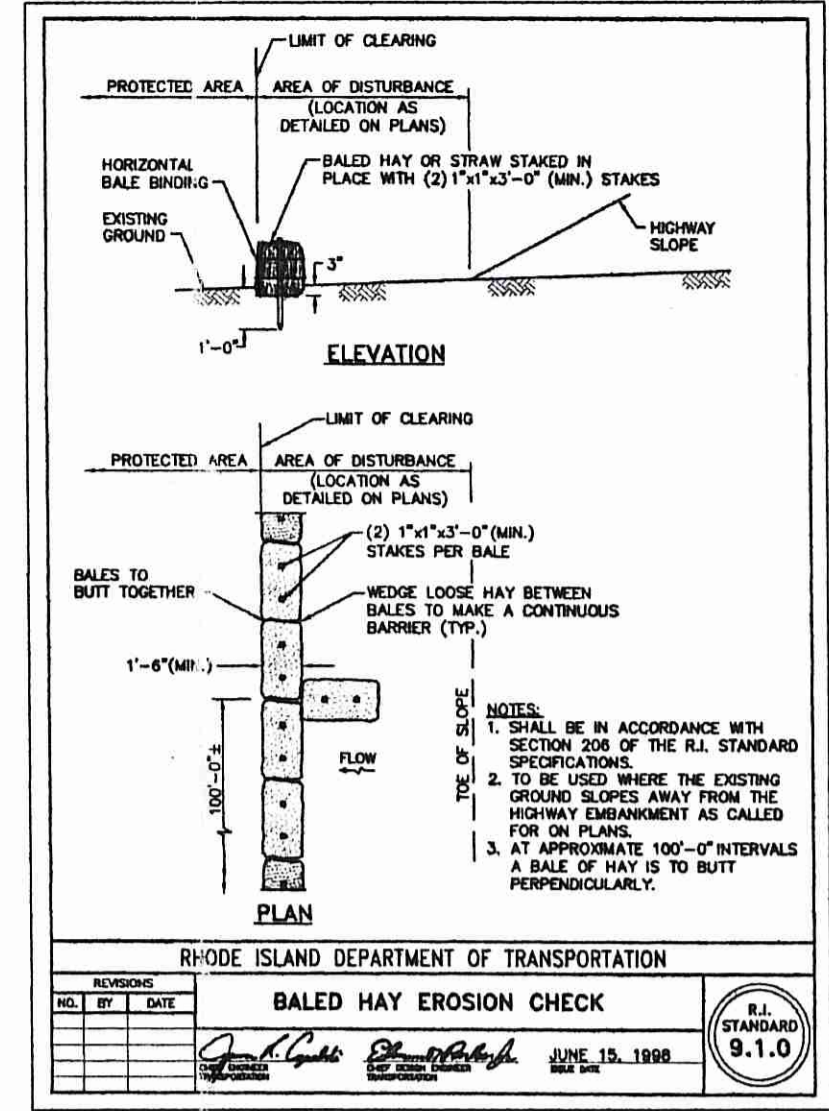


SYMBOL	PLANT SPECIES	# OF PLANTS
A	SWEET PEPPER BUSH	(2)
B	JOE PYE WEED	(10)
C	SWEET FERN	(4)
D	HIG-BUSH BLUEBERRY	(3)
E	BUTTERFLY MILKWEED	(5)
F	BLUE FLAG IRIS	(16)
G	BEARBERRY	(14) FILL IN

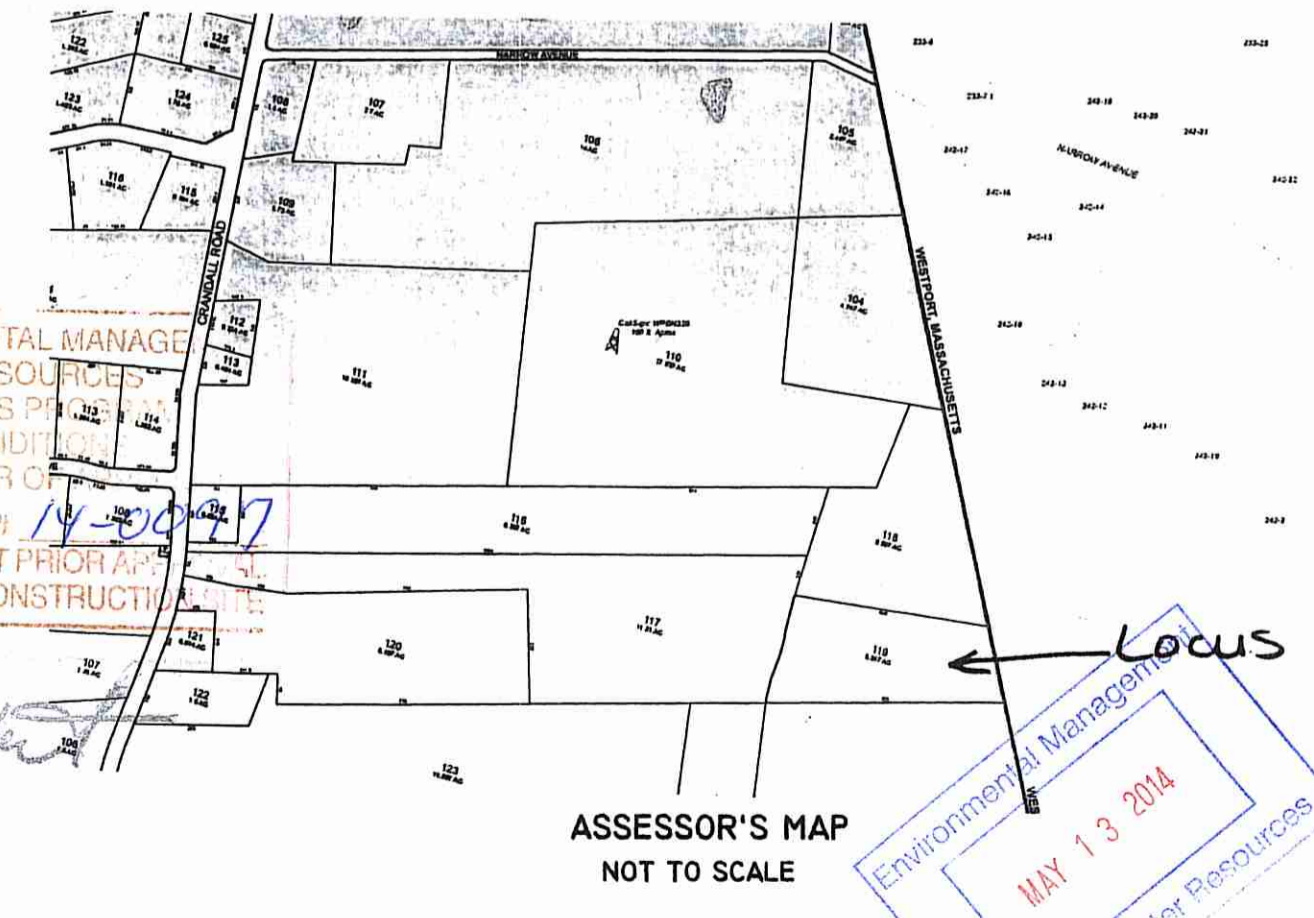
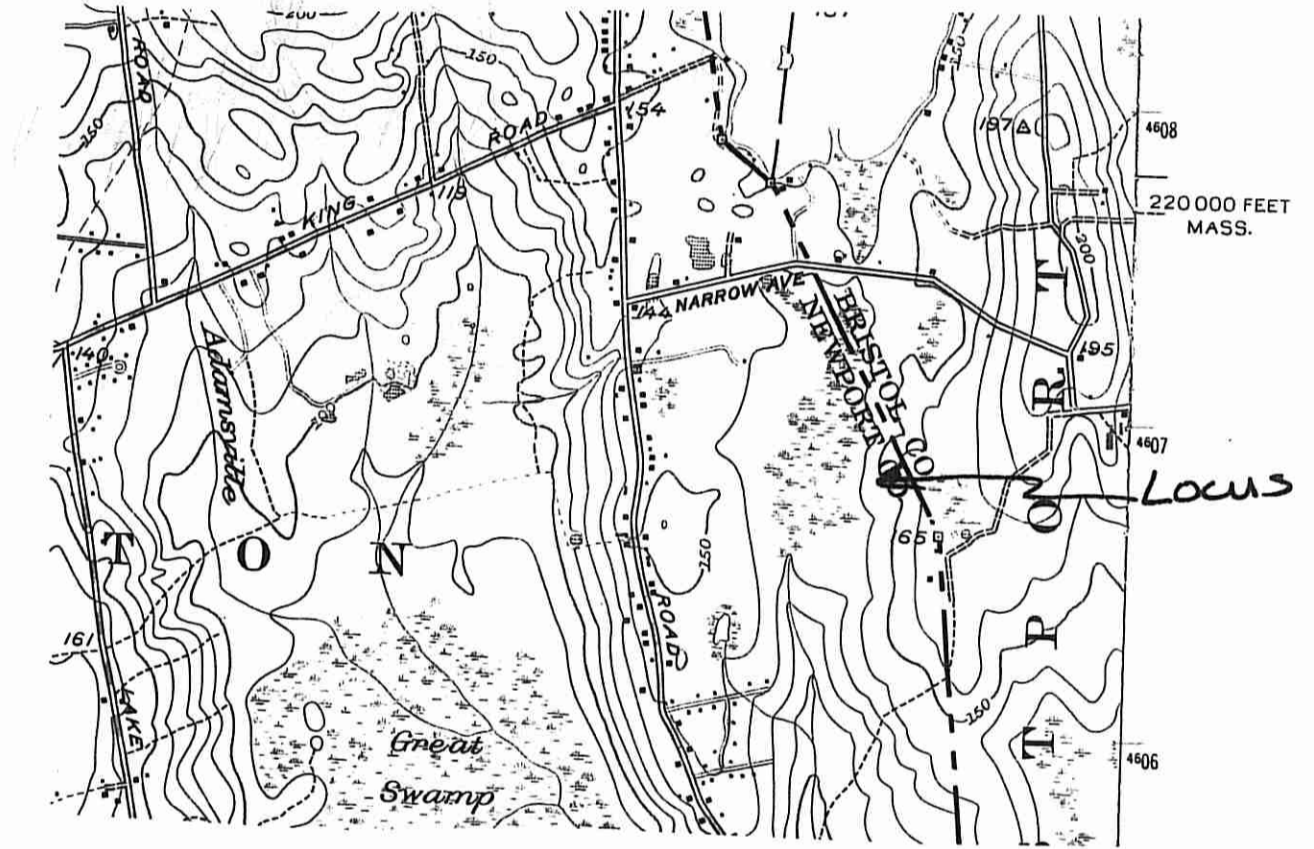
NOTE:  
PLANTS MUST BE INCLUDED ON RI COASTAL PLANT LIST AS ACCEPTABLE FOR RAIN GARDENS. SUBSTITUTIONS WILL BE PERMITTED WITH CONCURRENCE FROM RI CMC.



Kindly be advised that this Permit is not equivalent to a verification of the type or extent of freshwater wetlands on site.

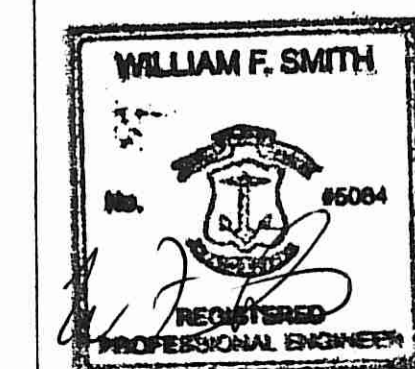
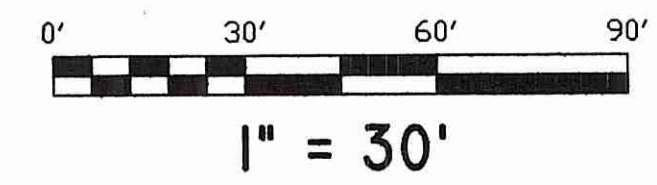
Revised Limit of Disturbance per RIDEM

plantings per Condition No. 16(b) of the permit letter.



DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
OFFICE OF WATER RESOURCES  
FRESHWATER WETLANDS PERMIT  
APPROVED WITH CONDITIONS AS SPECIFIED IN THE LETTER OF DATED JUN 20 2014 FILE # 14-0047  
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL  
APPROVED PLANS MUST BE AT CONSTRUCTION

Charles A. Hatten



REVISIONS:  
05/12/14: ADD WATER LINE  
10/31/12: ADD RAIN GARDEN

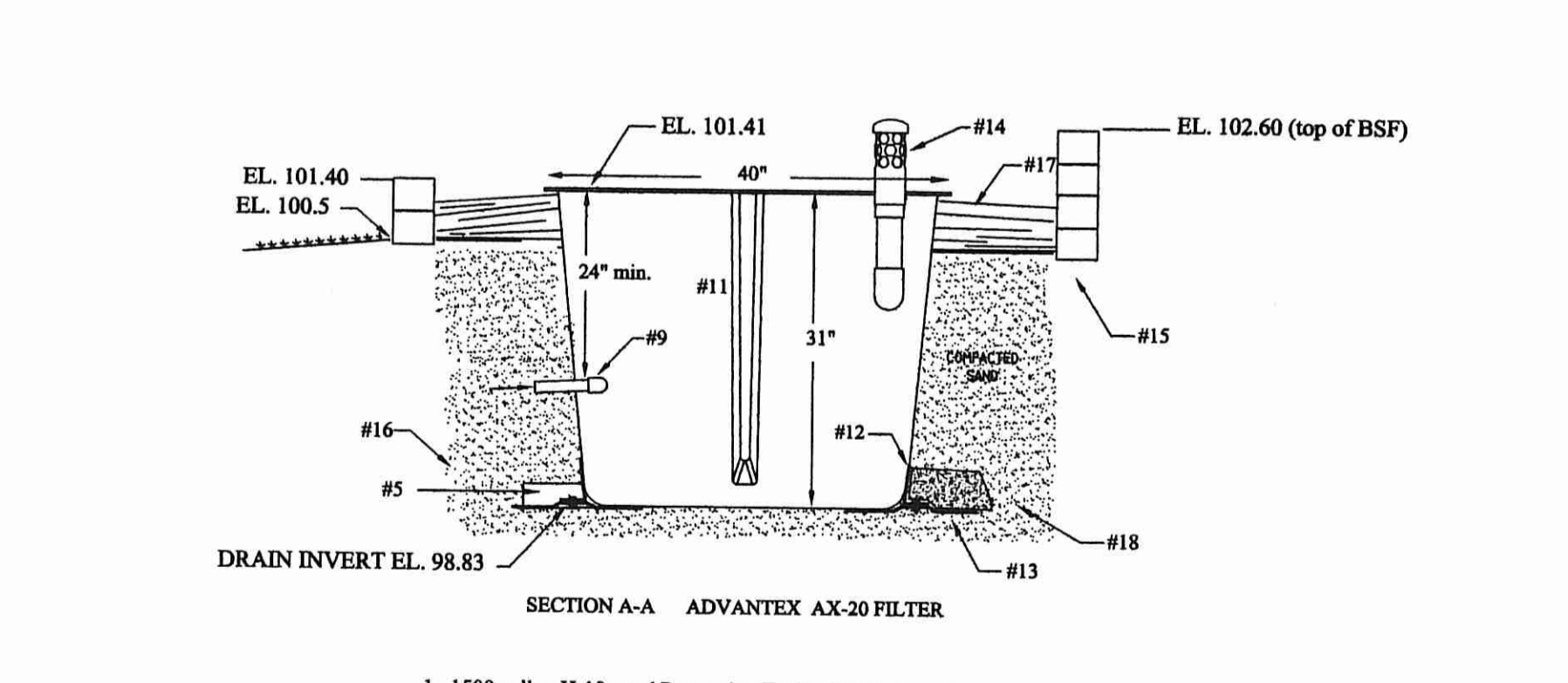
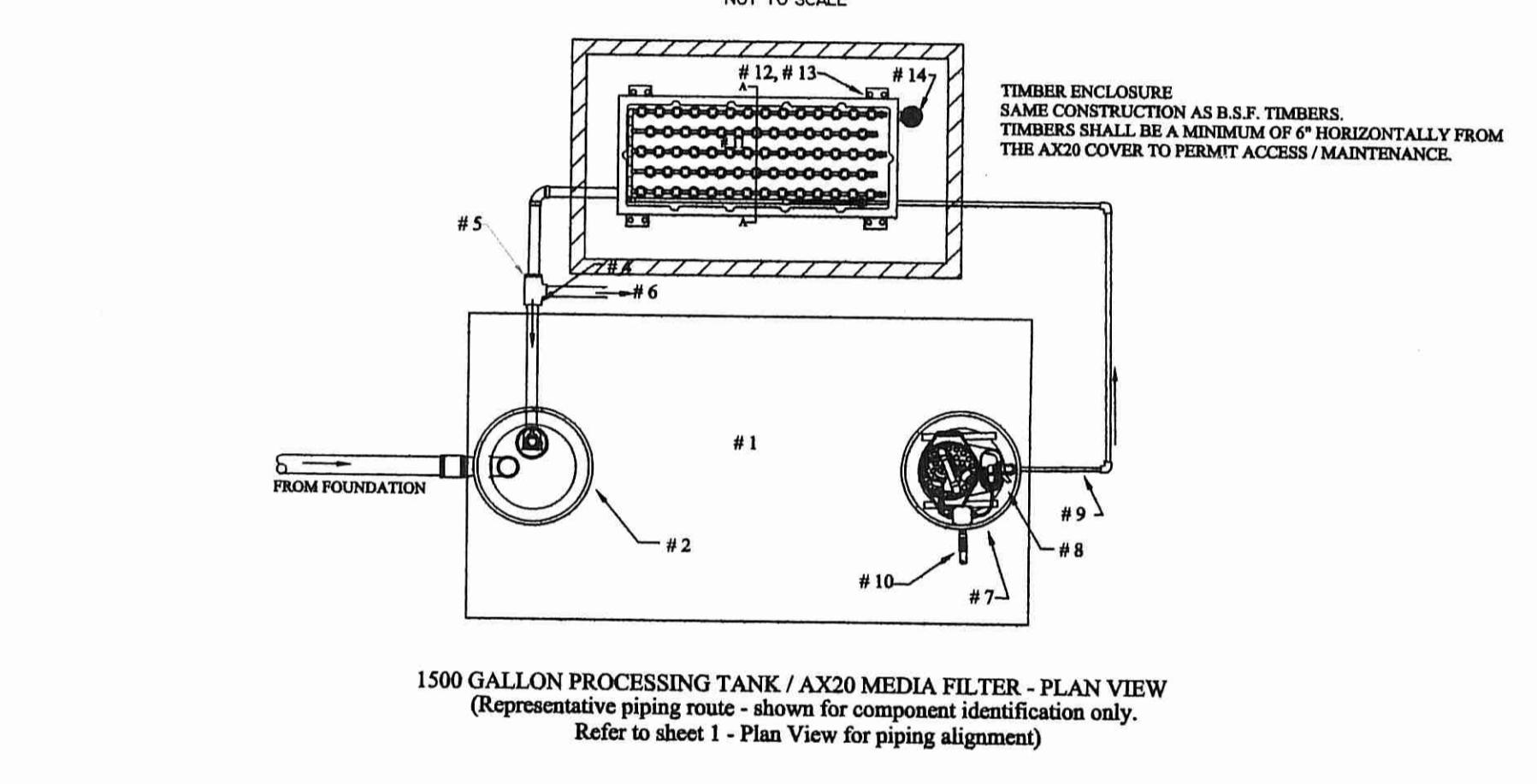
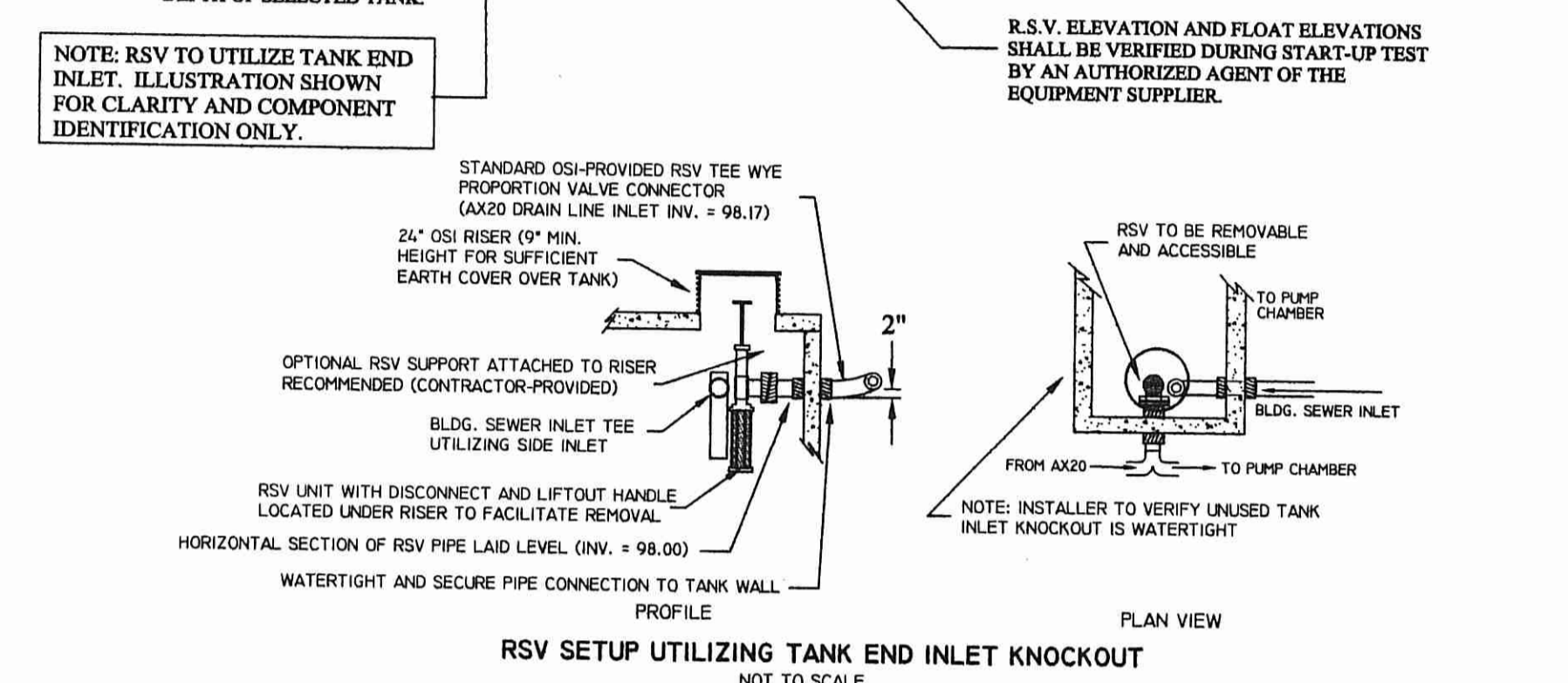
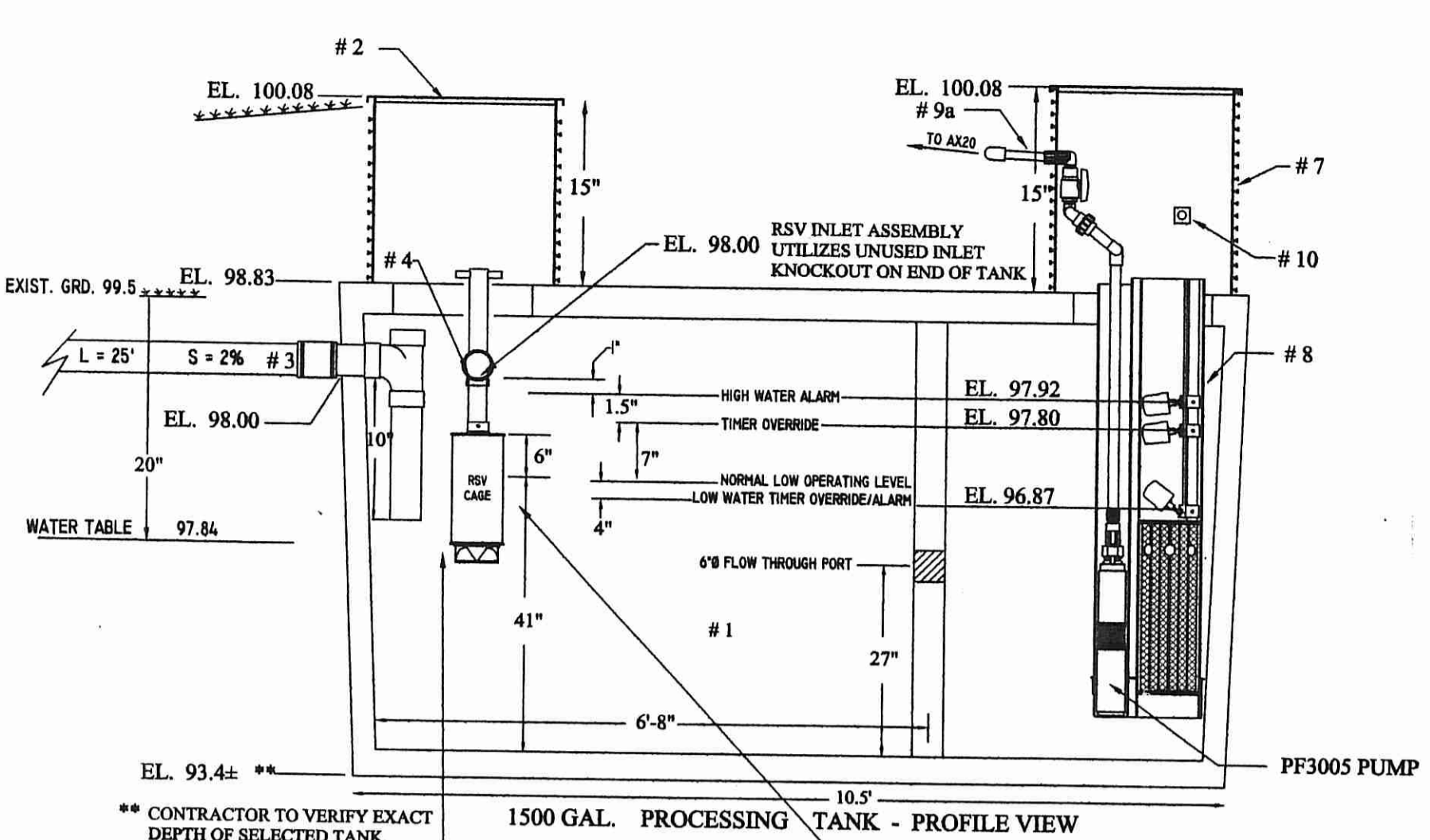
PROPOSED OWTS NEW CONSTRUCTION PLAN  
PREPARED FOR  
**KEVIN ROGERS**  
PLAT 605 LOT 119  
299 NARROW AVENUE  
TIVERTON, RHODE ISLAND

SCALE: 1" = 30' DATE: AUGUST 22, 2012

**Civil Engineering Concepts, Inc.**  
34A MAIN STREET  
LITTLE COMPTON, RI 02857  
PH: (401) 592-0177  
FAX: (401) 592-0178  
EMAIL: wsmithccc@aol.com

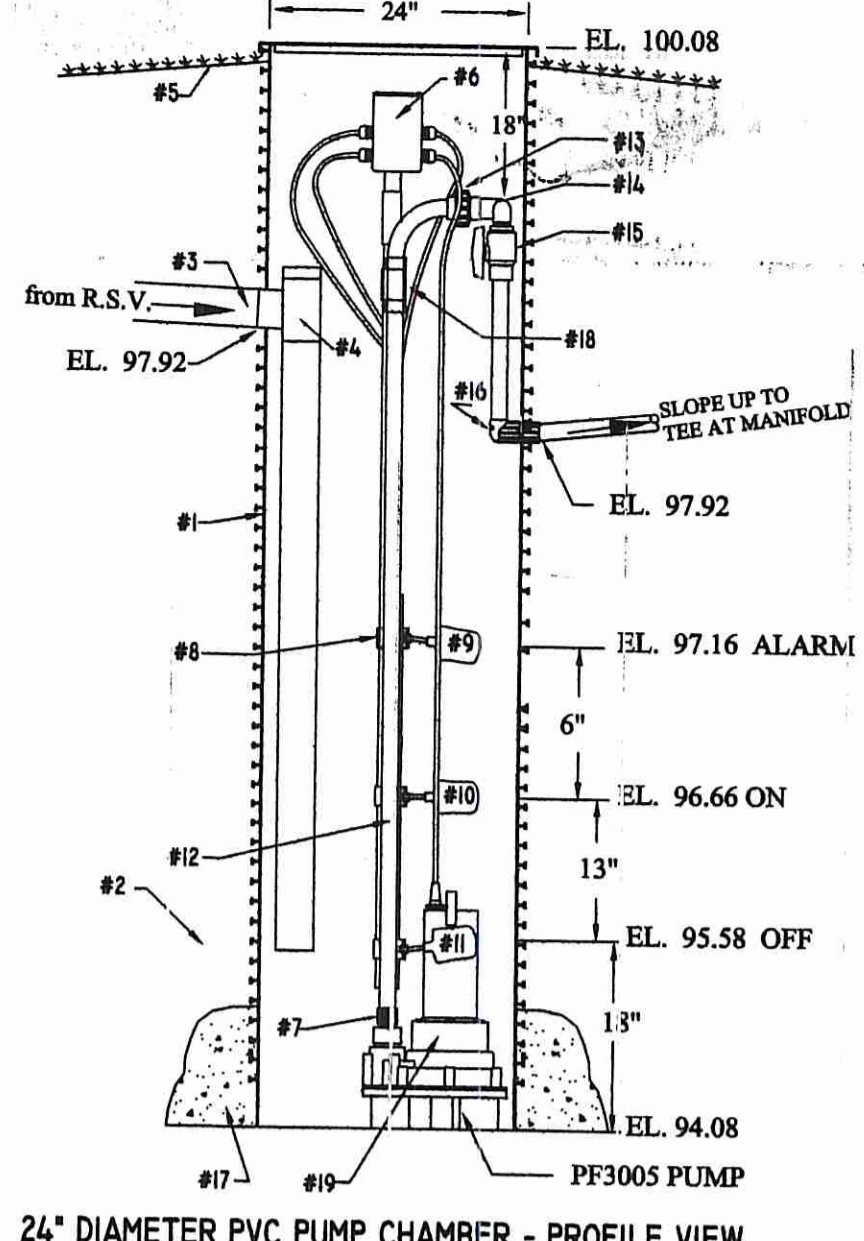
P.O. BOX 5323  
NEW BEDFORD, MA. 02742  
(508) 990-4900  
WEB SITE: www.ri-engineer.com

SHEET 1 OF 2 JOB#: 03-048



- 1500 gallon H-10 rated Processing Tank with baffle wall.
- 24" dia. OSI PVC inlet riser, w/ fiberglass bolt down cover, on watertight tank adapter.
- 4" SCH-40 PVC building sewer pipe w/ inlet tee.
- Recirculation Splitter Valve (manufacturer specified).
- 2" SCH-40 gravity pipe from AX-20 pod to R.S.V.
- 2" SCH-40 gravity pipe from R.S.V. to B.S.F. pump chamber.
- 24" dia. OSI PVC outlet riser, w/ fiberglass bolt down cover, on watertight tank adapter.
- 24" dia. OSI PVC pump package w. OSI PF3005, 1/2 hp, 1" discharge pump.
- 1" Class 200 (SCH40) PVC from Bionube AX pump to AX20 pod.
- Waterproof / vapor-proof electrical junction box.
- Advantex AX-20 recirc. media filter pod.
- Factory installed brackets (1 of 4).
- Contractor installed, factory provided, anti-floatation flanges (1 of 2).
- OSI passive air intake vent.
- 6" x 6" P.T. timber wall (same construction as B.S.F.).
- Compacted clean granular (sand) material.
- 3" layer of mulch or pea gravel extending from top of compacted granular fill up to 1" below AX cover.
- 2 cu. ft. of poured concrete on each of two anti-floatation flanges.

PROCESSING TANK / ADVANTEX AX20 FILTER DETAILS  
NOT TO SCALE



- PVC water tight basin w/ fiberglass cover
- Backfill material to be compacted (1" lifts) granular (sandy) fill
- 2" SCH-40 PVC (gravity) from R.S.V. Pressure rated fittings required, DWV fittings not permitted
- 2" x 2" x 2" SCH-40 tee with drop pipe extending to lowest float
- Finished grade to be 1" min. below cover
- Waterproof / vapor-proof PVC junction / splice box & elec. conduit
- SCH-40 reducer (if necessary)
- Level Control Float Assembly - removable w/o entry into chamber
- "ALARM" Float
- "ON" Float
- "OFF" Float
- Discharge Transport piping: Class 200 psi (SCH-40) with pressure rated fittings - DWV fittings not permitted
- Threaded Disconnect - accessible from surface w/o chamber entry
- Drainback-type assembly required
- Fully ported Shut-off
- 3/16ths inch Weephole (directed away from floats)
- CONCRETE BALLAST REQUIRED - 10 CU. FT. (min)
- Checkvalve not required. Anti-siphon valve not required.
- OSI Effluent Pump: O.S.I. # PF3005

BSF PUMP CHAMBER DETAIL  
NOT TO SCALE

- 102.1 .....Top of Foundation (min)  
98.1 .....Finished crawl Space / Basement (min)  
97.68.....Invert at foundation wall
- 99.5 .....Average exist. grade at Tank  
97.84.....Elevation of Water Table at Tank (20")  
98.00.....Inlet invert at Tank
- 97.92.....Inlet invert at BSF Pump Chamber  
97.92.....Invert out of BSF Pump Chamber
- 100.6 .....Min. prop. grade adjacent to BSF  
102.60.....Elevation of top of Pea Stone  
102.15.....Invert of Distribution Lateral (laid level)  
101.90.....Top of C-33 Filter Sand  
99.90.....Bottom of C-33 Filter Sand  
99.40.....Bottom of 6" layer C-33 / Native Soil  
98.84.....Elev. of Water Table at BSF (20")  
100.5 .....Existing average grade at BSF

ELEVATION SCHEDULE

NUMBER OF BEDROOMS: 3 - Proposed  
DESIGN GALLONAGE: 345 GPD  
GARBAGE GRINDER: Not Allowed  
LEACHING SYSTEM USED: Bottomless Sand Filter  
SIZE OF PROCESSING TANK: 1500 gallons  
SECONDARY TREATMENT UNIT: Advantex AX-20 Media Filter

PERCOLATION TEST (from previously approved design plan - 9833-960): 10 min/inch  
SOIL CATEGORY: Use Soil Category 6  
BSF LOADING RATE: 2.3 gal/d/ft/day, timed dose category 1 L.R.

TOTAL SQUARE FOOTAGE REQ'D:  
345 GAL/DAY  
2.3 L.R. = 150.0 S.F. REQUIRED

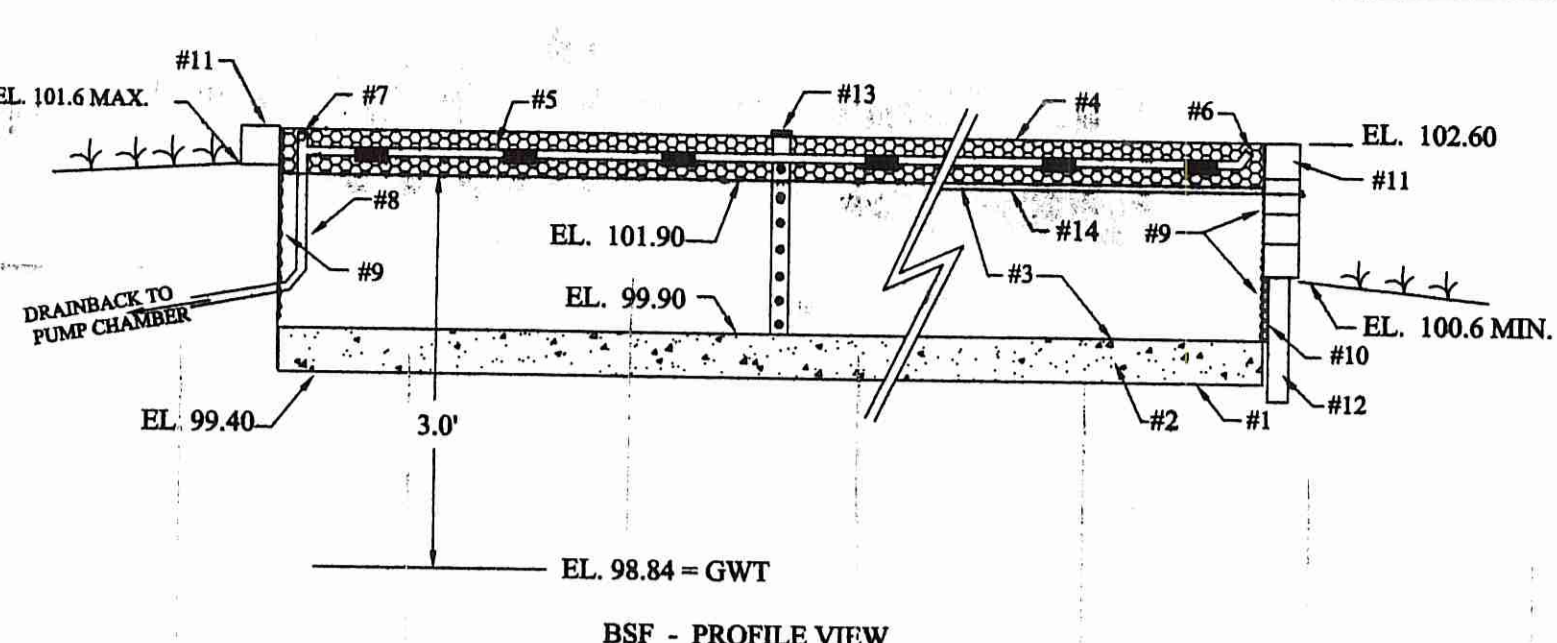
BSF SQUARE FOOTAGE PROVIDED:  
7.5' x 27.0' = 202.5 S.F. PROVIDED

BSF PUMP CHAMBER SIZE: 24" diameter, 6' deep  
BSF DOSING CYCLE: 13" drawdown between "OFF" and "ON"  
DOSING QUANTITY: 25.5 GALLONS/CYCLE

BSF DISCHARGE:  
25.5 gal/cycle - 3.7 gal (drainback)  
90 orifices (per zone) = 0.24 GAL/ORIFICE/CYCLE

37.1 gpm (pump discharge)  
90 orifices = 0.41 GPM/ORIFICE

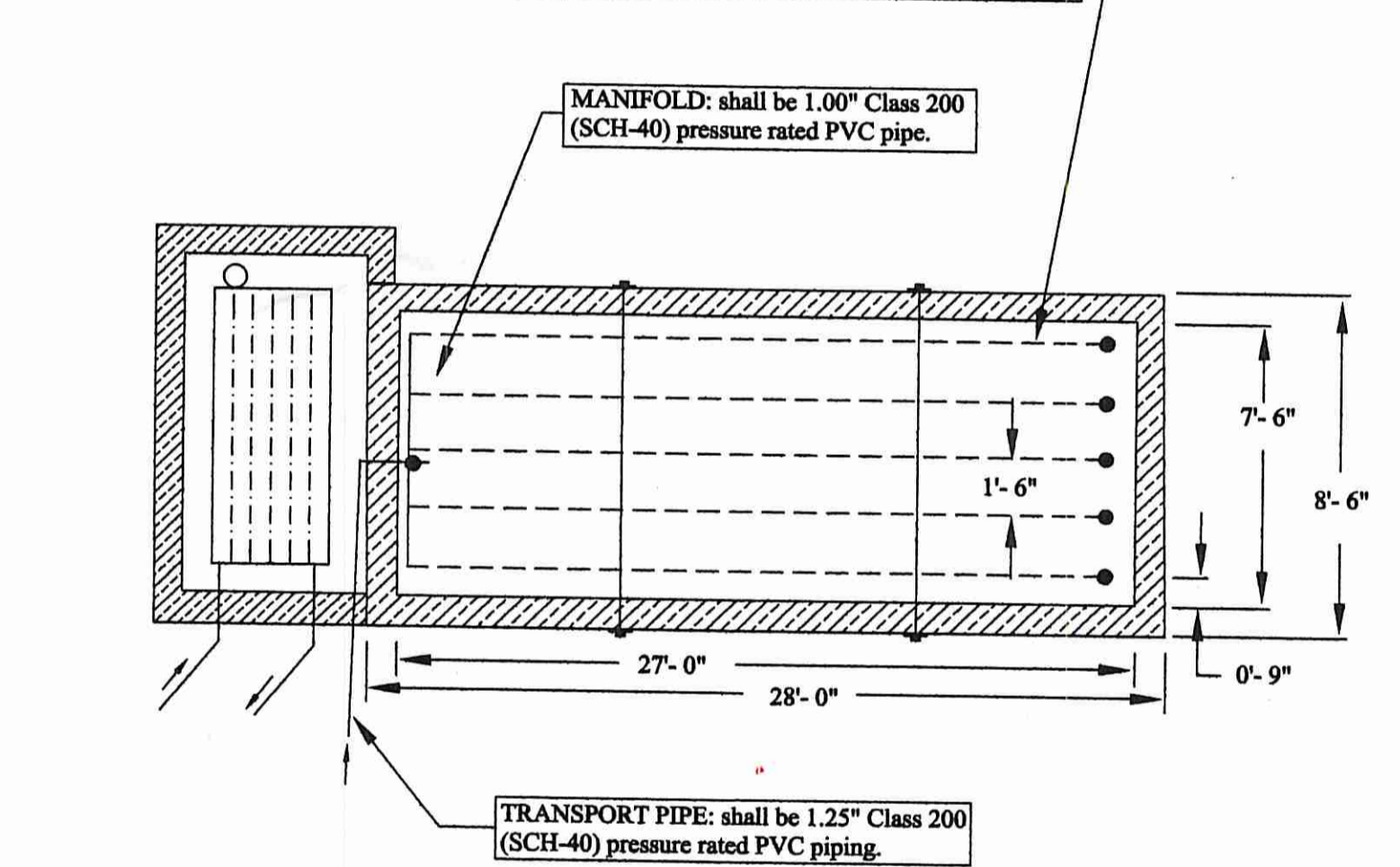
BASIS OF SANITARY DESIGN



- Scarified and non-compacted native soil. Existing BSF ground surface preparation shall only consist of stripping native "A" and root structure (and any native "B" horizon if necessary to achieve specified depth/elevation).
- 6" thick layer of evenly mixed Native Mineral Soil (from B horizon) and ASTM C-33 Sand.
- 24" minimum thick layer of non-compacted ASTM C-33 Sand and ASTM C-33 Sand.
- 8" (min.) thick layer of 3/8ths inch Washed Pea Gravel
- Class 200 (SCH-40) PVC pipe with pressure rated fittings and orifices (with shields) spaced as specified in detail below.
- 45-degree elbow with threaded female cap (matching lateral diameter)
- Class 200 (SCH-40) PVC Manifold pipe with threaded male plug clean out
- Class 200 Transport pipe from BSF pump chamber.
- Insulation sleeved over vertical portion of transport pipe inside BSF. Install "Tee" and 2" threaded plug at 90-degree bend / connection to Manifold (allowing cleaning access to Transport pipe).
- 30 mil. PVC liner
- 1/2" non-PT plywood support frame above grade
- 6" x 6" PT timber support frame to brace 6" x 6" timber frame construction and plywood frame. Recommend 3 vertical timbers at each corner and every 10' o.c.
- 4" dia. filter fabric wrapped SDR-35 inspection well with removable cap
- 1/2 inch (min) dia. threaded tie rods required when 6" x 6" timbers exceed 2 courses in height. Refer to Bottomless Sand Filter note #28.
- 4" x 4" vertical non-PT vertical support timbers to brace 6" x 6" timber frame construction and plywood frame. Recommend 3 vertical timbers at each corner

DISTRIBUTION LATERALS: shall be 0.75" dia. Class 200 (SCH-40) PVC with 1/8 inch orifices drilled at 18" o.c. at 6 o'clock position with orifice shields. 1.0" dia. 45-degree elbows with threaded female cap at distal ends required. Laterals laid level. Total of 17 bottom-mounted orifices per Lateral.

Two orifices per lateral, one at 1/3rd and one at 2/3rd distance from manifold, shall be located at the 12 o'clock position and fitted with an orifice shield on top to allow for proper drainage.



BOTTOMLESS SAND FILTER DETAILS  
NOT TO SCALE

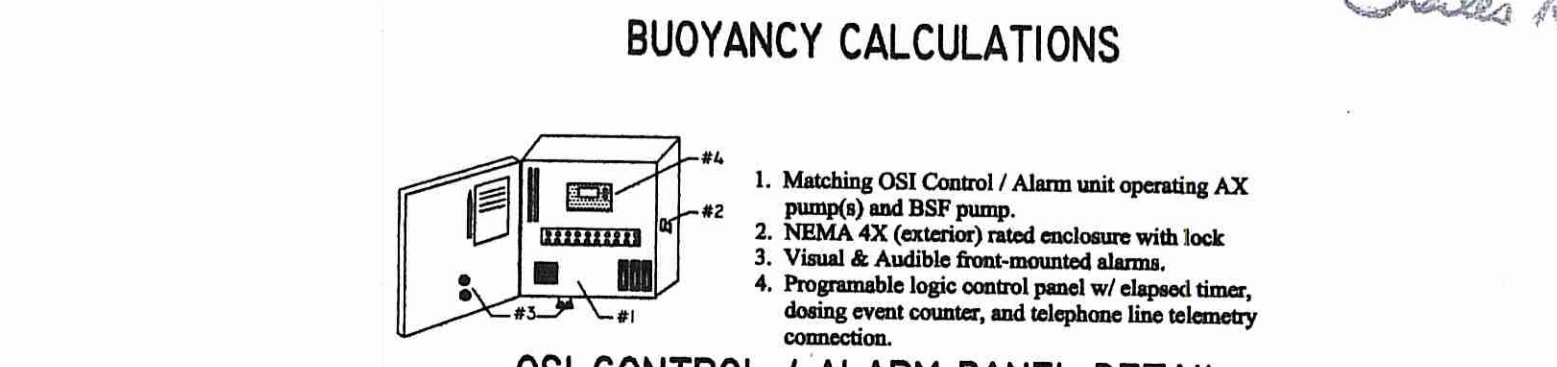
Kindly be advised that this Permit is not equivalent to a verification of the type or extent of freshwater wetlands on site.

PROCESSING TANK  
Tank type: 1500 Gallon H-10 Tank Wt.: 12,400 lbs.  
Weight of Earth Cover (min. of 1' of soil on tank): 4,546 lbs.  
Upward lift (neglecting soil friction): 10.2' (depth) x 5.66' (width) x 3.0' (max. submerged depth) x 62.4 lbs/c.f. = 13,350 lbs.

Safety factor:  
12,400 + 4,546 = 16,946  
16,946 / 13,350 = 1.27

BSF PUMP CHAMBER  
Tank type: OSI 24" dia. PVC unit Tank Wt.: 200 lbs.  
Weight of Earth Cover: 0 lbs.  
Upward lift (neglecting soil friction): 1.0' x 1.0' x 3.14 x 4.5' (max. submerged depth) x 62.4 lbs/c.f. = 882 lbs.

Safety factor:  
200 + 876 = 1,076  
1,076 / 882 = 1.22



OSI CONTROL / ALARM PANEL DETAIL  
NOT TO SCALE

- GENERAL CONSTRUCTION NOTES
- Designer recommends installing the septic system during dry months (June-October) to avoid complications with a high water table or excessive surface water runoff during construction. A high water table or saturated ground conditions during construction activities could compromise the quality and life expectancy of the system.
  - All construction shall conform to the State of Rhode Island and Providence Plantations Department of Environmental Management - Rules and Regulations Establishing Minimum Standards relating to location, design, construction, and maintenance of On-Site Wastewater Treatment Systems as most recently amended, and in accordance with the Bottomless Sand Filter Guidelines Document (as most recently amended).
  - All work shall be done in a workmanlike manner with lines laid as straight as possible and joints made watertight. All work shall be performed by an Installer licensed in the State of Rhode Island and certified for the installation of B.S.F. - type systems by RI DEM and the Vendor. Verification of Installer's certification may be required by the Designer prior to "start of construction" request by the Installer.
  - Designer to be notified 72 hours prior to the start of OWTS construction. Contractor is to ensure that Designer is notified 2 working days in advance of any required inspections so proper notification to RI DEM can be made. Work shall not continue until the previous stage is inspected and approved.
  - Contractor or homeowner shall provide the Designer with a copy of the recorded Maintenance Agreement prior to the Designer's issuance of Certificate of Construction, and local knowledge. Actual locations are to be verified by the Contractor prior to excavation through Dig-Safe procedures and any local utility department as necessary.
  - Area to be utilized for the B.S.F. shall remain clear of all vehicles, equipment, and stockpiles materials. Contractor shall delineate the B.S.F. area with caution tape to restrict access. Compaction or smearing of native soil will compromise the operation of the B.S.F.
  - Proper size hole saws, in good conditions, are to be used for the installation of conduit/piping grommets. Refer to, and follow, required hole sizes specified in manufacturer's installation documentation. The use of incorrectly sized hole saw will result in improperly seated grommets. Any conduit/piping installed into polyethylene riser or tank that is not watertight will not be approved by the Designer.

- SEPTIC/RECIRCULATION TANK: Gallonage as specified on Processing Tank Detail
- Equipped with suitable cast-in-place PVC mounting flange for detail-specified diameter inlet & outlet PVC risers. Watertight bonding epoxy (or other proper adhesive) required between tank adapter and risers. Access covers are not to be covered with soil. Final floor placement (elevation) shall be at least 1" below the access covers and graded away from the tank to prevent surface water from ponding on and entering the covers.
  - All tank seams, riser connections (if any) and all plumbing joints are to be installed 100% watertight, sealed with suitable gasket material, or other bonding agent suitable for that hydraulic cement. Static water test required on the tank following attachment of risers. The life span of the system would be compromised by the intrusion of any groundwater.
  - Manufacturer's mounting hardware shall be utilized. All materials and construction shall meet the manufacturer requirements and applicable building, plumbing, electrical, and safety codes. Third party or alternate generic parts requiring substantial field modifications to fit shall not be permitted.
  - For additional pump information, see details contained within this plan, accompanying documentation and manufacturers published information provided at the time of pump purchase. The information contained within this plan is intended to provide schematic requirements only. Actual manufacturer's shop drawings are to be coordinated with the component supplier, including all accessories such as alarms, floats, etc. that are compatible with the pumps. Odd components requiring extensive modification to the system are not permitted.
  - A sign shall be posted in the vicinity of pump manholes warning of the potential of hazardous sewer gases and the need for proper confined space entry, venting, and air monitoring prior to working on the pump assembly.
  - Electrical wiring is to be encased in suitable conduit with proper fittings at each end to maintain a watertight connection and prevent transport of vapors/gas from the components to the control panel and building. Electrical installation shall conform to all applicable local/state regulations.

- ADVANTEX AX RECIRCULATING MEDIA FILTER:
- The AX pod shall be laid level on a 5" (min) thick bed of compacted sand/gravel. When installed above the processing tank, it is recommended that a frame of non-P.T. 2" x 6" lumber be constructed on top of the processing tank to support the sand/gravel, preventing material washout from under the AX pod.
  - Proper compaction of well-drained granular material under, along side, and above the four anti-floatation flanges is necessary to ensure the pod will not float. If concrete ballast is specified on plan, compacted material under and along side of the flanges is required to support the concrete.
  - Flange connection of backfilled material around the AX pod and related piping is required to prevent settlement and air pockets that may fill with water resulting in floatation.
  - All piping connected to the AX unit shall be Class 200 (SCH-40 or SDR-21) pressure rated piping with pressure rated fittings (no DWV-type fitting permitted).
  - The Passive Air Vent shall be located less than 15' from the AX pod. 2" SCH-40 PVC connector pipe shall slope down from vent to pod to allow draining. Bottom of the perforated air intake shall be 12" minimum above finished grade.
  - Any specified courses of 6" x 6" P.T. timbers surrounding the pod shall be constructed the same as the B.S.F. timber frame. Compacted well-drained granular soil required below timbers. Timbers shall extend past the sides & ends of pod to allow for vent, plumbing, and flanges.
  - Mulch or pea stone covered with mulch shall be placed between the top and the timbers, extending to the top of the timbers.
  - Finished grade shall slope down and away from the cover to prevent surface water from ponding on and entering the cover.
- B.S.F. PUMP SYSTEM:
- OSI 6" deep PVC pump chamber. Any weepholes shown shall not be directed toward floats. Pump floats shall be controlled by the septic/recirculation tank Bionube Pump Vault Control Panel. Discharge piping shall be equipped with an anti-siphon valve only when the B.S.F. is located below the pump chamber "OFF" float elevation. Final floor placement (elevation) shall be at least 1" below the fiberglass/PVC access cover and graded away from chamber to prevent surface water from ponding on and entering the cover.
  - Transport line shall be Class 200 (SCH-40) pressure piping (with pressure rated fittings) laid at consistent slope up to the B.S.F. Manifold to allow for drainback. A minimum of 15" earth cover over pipe is required unless insulation is specified. Transport pipe shall be threaded onto pump basin's flexible discharge pipe. 1 cu. ft. (min) concrete thrust blocks required at all angle points.
  - B.S.F. pump(s) shall be as specified. Any pump substitution shall require the Designer's review of the substitute pump specifications and pump curve.
  - B.S.F. pump calculations input data/pump curve is provided on attachment with application. Lateral lengths & manifold lengths used for pump specifications reflect that piping does not extend to the far edges of the B.S.F. filter box.

- ELECTRICAL CONTROL/ALARM PANEL: w/ telephone line remote telemetry connection
- Control Panel shall be an OSI pump-matched NEMA-4 rated waterproof lockable unit with visual alarms and programmable timer that operates both OSI AX Media Filter pump unit and B.S.F. pump on same circuit.
  - Panel to be mounted adjacent to exterior wall of the building within view of the tanks. Outside face of Control Panel shall be equipped with high-intensity alarm light and alarm silence button that shall automatically reactivate after 12 hours.

- BOTTOMLESS SAND FILTER (B.S.F.):
- A start up test is required to be performed by the Installer/Maintenance provider and witnessed by the Designer of the AX pumping system, the B.S.F. pumping system, and the pressure (head) testing of the B.S.F. laterals. Any subsequent electrical work shall include the Electrician's verification to the Maintenance provider that the electricity is properly restored to the Control Panel.
  - B.S.F. shall be constructed as shown with materials as specified in the details. Installation of a 4" dia. perforated (filter fabric wrapped) inspection well required. sand/gravel is not permitted. Designer may require sieve analysis from sand supplier within 3 days prior to sand delivery.
  - Sand media material shall conform to ASTM C33 sand (sieve) requirements with less than 1% fines passing number 200 sieve. Bank run sand and conventional OWTS sand/gravel is not permitted.
  - Manifold: dia. as specified on detail and shall be Class 200 (SCH-40) PVC. All fittings shall be pressure rated (DWV fittings not recommended).
  - Distribution lateral: dia. specified on detail and shall be Class 200 (SCH-40) PVC with 1/8" orifice holes (drilled with a new bit) and fitted absolute cold weather orifice shields spaced at intervals specified. Laterals shall be laid level. Distal ends of laterals shall be equipped with a 45-degree elbow and 3/4" or 1" threaded female end cap. Sweep elbows used at all angle points. All fittings shall be pressure rated (DWV fittings not acceptable).
  - Leaching area excavation shall be level and scarified as shown on B.S.F. cross-section detail. Care shall be taken to avoid compaction of remaining soil. Excavation of native grass/hatch layer and a horizon. Prepared native soil surface (bottom inspection) shall be inspected by the Designer prior to placement of 6" thick layer of sand/soil mix.
  - Above ground B.S.F. support framing shall consist of 6" x 6" pressure treated timbers drilled and pinned to the soil with #3 or #4 rebar and screwed/nailed together at the corners and joints. Below ground construction shall utilize 1/2" min. thickness non-P.T. plywood in place of timbers. 30 ml. liner shall be placed inside timbers and plywood. Vertical 4" x 4" timbers (to support 6" x 6" frame) required with three at each corner and one every 10' on center. (max)
  - Where more than two courses of 6" x 6" timbers are exposed, 1/2" dia. threaded galvanized rod(s) with 2" dia. galvanized washers and nuts shall be installed in the second tier down from the top (to support timbers from bowing out), evenly placed along the length of B.S.F. (approximately 12' o.c.).
  - Trees or shrubs shall not be planted within 10' of the B.S.F. without vertical placement of a suitable root barrier fabric installed at least 3' beyond the B.S.F. and extending from 4" below finished grade to 1' below the bottom of the native soil/B.S.F. sand interface.
  - Heavy equipment shall not be operated over the components or the prepared leaching area during installation. Rubber tired machinery is not to be driven over the prepared natural soil base or sand/stone bed during system installation.
  - B.S.F. is not to be covered with topsoil or any other type of cover material that will restrict air flow. Any accumulated weeds, grass, or foreign material on the filter shall be removed by hand labor. Pea gravel surface may remain fully exposed to atmosphere.
  - All existing or proposed (if any) wells within 200' of proposed OWTS are shown. Site is serviced by a private well.
  - All existing or proposed (if any) public wells within 500' of proposed OWTS are shown.
  - All existing or proposed septic systems within 100' of any proposed or existing on-site well are shown.
  - No parking is permitted in the vicinity of the OWTS.
  - No upgradient drains allowed within 25' of proposed OWTS. No downgradient drains allowed within 50' of leaching area or within 25' of other OWTS components. Refer To RI Department of Environmental Management - Rules Establishing Minimum Standards Relating to Location, Design, Construction, and Maintenance of On-site Wastewater Treatment Systems, Table 2.1 Minimum Setback Distances.
  - A backup generator (adequate for supplying the pumps in case of electrical failure) is strongly recommended.
  - Property lines as depicted on this plan are approximate only based on Assessor Tax Maps and are not the result of a boundary survey.
  - For proper operation, the septic tank shall be inspected annually and pumped when any solids accumulation exceeds 1/3rd liquid depth.
  - A manufacturer-approved maintenance contract for the pump/filter system is required to be filed in the applicable Town Hall Land Evidence records office. Contract must be kept current as a condition of approval.

41. Any silt fencing or haybale checkdams shown on the plan are to be installed prior to any site activity and shall remain in place and be maintained until all activities are completed, inspections performed, and vegetation established.

42. Any substantial silt accumulation against the haybales or silt fencing is to be removed in a manner that will not compromise the effectiveness of the erosion control device.

43. All construction litter and debris is to be removed from the vicinity of the haybales or silt fencing on a daily basis.

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
OFFICE OF WATER  
FRESHWATER WETLANDS  
APPROVED WITH CONDITIONS  
AS SPECIFIED IN THE LETTER OF  
DATE: JUN 20 2014 FILE # 14-0097  
NO CHANGES ALLOWED WITHOUT PERMISSION  
APPROVED PLANS MUST BE AT CONSTRUCTION

WILLIAM F. SMITH  
REGISTERED PROFESSIONAL ENGINEER  
No. 15004

PROPOSED OWTS NEW CONSTRUCTION PLAN  
PREPARED FOR  
KEVIN ROGERS  
PLAT 605 LOT 119  
299 NARROW AVENUE  
TIVERTON, RHODE ISLAND

SCALE: NONE DATE: AUGUST 22, 2012

Civil Engineering Concepts, Inc.  
34A MAIN STREET P.O. BOX 5323  
LITTLE COMPTON, RI 02837 NEW BEDFORD, MA. 02742  
PH: (401) 592-0177 FAX: (401) 592-0178 EMAIL: wsmithc@aoi.com  
FAX: (401) 592-0178

REVISIONS:  
05/12/14 REVISE BSF PUMP  
10/31/12: NO CHANGES THIS SHEET

SHEET 2 of 2 WEB SITE: www.ri-engineer.com JOB#: 03-048