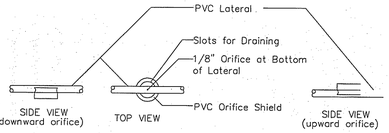


COLD WEATHER ORIFICE DETAIL

NOT TO SCALE

DESIGN CRITERIA

- PEAK FLOW = 2 BEDROOMS @ 115 GALLONS PER DAY / BEDROOM = 230 GPD
- CATEGORY 1 SYSTEM SOIL CAT 7 USE 2.1 GAL/SF/DAY LOADING RATE
- SIZE A BOTTOMLESS SAND FILTER:
  - 230 GPD / 2.1 GAL/SF/DAY = 110 S.F.
  - USE A 8' X 18' BOTTOMLESS SAND FILTER

INVERT SCHEDULE

OUT OF DWELLING	EL. 440.00
DESIGN G.W.T. BSF/TANK	EL. 438.50
SEPTIC TANK IN	EL. 439.90
TOP OF SEPTIC TANK	EL. 440.14
R.S.V. TO PUMP CHAMBER	EL. 439.30
AX20 FILTER POD INLET	EL. 441.50
TOP OF ADVANTEX FILTER	EL. 442.00
PUMP CHAMBER INLET	EL. 439.90
PUMP CHAMBER OUT	EL. 440.50
BOTTOM OF SAND	EL. 440.00
BOTTOM OF PEA GRAVEL	EL. 442.00
FLUSHING VALVE	EL. 442.50
BSF MANIFOLD	EL. 442.50
TOP OF PEA GRAVEL	EL. 442.70

PUMP CHAMBER

BOTTOM OF CHAMBER	EL. 437.00
REDUNDANT OFF	EL. 438.60
PUMP ON	EL. 439.00
HIGH WATER ALARM	EL. 439.50

ADVANTEX AX20 SYSTEM FLOAT LEVELS

HIGH WATER ALARM	EL. 439.30
TOP OF RSV CAGE	EL. 439.20
NORMAL LOW LIQUID LEVEL	EL. 438.73
LOW WATER ALARM /REDUNDANT OFF	EL. 438.40

B.S.F. Demand Dosing

35 ORIFICE * 0.24 GAL PER ORIFICE = 8.4 GALLONS
8 LF 2" TRANSPORT LINE VOLUME = 1.3 GALLONS
TOTAL DOSED = 9.7 GALLONS PER DOSE

PUMP BASIN DRAWDOWN:
9.7 GAL PER DOSE / 2 GAL PER INCH = 4.85" = 0.40'

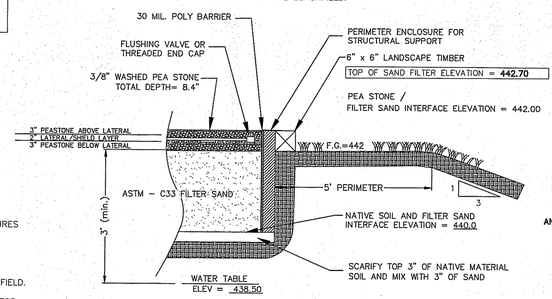
DESIGN CHECK:
230 GAL PER DAY / 9.7 GAL PER DOSE = 24 DOSE PER DAY
(O.K. – BETWEEN 24 AND 48 DOSE PER DAY)

GENERAL NOTES

1. THE OWTS INSTALLER SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL MEASURES DEPICTED ON THIS PLAN.
2. THE INSTALLER SHALL NOTIFY THIS DESIGNER 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
3. THE DESIGNER SHALL BE CONTACTED IF ANY DISCREPTANCIES ARE FOUND IN THE FIELD.
4. THE INSTALLER SHALL CONTACT THE DESIGNER AT LEAST 24 HOURS IN ADVANCE FOR BOTTOM AND COVER INSPECTIONS.
5. THE CONTRACTOR IS RESPONSIBLE FOR DEWATERING DURING EXCAVATION OF ALL COMPONENTS OF THE OWTS.

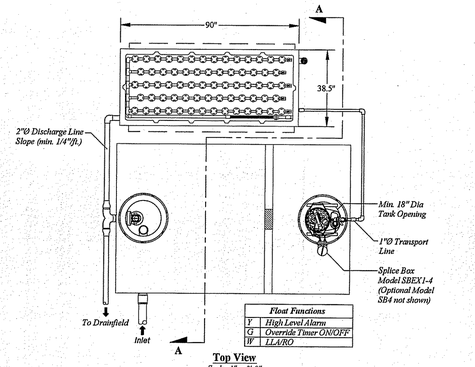
OWTS NOTES

1. ALL DESIGN, CONSTRUCTION, AND MAINTENANCE REQUIREMENTS, WHETHER NOTED HEREON OR NOT, SHALL BE IN CONFORMANCE WITH RULES AND REGULATIONS ESTABLISHING MINIMUM STANDARDS RELATING TO LOCATION, DESIGN, CONSTRUCTION AND MAINTENANCE OF ONSITE WASTEWATER TREATMENT SYSTEMS", JULY, 2012 AND ALL AMENDMENTS, BY THE RHODE ISLAND DEPT. OF ENVIRONMENTAL MANAGEMENT.
2. ALL TREES, STUMPS, AND BRUSH SHALL BE REMOVED WITHIN 10 FEET OF THE SYSTEM.
3. THERE ARE NO KNOWN PRIVATE WELLS OR DRAINS EXIST. OR PROPOSED LOCATED WITHIN 200 FEET OF THE OWTS EXCEPT AS SHOWN AND NO KNOWN PUBLIC WELLS (EXIST. & PROP.) LOCATED WITHIN 500 FEET OF THE PROPOSED ISDS.
4. THERE ARE NO KNOWN SUBSURFACE DRAINS, EXISTING OR PROPOSED, WITHIN 50 FEET OF THE PROPOSED OWTS.
5. NO VEHICULAR TRAFFIC IS ALLOWED OVER THE LEACHFIELD.

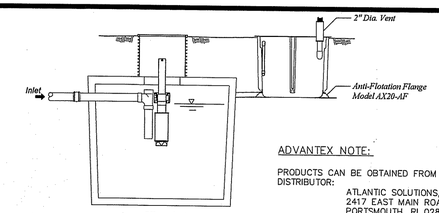


BOTTOMLESS SAND FILTER DETAIL - SECTION

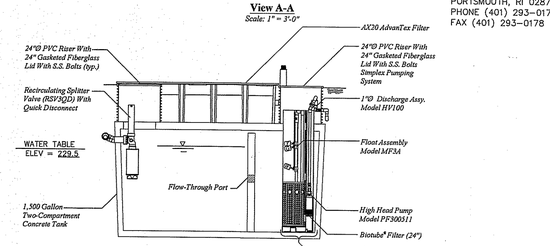
NOT TO SCALE



Top View
Scale: 1" = 3'-0"



View A-A
Scale: 1" = 3'-0"



Side View
Scale: 1" = 3'-0"

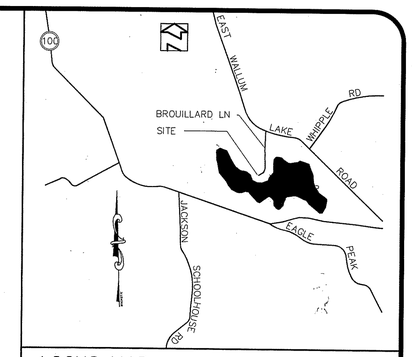
ADVANTEX NOTE:

PRODUCTS CAN BE OBTAINED FROM OSI PRODUCT DISTRIBUTOR:

ATLANTIC SOLUTIONS, LTD.
2417 EAST MAIN ROAD
PORTSMOUTH, RI 02871
PHONE (401) 293–0176
FAX (401) 293–0178

ADVANTEX AX20 DETAILS (SHALLOW GWT)

NOT TO SCALE

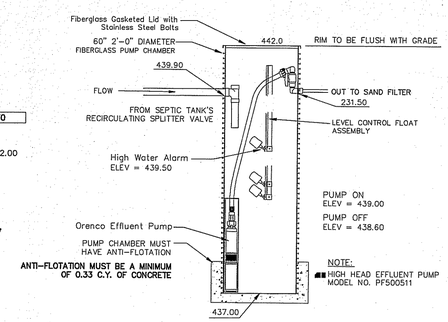


LOCUS MAP

NOT TO SCALE

BOTTOMLESS SAND FILTER (BSF) NOTES

1. THE PROPOSED BOTTOMLESS SAND FILTER (BSF) SHALL BE STAKED OUT AND PROTECTED PRIOR TO ANY SITE PREPARATION ACTIVITIES. OVER DIGGING THE SAND FILTER SHOULD BE AVOIDED; MINIMAL BACKFILLING ON BOTTOM AND SIDES PROVIDES A MORE STABLE ENCLOSURE.
2. SOD, VEGETATION AND DEAD OR DECAYING ORGANIC LITTER SHALL BE REMOVED FROM THE AREA PLANNED FOR THE BSF INSTALLATION. THREE (3) INCHES OF THE NATIVE SOIL SHALL BE SCARIFIED AND MIXED WITH 3 INCHES OF SAND MEDIA. PERIMETER STRIPPING AND EXCAVATION OF SOIL BENEATH THE NATIVE SOIL/FILTER SAND INTERFACE IS PROHIBITED.
3. A PERIMETER SUPPORT FRAME OF PLYWOOD AND 2x4 CONSTRUCTION IS USED TO HOLD THE LINER IN PLACE DURING INSTALLATION. TREATED WOOD IS NOT NECESSARY. DURING CONSTRUCTION OF THE SAND/FILTER, IT IS IMPORTANT THAT SAND BE PLACED BETWEEN THE EXCAVATED SOIL AND THE SUPPORT FRAME. ALL NAILS OR STAPLES USED MUST HAVE THEIR SHARP ENDS POINTED AWAY FROM THE LINER.
4. A PERMANENT TOP FRAME STRUCTURE (SUCH AS DECAY RESISTANT LANDSCAPE TIMBERS) MUST BE PROVIDED ON ANY PORTION OF A BSF THAT IS INSTALLED ABOVE GRADE. BELOW GRADE USE OF TIMBERS IS PROHIBITED TO PREVENT SOIL SLUMPING AFTER TIMBERS HAVE ROTTED.
5. MAINTAIN 5 FOOT LEVEL PERIMETER AROUND BSF.
6. THE 30 MIL PVC LINER IS UNFOLDED FROM THE CENTER OF THE EXCAVATION AND DRAPED OVER THE TOP EDGES OF THE PERIMETER SUPPORT FRAME. CARE MUST BE TAKEN TO ENSURE THAT THE LINER IS IN FULL CONTACT WITH SIDES AND THAT NO BRIDGING OCCURS.
7. FILTER SAND IS PLACED AND COMPACTED WHILE IT IS DAMP. IF THE SAND IS NOT DAMP, IT WILL NOT COMPACT WELL AND SETTLEMENT MAY CAUSE DISLOCATION AND BREAKAGE OF THE DISTRIBUTION LATERALS. THE SAND SURFACE MUST BE FLAT. SEE THE APPROPRIATE SAND GRADATION GRAPH FOR SPECIFICATIONS.
8. THREE INCHES OF 3/8 INCH PEA STONE IS PLACED ON TOP OF THE COMPACTED SAND, DISTURBING THE SAND AS LITTLE AS POSSIBLE. SEE PEA STONE SPECS. AFTER THE LATERALS ARE INSTALLED AND PRESSURE TEST IS PERFORMED, PLACE PEA STONE OVER THE DISTRIBUTION LATERALS TO PROVIDE 3 INCHES DEPTH OF PEA STONE OVER ALL UPPER ORIFICE SHIELDS. NO FILTER FABRIC OF ANY KIND SHOULD BE PLACED BETWEEN THE SAND AND OVERLYING PEA STONE.
9. THE LINER'S PVC BOOT PERMITS A WATERTIGHT PENETRATION OF THE LINER FOR THE TRANSPORT PIPE DELIVERING EFFLUENT TO THE SAND FILTER'S DISTRIBUTION SYSTEM. IN THE EVENT THE GROUND WATER REACHES THAT ELEVATION, THE BOOT WILL PREVENT INFILTRATION. THE MANUFACTURER'S GUIDE MUST BE FOLLOWED EXACTLY WHEN INSTALLING THE PVC BOOTS.
10. THE 1/8 INCH DIAMETER ORIFICES SHOULD BE DRILLED WITH A DRILL PRESS OR DRILL GUIDE USING A NEW 1/8 INCH DRILL BIT AND SHOULD NOT HAVE ANY VISIBLE BURRS. ALL PVC JOINTS SHOULD BE GLUED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
11. ORIFICE SHIELDS ARE PLACED ON THE LATERALS TO PREVENT THE PEA GRAVEL FROM BLOCKING THE FLOW OUT OF THE ORIFICES AND TO OBTAIN BETTER EFFLUENT DISTRIBUTION OVER THE SAND. COLD WEATHER ORIFICE SHIELDS SHOULD BE USED IN COLD WEATHER CLIMATES TO PREVENT THE FREEZING OF THE LATERALS.
12. AS PART OF THE COLD WEATHER REQUIREMENT, TWO (2) OF THE ORIFICES IN EACH DISTRIBUTION LATERAL MUST BE DRILLED POINTING UPWARD AND THE REST ARE DRILLED POINTING DOWNWARD. UP–POINTING ORIFICES SHALL BE LOCATED AT POINTS APPROXIMATELY 1/3 AND 2/3 ALONG THE LENGTH OF EACH DISTRIBUTION LATERAL. INSTALL COLD WEATHER ORIFICE SHIELDS AT ALL ORIFICES (UPWARD AND DOWNWARD POINTING).
13. THE ELECTRICAL SPLICE BOX MUST BE UL OR CSA LISTED AND CORROSION–PROOF WITH THE PROPER NUMBER OF CORD GRIPS INSTALLED. HEAT SHRINK AND OR WATERTIGHT WIRE NUTS MUST BE USED ON THE INDIVIDUAL WIRE SPLICES. WITHIN THE BOX TO ENSURE THE INTEGRITY OF THE SPLICES IF THE BOX BECOMES FLOODED. SUFFICIENT LENGTH OF WIRES MUST BE PROVIDED IN THE BOX TO ALLOW FOR FUTURE REPAIRS.
14. THE CONDUIT SEAL MUST BE UL OR CSA LISTED AND MUST BE INSTALLED USING PROPER CONDUIT SEALANT AS RECOMMENDED BY THE MANUFACTURER. SILICONE IS NOT ALLOWED. THE SEAL PREVENTS WATER FROM DRAINING INTO THE SPLICE BOX AND GASES FROM ESCAPING THE TANK.
15. THE ELECTRICAL CONDUIT MUST BE UL OR CSA LISTED. THERE ARE ELECTRICAL CODE RULES RESTRICTING THE NUMBER OF BENDS BETWEEN PANELS AND JUNCTION BOXES. REFER TO NEC 1993 SECTION 347–14.
16. INSTALL LID INSULATION ON ALL LIDS TO PREVENT FREEZING.
17. THE CLASS 200 TRANSPORT PIPE SHALL BE ALLOWED TO DRAIN BACK COMPLETELY. TO PUMP CHAMBER. MAXIMIZE PITCH OF TRANSPORT PIPE TO ACHIEVE DRAINBACK AND PROVIDE FURTHER FREEZE PROTECTION AS CONDITIONS WARRANT.
18. IN AREAS WHERE THE BSF MAY BE ACCESSIBLE TO CHILDREN, THE PEA STONE SURFACE MAY BE COVERED WITH A BROAD WEAVE FILTER FABRIC AND AN ADDITIONAL LAYER OF PEA STONE OR LARGER WASHED STONE, NO GREATER THAN 2" IN THICKNESS. TO DISCOURAGE PHYSICAL DISTURBANCE TO OR CONTACT WITH THE TREATMENT ZONE.
19. PROVIDE A PERMANENT 10' MINIMUM BUFFER BETWEEN BSF AND ANY TREES OR SHRUBS.



PUMP CHAMBER DETAIL - 24" DIA.

NOT TO SCALE

SILT FENCE DETAIL

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.

Maintenance Notes:

DRY SWALE

1. DRY SWALES SHALL BE INSPECTED ANNUALLY AND SHOULD BE INSPECTED AFTER LARGE STORM EVENTS.
2. ERODED SIDE SLOPES AND CHANNEL BOTTOMS SHALL BE STABILIZED AS NECESSARY.
3. IF THE SURFACE OF THE DRY SWALE BECOMES CLOGGED TO THE POINT THAT STANDING WATER IS OBSERVED ON THE SURFACE 48 HOURS AFTER PRECIPITATION EVENTS, THE BOTTOM SHALL BE ROTO–TILLED OR CULTIVATED TO BREAK UP ANY HARD–PACKED SEDIMENT, AND THEN RESEEDED.
4. VEGETATION IN DRY SWALES SHALL BE MOWED AS REQUIRED TO MAINTAIN MINIMUM GRASS HEIGHTS IN THE 4–6 INCH RANGE.

DRY SWALE SIZING CALCULATIONS

- Impervious roof area each half = 672 s.f.
- Soil type: Sandy Loam
- Design Infiltration Rate = 1.02 in./hr.
- Intensity = 1-inch
- Water Quality Volume Needed:
  672 s.f. x 0.083 (1") = 55.78 c.f. Say 56 c.f.
- Proposed Dry Swale Depth = 12-inches or 1.0-feet

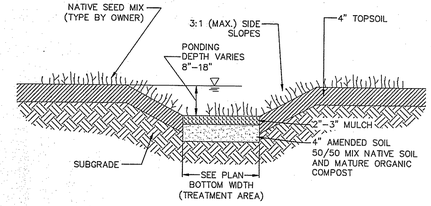
Surface Area at Bottom of the Trench:

$$A(f) = (WQv)(df) / [(k)(hf + df)(tf)]$$

Where:
A(f) = surface area of the filter bed (ft²)
df = Filter bed depth (ft) = 1.0 ft
K = coefficient of permeability of the filter media (use 1.0 ft/day)
h(f) = Average height of water above the dry swale (ft) (use 0.5 ft)
tf = design filter bed drain time (assume 1 day for design purposes)

$$A(f) = (56)(1.0) / [(1.0)(0.5 + 1.0)(1.0)]$$

A(f) = 37 s.f. use 38 s.f. for each half of the roof



VEGETATED SWALE DETAIL

NOT TO SCALE

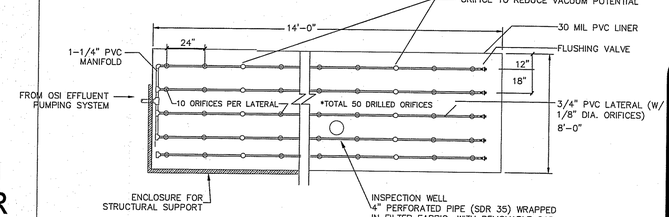
STORMWATER TREATMENT PRACTICE				
IMPERVIOUS SURFACE	AREA	METHOD	AREA REQ'D	AREA PROVIDED
ROOF TOP	672 S.F.	VEGETATED SWALE	37 S.F.	38 S.F.
ROOF TOP	672 S.F.	VEGETATED SWALE	37 S.F.	38 S.F.

* PER SOIL EVALS FSL

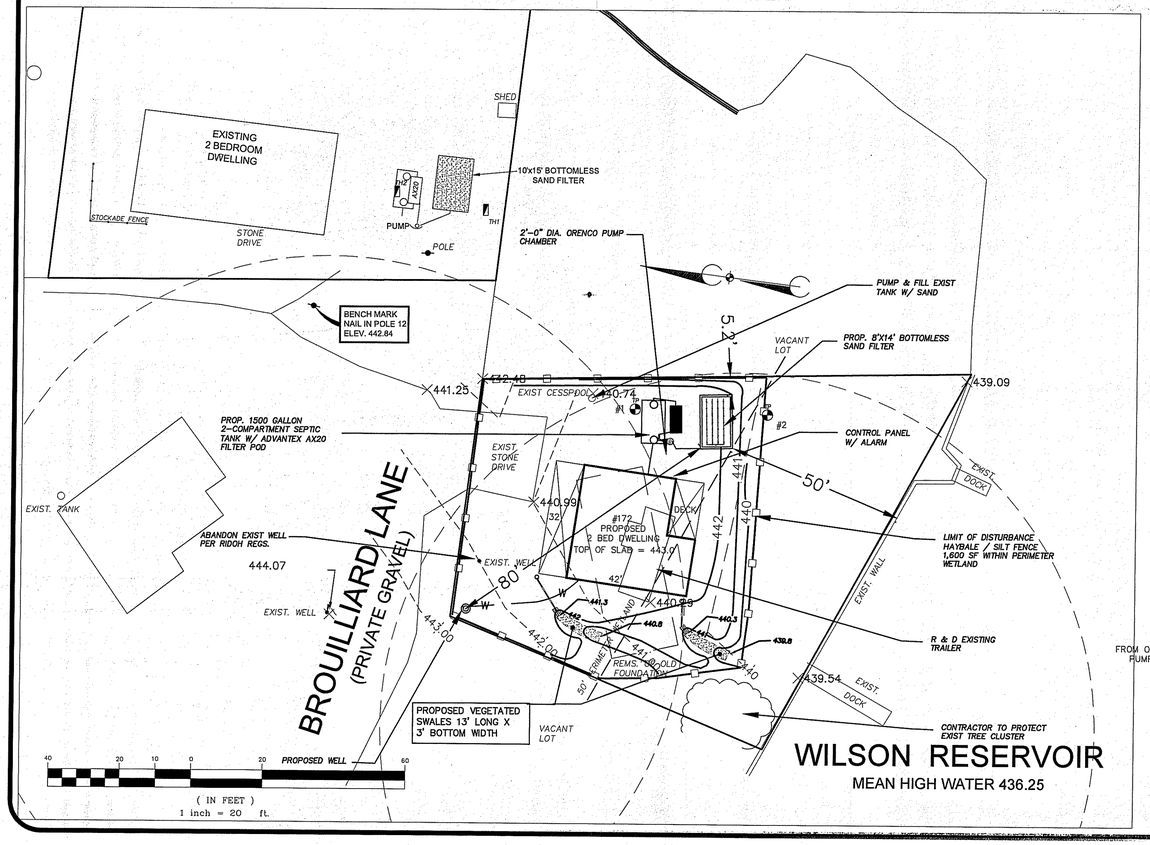
Maintenance Notes:

VEGETATIVE SWALE

1. VEGETATED SWALES SHALL BE INSPECTED ANNUALLY AND SHOULD BE INSPECTED AFTER LARGE STORM EVENTS.
2. ERODED SIDE SLOPES AND CHANNEL BOTTOMS SHALL BE STABILIZED AS NECESSARY.
3. IF THE SURFACE OF THE DRY SWALE BECOMES CLOGGED TO THE POINT THAT STANDING WATER IS OBSERVED ON THE SURFACE 48 HOURS AFTER PRECIPITATION EVENTS, THE BOTTOM SHALL BE ROTO–TILLED OR CULTIVATED TO BREAK UP ANY HARD–PACKED SEDIMENT, AND THEN RESEEDED.
4. VEGETATION IN DRY SWALES SHALL BE MOWED AS REQUIRED TO MAINTAIN MINIMUM GRASS HEIGHTS IN THE 4–6 INCH RANGE.



BOTTOMLESS SAND FILTER - PLAN VIEW



FLOOD PLAIN & SURVEY NOTE:
A PORTION OF THIS PARCEL IS LOCATED IN A ZONE AE SPECIAL FLOOD HAZARD AREA SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD BASE FLOOD ELEVATIONS PANEL #44007C0242G

BASE LINE DATA OBTAINED BY ONSITE SURVEY
DATA CONFORM TO CLASS III & IV AS SPECIFIED IN THE LETTER OF APPROVAL STANDARD AS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
FRESHWATER WETLANDS PROGRAM
APPROVED WITH CONDITIONS
DATE MAY 17 2017 FILE # 17-003Y
NO CHANGES ALLOWED WITHOUT PRIOR APPROVAL
APPROVED PLANS MUST BE AT CONSTRUCTION SITE
Patrick D. Wenck

OWTS SITE PLAN & DETAILS
OWTS DESIGN
A.P. 121 · LOT 2–4
172 BROUILLARD LANE BURRILLVILLE, RI

PREPARED FOR:
RICKY PALLADINI
48 MILL POND RD HARRISVILLE, RI

NICHOLAS J. PIAMPIANO
No. 6512
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
D 3059

NO.	DATE	DESCRIPTION
1	3/26/17	PER RIDEM

DATE: JANUARY 23, 2017
SCALE: AS NOTED
DESIGN/CHECK BY BY: C.S.R.

ADVANCED CIVIL DESIGN, INC.
CIVIL ENGINEERS
7 COUNTRYSIDE LANE
SCITUATE, RI 02857
P1: (401) 644–8656
P2: (401) 473–4404

SHEET NO. 1
1 OF 1