

Location Map  
N.T.S.

Notes:

1. This plan is not a boundary survey. Portion of parcel was depicted in administrative subdivision prepared by Krebs and Lansing Consulting Engineers Inc. and recorded in the Richmond land records. Remaining parcel outline references tax map downloaded from VCGI and physical evidence observed in the field.
2. Topographic information shown on plan was developed by Krebs and Lansing Consulting Engineers Inc. Topographical survey completed in 2019, 2020, and 2021.
3. Wetlands delineation shown on plan was completed by Gilman and Briggs Environmental on November 5, 2019. The areas delineated were characterized as Class II wetland according to the Vermont Wetland Rules last revised April 1, 2017. The location of the wetland flags was completed by Krebs and Lansing Consulting Engineers Inc. on November 6, 2019 and December 16 & 17, 2019.
4. This plan may be copied to the extent necessary to comply with Vermont State Laws pertaining to accessibility to public records. Use of these plans for construction purposes requires the permission of Krebs & Lansing Consulting Engineers.
5. Large animal habitat, imagery, and LIDAR information downloaded from the Vermont Center for Geographic Information (VCGI).

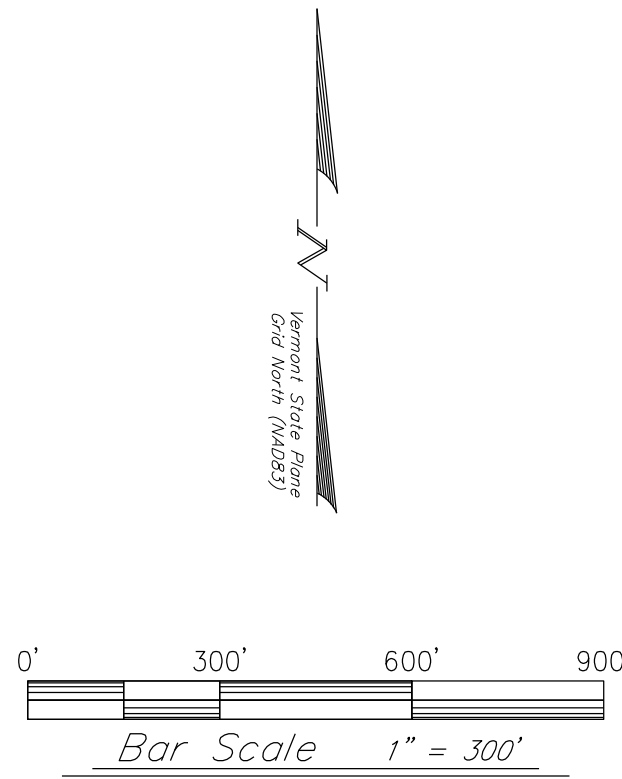
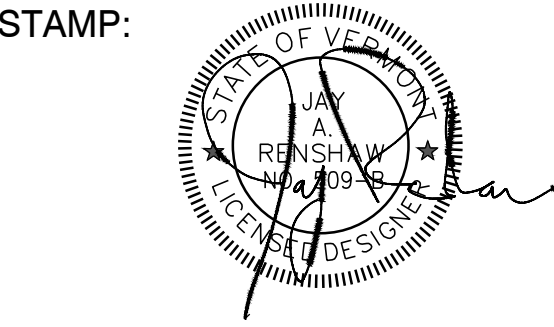
Legend

- Survey control point
- Soil test hole
- Utility pole
- Overhead utility line
- Temporary bench mark
- Approximate property line
- Proposed property line
- Edge of woods/cluster
- Drainage
- Large animal habitat

Randall Farm  
Subdivison

East Hill Road  
Richmond, Vermont

**KREBS & LANSING**  
CONSULTING ENGINEERS  
184 Main Street, Suite 201 P: (802) 878-0375  
Colchester, Vermont 05446 www.krebsandlansing.com



Project:  
Randall Farm  
5 Lot Subdivision  
Peggy M. Farr  
Revocable Trust

Project No.	19327
Scale	1"=300'
Drawn by	JAR/SWH
Checked by	
Date	03/19/2021

Revisions		
No.	Date	Description
1	4-21-2021	5 lot subdivision

Drawing Title  
Overall Parcel Plan

Drawing No.  
C-2.0



East Hill Road  
Richmond, Vermont



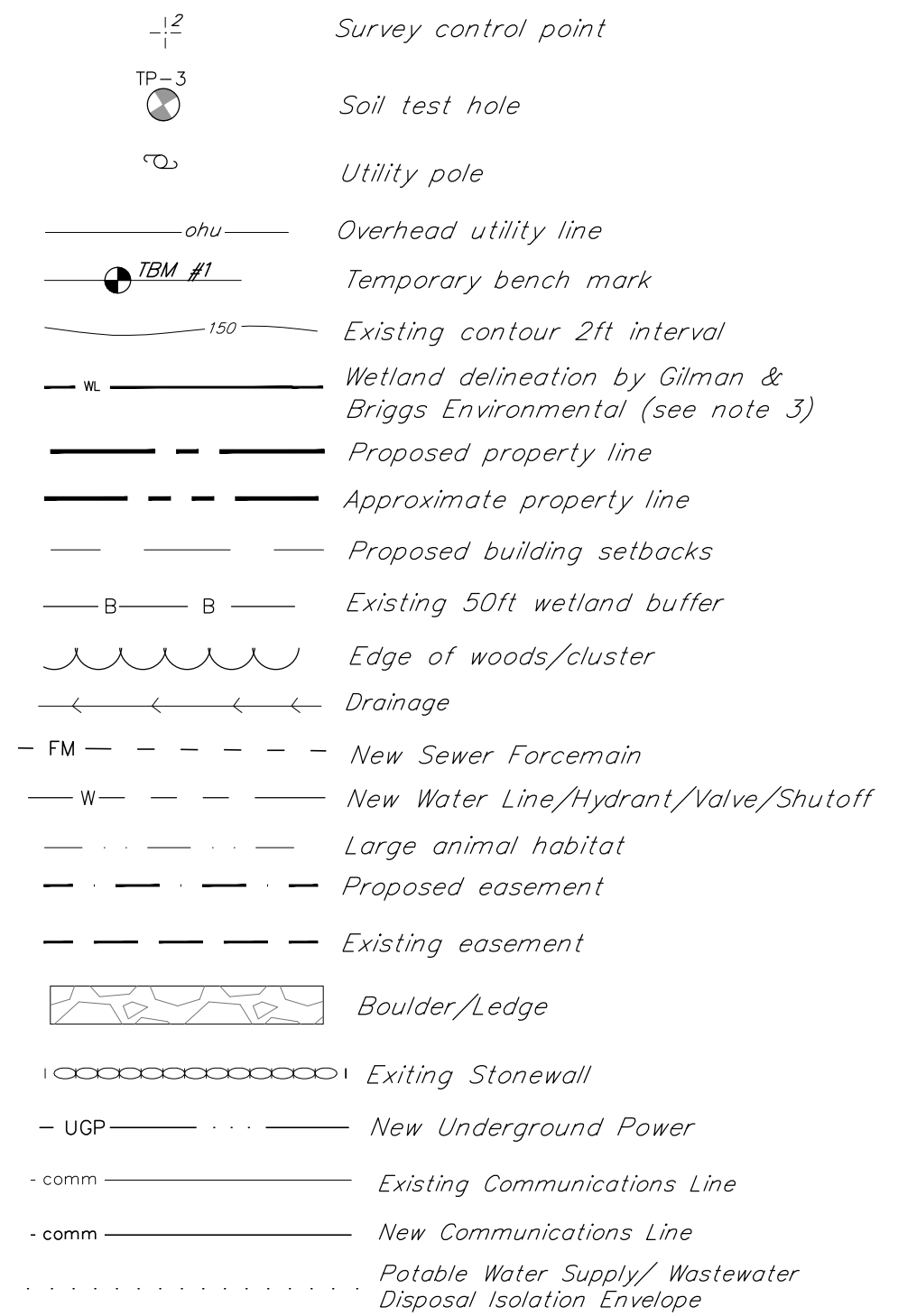
Project No.	19327
Scale	1"=80'
Drawn by	JAR/SWH
Checked by	
Date	03/19/2021

Drawing Title

Overall Site Plan

# C-3.0

9327/dwgs/SP-Farr.dwg









# Randall Farm Subdivison

East Hill Road  
Richmond, Vermont

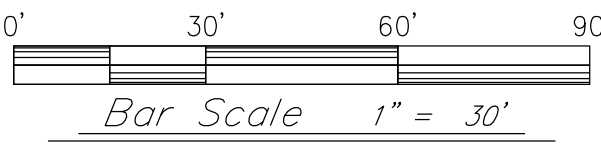
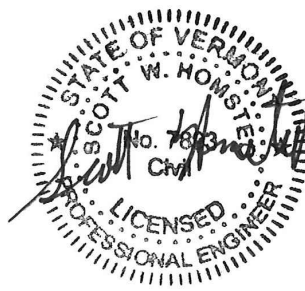
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STAMP:



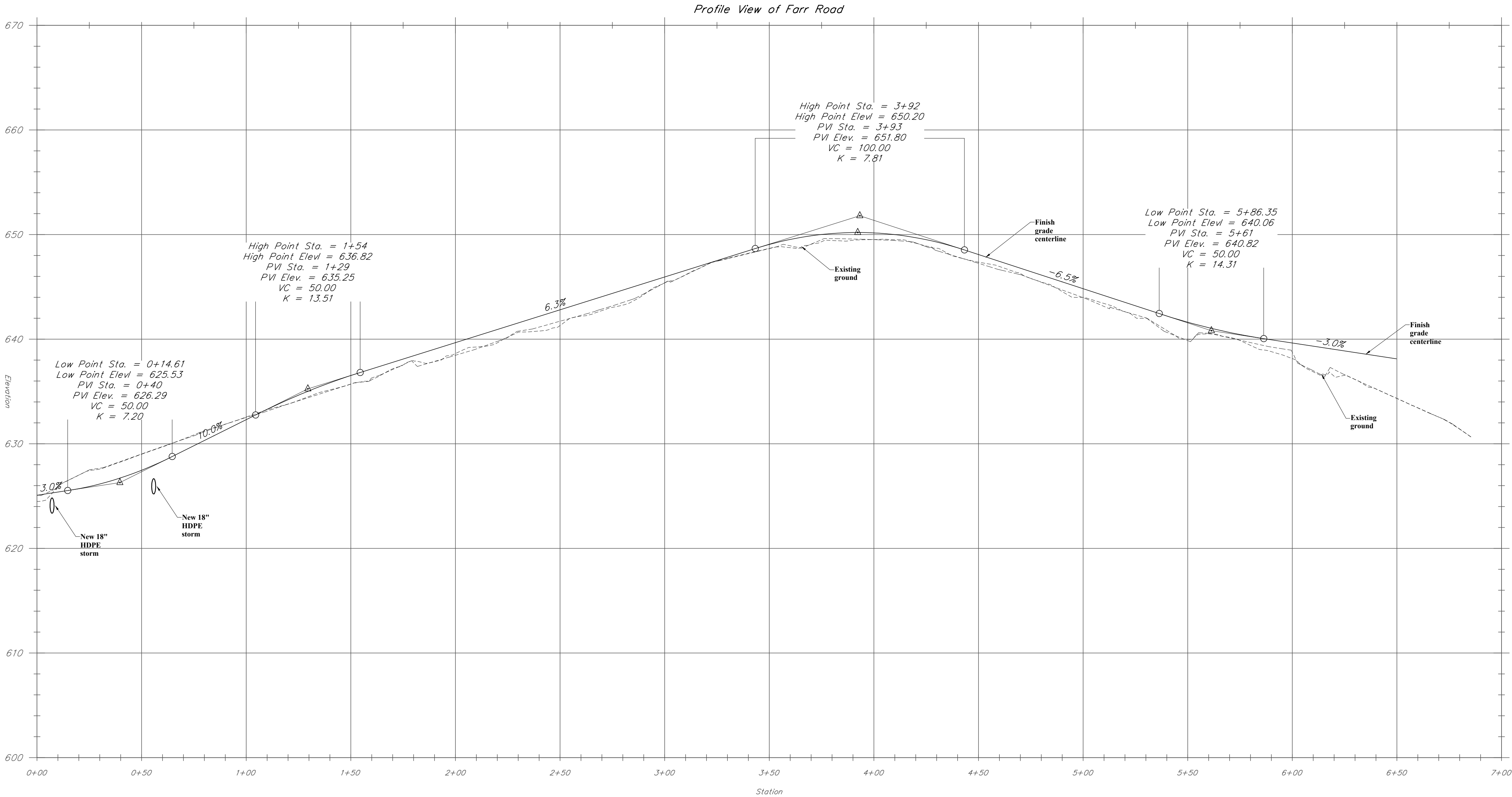
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1	4-21-2021	5 lot subdivision

Drawing Title  
Road Profile

Drawing No.  
C-4.1




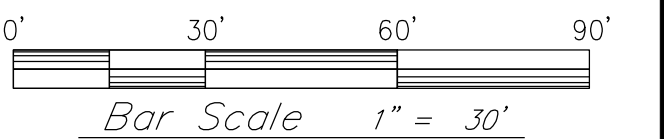
## ROAD PROFILE

HORIZONTAL SCALE 1"=30'  
VERTICAL SCALE 1"=6'



East Hill Road  
Richmond, Vermont

64 Main Street, Suite 201  
Colchester, Vermont 05446

A circular professional engineer seal for the State of Vermont. The outer ring contains the text "STATE OF VERMONT" at the top and "LICENSED PROFESSIONAL ENGINEER" at the bottom. Inside the ring, the name "SCOTT W. HOMSTE" is printed. Below the name, the number "No. 7633" and the letters "CIVIL" are visible. A handwritten signature, "Scott W. Homste", is written across the seal.

Randall Farm  
5 Lot Subdivision  
Peggy M. Farr  
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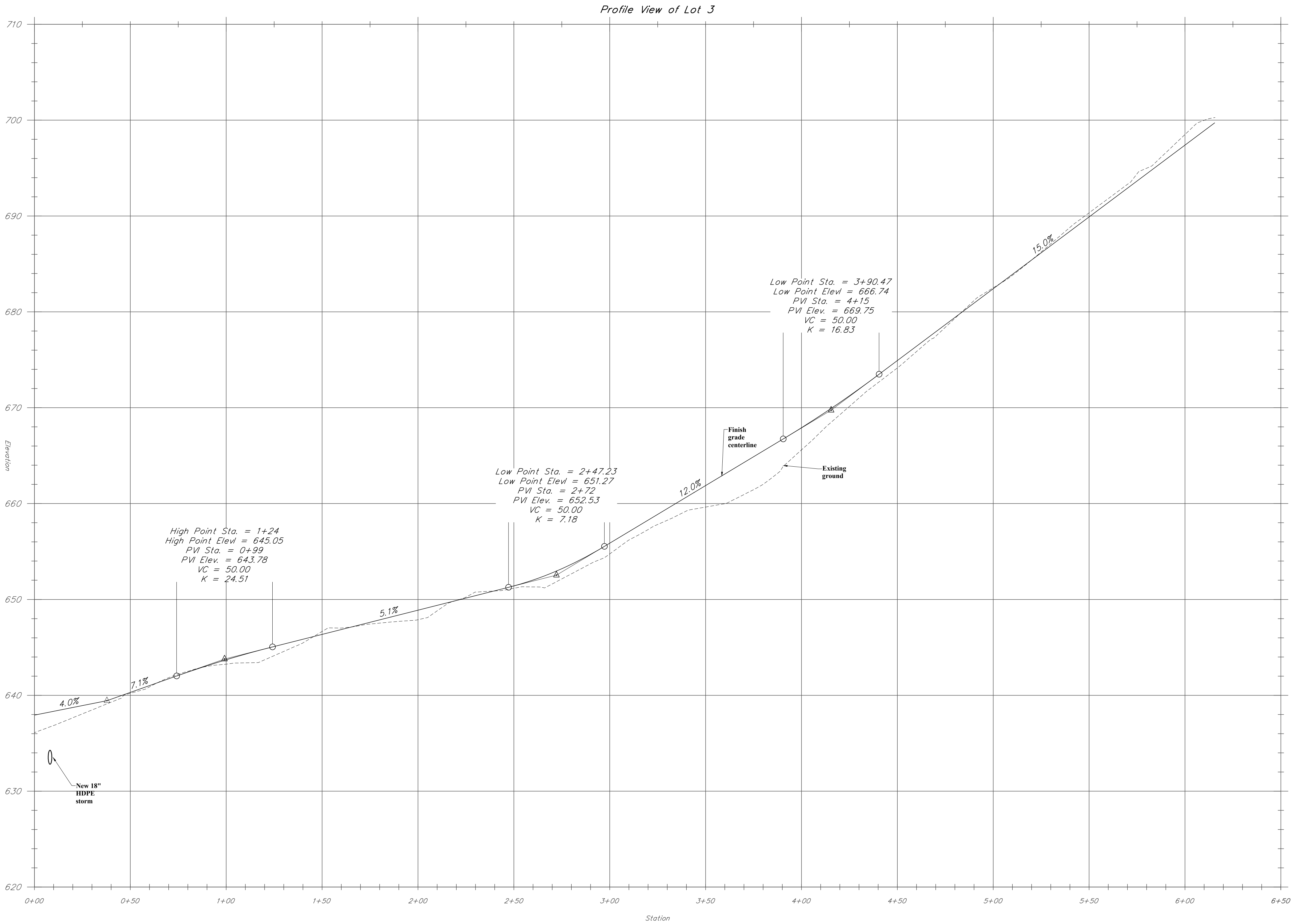
No.	Date	Description
1	4-21-2021	5 lot subdivision

### Lot 3 Driveway Plan

# C-5.0







### LOT 3 PROFILE

HORIZONTAL SCALE 1"=30'  
VERTICAL SCALE 1"=6'

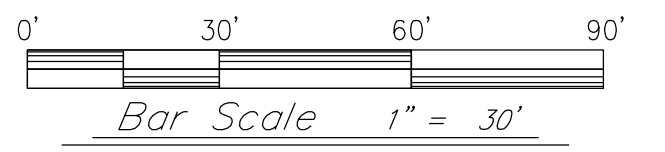
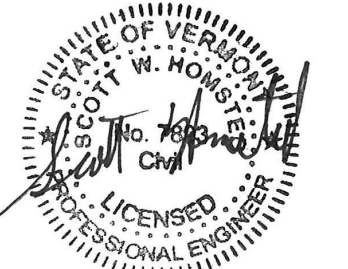
## Randall Farm Subdivison

East Hill Road  
Richmond, Vermont



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STAMP:



Project:

Randall Farm  
5 Lot Subdivision  
Peggy M. Farr  
Revocable Trust

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Scale

as noted

Drawn by

JAR/SWH

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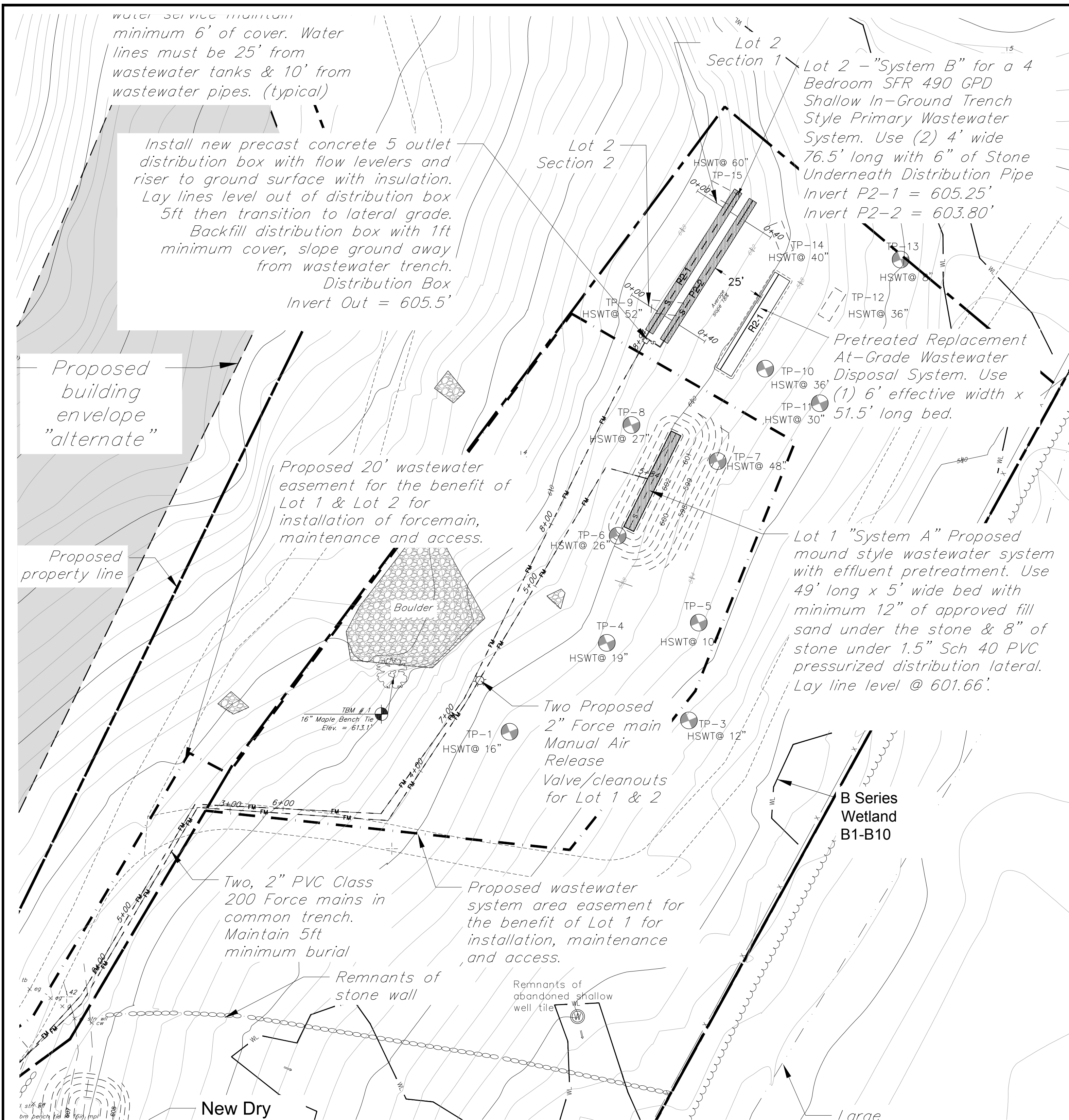
Drawing Title

Lot 3 Driveway  
Profile

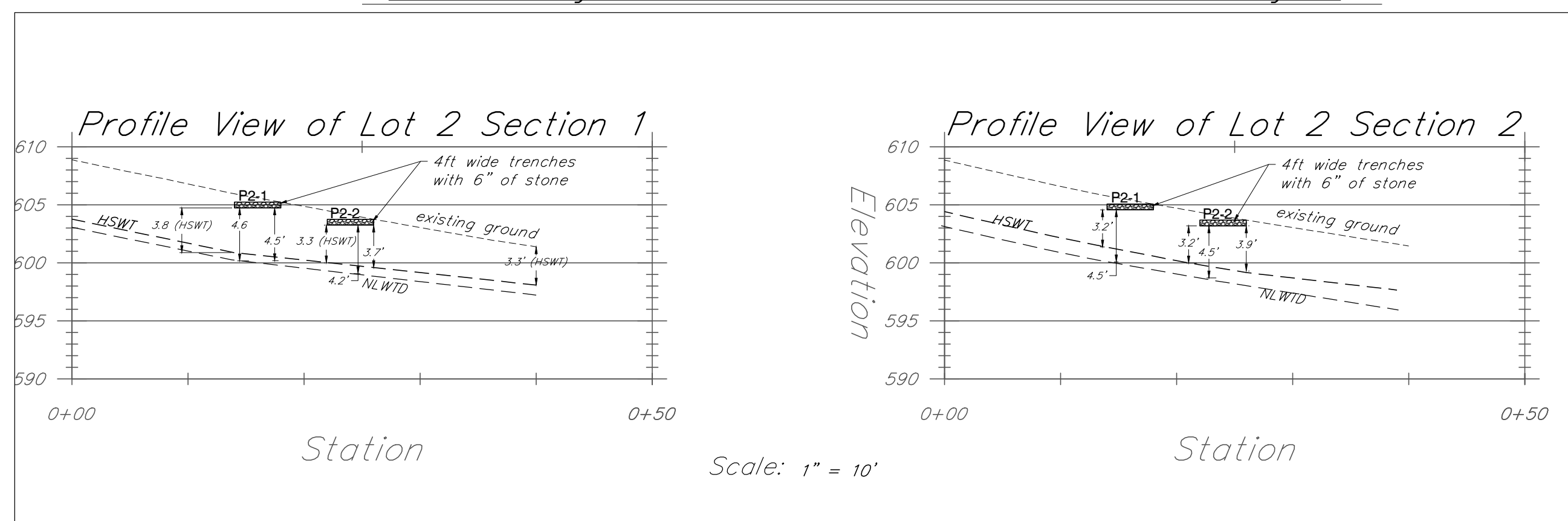
Drawing No.

C-5.1





Profile Cross Sections for Lot 2  
Primary Shallow In-Ground Trench Style



Basis of Design for Lot 1 Mound  
Style Wastewater Disposal System

- Design Flow:
- For an Proposed 4 Bedroom Single Family
  - Design Flow = 3 bedrooms 140gpd \* 3 gals/day/bedroom = 420 gals/day
  - Additional bedroom based on 1 person per/bedroom = 70 gpd
- Application Rate:
- For mound system
  - Application rate =  $Q = 1.0$  gals/s.f./day
  - For filtrate effluent disposal system
  - Application rate =  $2 * Q = 2 * 1.0 = 2.0$  gals/s.f./day
- Required Leach Area:
- Area required =  $\frac{490}{2.0} = 245$  s.f.
  - Use 5' wide Bed
  - Required system length =  $\frac{245 \text{ s.f.}}{5 \text{ ft.}} = 49.0$  ft.
  - Use 1, 49' long x 5' wide bed style mound
- Septic Tank:
- New 1,000 gallon single compartment septic tank with outlet filter and risers to ground surface
- Combined Pump & Pretreatment Station:
- dose = 122.5 gal, Emergency Storage Alarm = 490 gal
  - Pretreatment unit to treat 490 gallons per day of effluent.

Basis of Design for Lot 2  
Primary Shallow In-Ground Trench Style

- Design Flow:
- 1 single family houses (4 bedroom) = 490 G.P.D.
  - For a 4 Bedroom Single Family
  - Design Flow = 3 bedrooms 140gpd \* 3 gals/day/bedroom = 420 gals/day
  - Additional bedroom based on 1 person per/bedroom = 70 gpd
- Application Rate:
- For Shallow In Ground Style Trench
  - Use bed application rate =  $Q = .80$
  - Table 9-3 (Loamy fine sand / SG)
- Required Leach Area for Primary:
- Area required =  $\frac{490 \text{ GPD}}{.8} = 612.5$  s.f.
  - Use 4' shallow in ground trench
  - Required trench length =  $\frac{612.5 \text{ s.f.}}{4 \text{ ft.}} = 153.12$  ft.
  - Use 2, 4' width x 76.5' shallow in ground trench style wastewater systems with 6" crushed stone under distribution pipe for Primary wastewater system
- Septic Tank:
- Use 1000 gallon, single compartment precast concrete septic tank with outlet filter and risers to ground surface
- Pump Station:
- Use 1000 gallon simplex pump station
  - dose = 122.5 gal, Emergency Storage Alarm = 490 gal

Basis of Design for Lot 2  
Replacement At-Grade System

- Design Flow:
- 1 single family houses (4 bedroom) = 490 G.P.D.
  - For a 4 Bedroom Single Family
  - Design Flow = 3 bedrooms 140gpd \* 3 gals/day/bedroom = 420 gals/day
  - Additional bedroom based on 1 person per/bedroom = 70 gpd
- Application Rate:
- For At Grade Application Rate
  - Use application rate =  $Q = .8$
  - Table 9-3 (Loamy fine sand / SG)
- Pretreatment Application Rate:
- For filtrate effluent disposal system
  - Application rate =  $2 * Q = 2 * .8 = 1.6$  gals/s.f./day
- Required Leach Area for replacement:
- Area required =  $\frac{490 \text{ GPD}}{1.6} = 306.25$  s.f.
  - Use 6' effective at grade
  - Required effective length =  $\frac{306.25 \text{ s.f.}}{6 \text{ ft.}} = 51.04$  ft.
  - Use 1, 6' effective width x 51.5' At-grade wastewater systems for replacement wastewater system with pretreated effluent
- Septic Tank:
- Use 1000 gallon, single compartment precast concrete septic tank with outlet filter and risers to ground surface
- Pump / Pretreatment Station:
- Use Advantex AX-20-1B combined pretreatment/pumpstation
  - dose = 122.5 gal, Emergency Storage Alarm = 490 gal
  - Pretreatment unit to treat 490 gallons per day of effluent.

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Performance Based Mounding Analysis  
for Mound System for Lot 1

For Primary System  
Design Flow = 490 gpd  
Natural Ground Slope = 15-20% (min.)  
Receiving Soil Texture = Sandy Loam

From Table 1:  
Linear Loading Rate Factor (l) = 33.7

From Soil Test Logs:  
Seasonal High Water Table at 16 inches 16"- 6" reserved unsaturated soil for assumed induced mounding, (H) = 10"/12" = .83' (based on Test Pits)

Primary Linear Loading Rate: (LLR)  
 $LLR = (h) * (l)$   
 $LLR = (.83) * (33.7) = (27.97)$   
 $LLR = 27.97 \text{ gpd/lf}$

Primary System Length: (L)  
For a Design Flow Q = 490 gpd  
 $L = 490 \text{ gpd} / 27.97 \text{ gpd/lf}$   
 $L = 17.52$  (minimum length required)  
49 linear feet provided

Table 1. Linear Loading Rate Factors Based on Soil Texture and Natural Ground Slope

	LINEAR LOADING RATE FACTORS (f)							
	Natural Ground Slope							
Soil Texture	0-2%	2.1-4%	4.1-6%	6.1-8%	8.1-10%	10.1-15%	15.1-20%	
Coarse sand, Sand, Loamy Coarse Sand, Loamy Sand	7.5	22.4	37.4	52.4	52.4	52.4	52.4	
Coarse Sandy Loam, Sandy Loam, Fine Sand, Very Fine Sand, Loamy Fine Sand, Loamy Very Fine Sand	3.7	11.2	18.7	26.2	33.7	33.7	33.7	
Fine Sandy Loam, Very Fine Sandy Loam	1.5	4.4	7.5	10.5	13.5	18.7	26.2	
Loam	1.1	3.4	5.6	7.9	10.1	14.0	19.6	
Silt Loam	0.7	2.2	3.7	5.2	6.7	9.4	13.1	
Sandy Clay Loam, Silty Clay Loam, Clay Loam	0.4	1.1	1.9	2.6	3.4	4.7	6.5	
Sandy Clay, Silty Clay, Clay	0.2	0.7	1.1	1.6	2.0	2.8	3.9	

Table from "Simplified Procedure for Prescriptive Desktop Mounding Analysis" dated February 6, 2003, published by State of Vermont Agency of Natural Resources Department of Environmental Conservation, Wastewater Management Division.

Lot 1 Mound Elevation Information

	Native Existing Ground	Bottom Stone	Pipe Invert	Top Stone	Finish Grade
Replacement	600.00'	601.00'	601.66'	602.00'	603.00'

Lot 2 Primary Shallow In-ground  
Trench Elevations Information

TRENCH NO.	EXISTING GROUND	BOTTOM STONE	PIPE INVERT	TOP STONE	FINISH GRADE
(P2-1)	605.25'	604.75'	605.25'	605.75'	606.25'
(P2-2)	603.80'	603.30'	603.80'	604.30'	604.80'

Performance Based Mounding Analysis  
for At-Grade Lot 2 Replacement System

For Primary System  
Design Flow = 490 gpd  
Natural Ground Slope = 15-20% (min.)  
Receiving Soil Texture = Loamy fine sand / SG

From Table 1:  
Linear Loading Rate Factor (l) = 33.7

From Soil Test Logs:  
Seasonal High Water Table at 30 inches 30"- 6" reserved unsaturated soil for assumed induced mounding, (H) = 24"/12" = 2.0' (based on Test Pits)

Primary Linear Loading Rate: (LLR)  
 $LLR = (h) * (l)$   
 $LLR = (2.0) * (33.7) = 67.4$   
 $LLR = 67.4 \text{ gpd/lf}$

Primary System Length: (L)  
For a Design Flow Q = 490 gpd  
 $L = 490 \text{ gpd} / 67.4 \text{ gpd/lf}$   
 $L = 7.2$  (minimum length required)  
51.5 linear feet provided

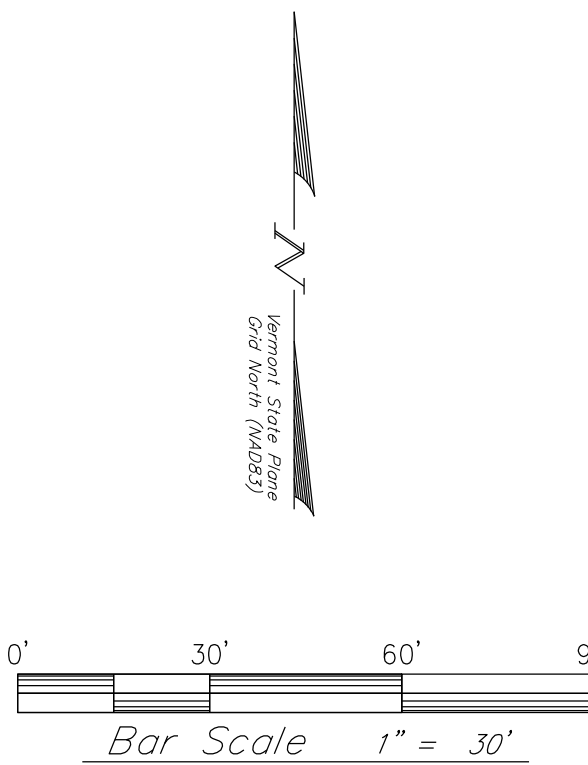
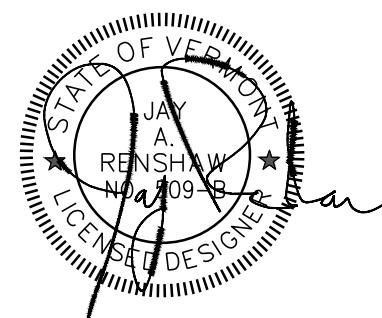
Legend

- Survey control point
- Soil test hole
- Temporary bench mark
- Finish Contour
- Overhead Power
- Existing Contour
- Existing Underground Power
- New Water Line/Hydrant/Valve/Shutoff
- Survey Control Point
- Approximate Property Line
- Potable Water Supply/ Wastewater Disposal Isolation Envelope
- Proposed Easement
- Proposed Property Line

Randall  
Farm  
Subdivison

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1	4-21-2021	5 lot subdivision
2	06-08-2021	ww cross sections added

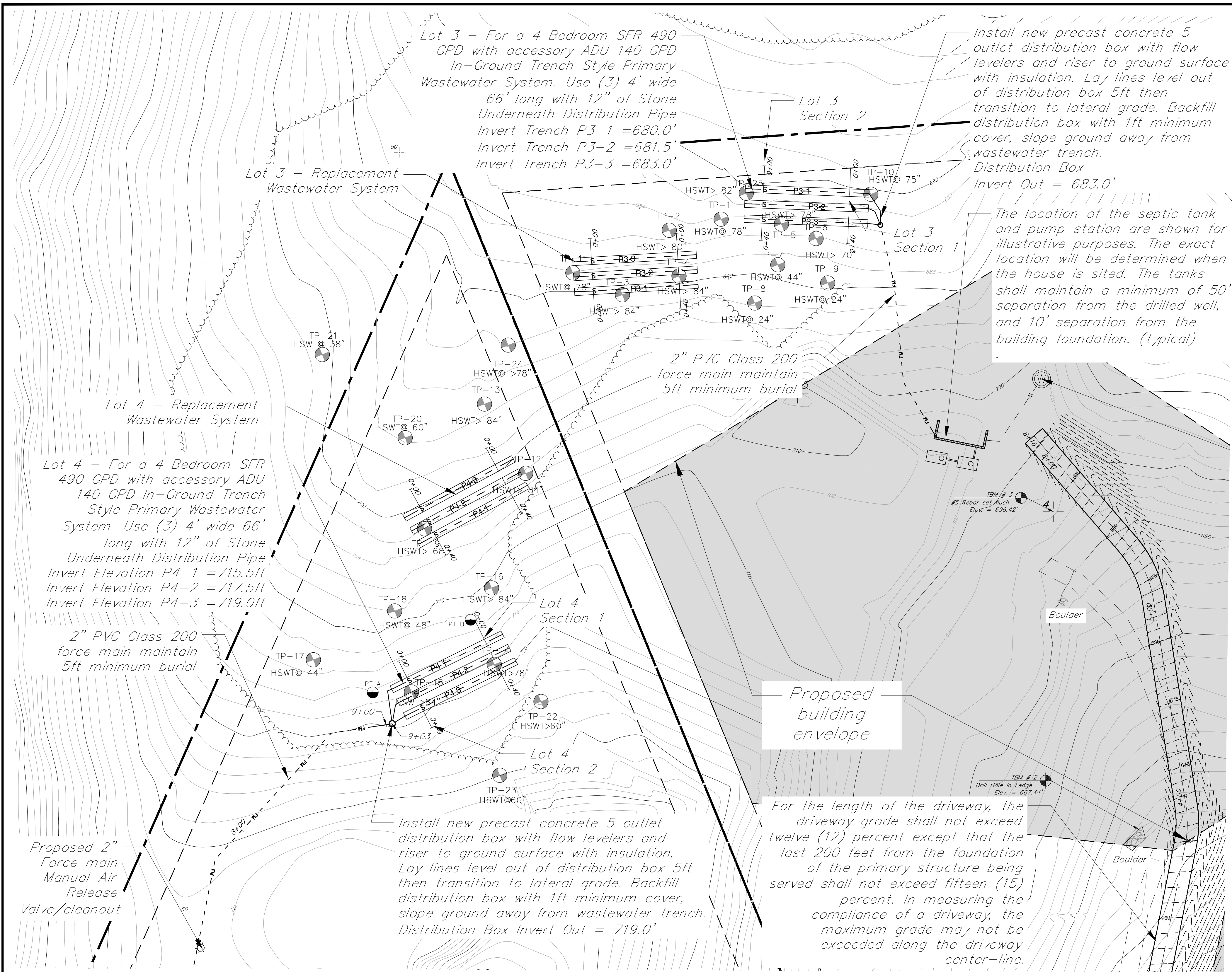
Drawing Title  
Wastewater Disposal  
Plan

Drawing No.

C-7.0

For Permit Review





Basis of Design for Lots 3 & 4 Primary & Replacement In-Ground Trench Style Wastewater System

Design Flow:

- For a new 4 bedroom residence & 1 bedroom ADU
- Design Flow = 3 bedrooms \* 140 gals./day/bedroom + 1 bedroom @ 70 gpd + 1 bedroom accessory apartment \* 140 gals./day/bedroom
- Total Design Flow = 420 gals./day + 70 gals./day + 140 gals./day = 630 gals./day

Application Rate:

For In Ground Trench Style System  
Table 9-3 (Loamy fine sand / SG) application rate = Q = 1.0)

Percolation Rate:

- The second slowest percolation rate, t, = 13 min./inch
- For inground system with 12" of stone under the pipes,
- Application rate =  $\frac{3}{t} = \frac{3}{13} = .83$  gals/s.f./day
- Use percolation application rate = Q = .80

Required Leach Area for Primary:

- Area required =  $\frac{630 \text{ GPD}}{.8} = 787.5 \text{ s.f.}$
- Use 4' in ground trench
- Required bed length =  $\frac{787.5 \text{ s.f.}}{4 \text{ ft.}} = 196.87 \text{ ft.}$
- Use 3, 4' width x 66' in ground trench style wastewater systems with 12" crushed stone under distribution pipe for Primary wastewater system

Septic Tank:

- Use 1500 gallon, 2 compartment precast concrete septic tank with outlet filter and risers to ground surface

Pump Station:

- Use 1000 gallon simplex pump station
- dose = 157.5 gal, Emergency Storage Alarm = 630 gal

Percolation Tests

Test #	Percolation Rate
A	14 min./inch
B	13 min./inch

Legend

- PT Percolation testing
- Survey control point
- Soil test hole
- TBM #1 Temporary bench mark
- Finish Contour
- Overhead Power
- Existing Contour
- Existing Underground Power
- New Water Line/Hydrant/Valve/Shutoff
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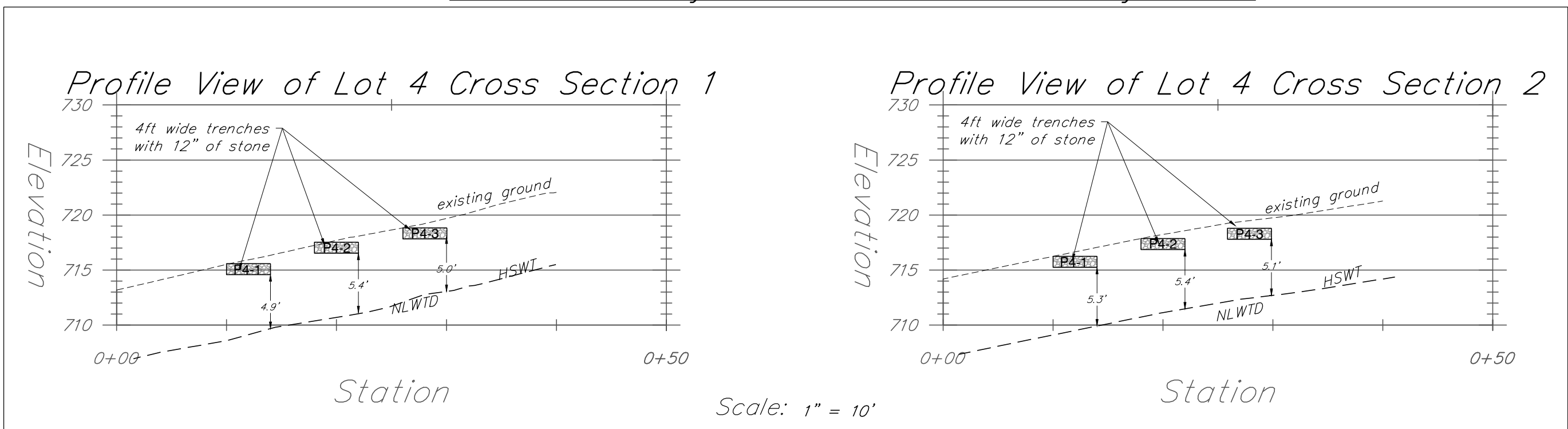
Lot 3 Primary In-ground Trench Elevations Information

TRENCH NO.	EXISTING GROUND	BOTTOM STONE	PIPE INVERT	TOP STONE	FINISH GRADE
(P3-1)	680.0'	679.00'	680.00'	680.50'	681.00'
(P3-2)	681.50'	680.50'	681.50'	682.00'	682.50'
(P3-3)	683.00'	682.00'	683.00'	683.50'	684.00'

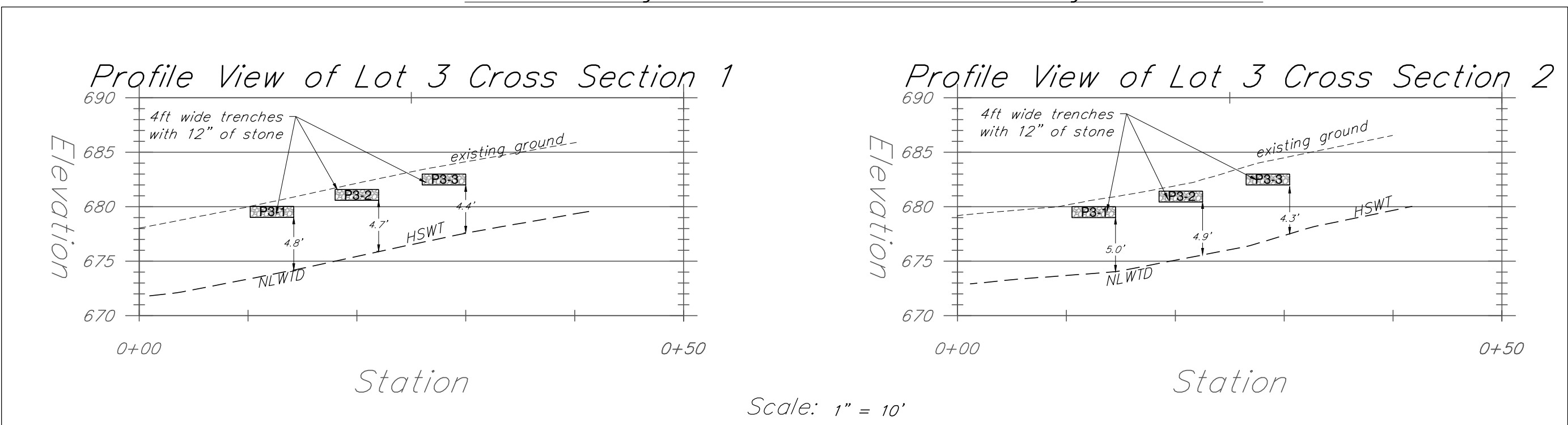
Lot 4 Primary In-ground Trench Elevations Information

TRENCH NO.	EXISTING GROUND	BOTTOM STONE	PIPE INVERT	TOP STONE	FINISH GRADE
(P4-1)	715.50'	714.50'	715.50'	716.00'	716.50'
(P4-2)	717.50'	716.50'	717.50'	718.00'	718.50'
(P4-3)	719.00'	718.00'	719.00'	719.50'	720.00'

Profile Cross Sections for Lot 4 Wastewater System Primary In-Ground Trench Style



Profile Cross Sections for Lot 3 Wastewater System Primary In-Ground Trench Style

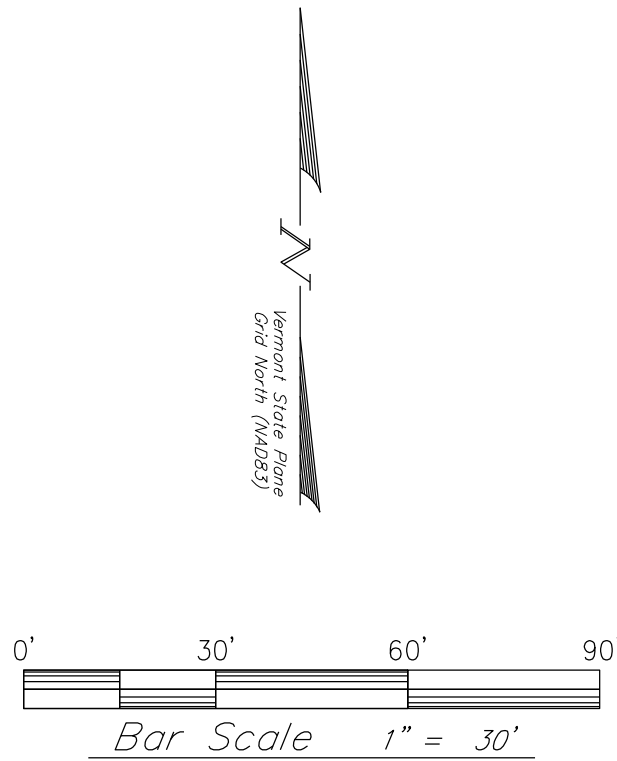
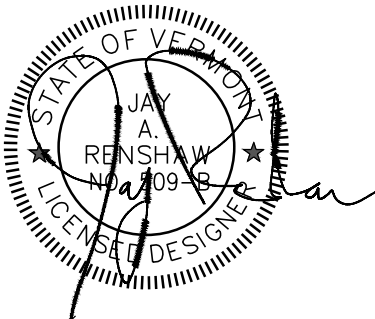


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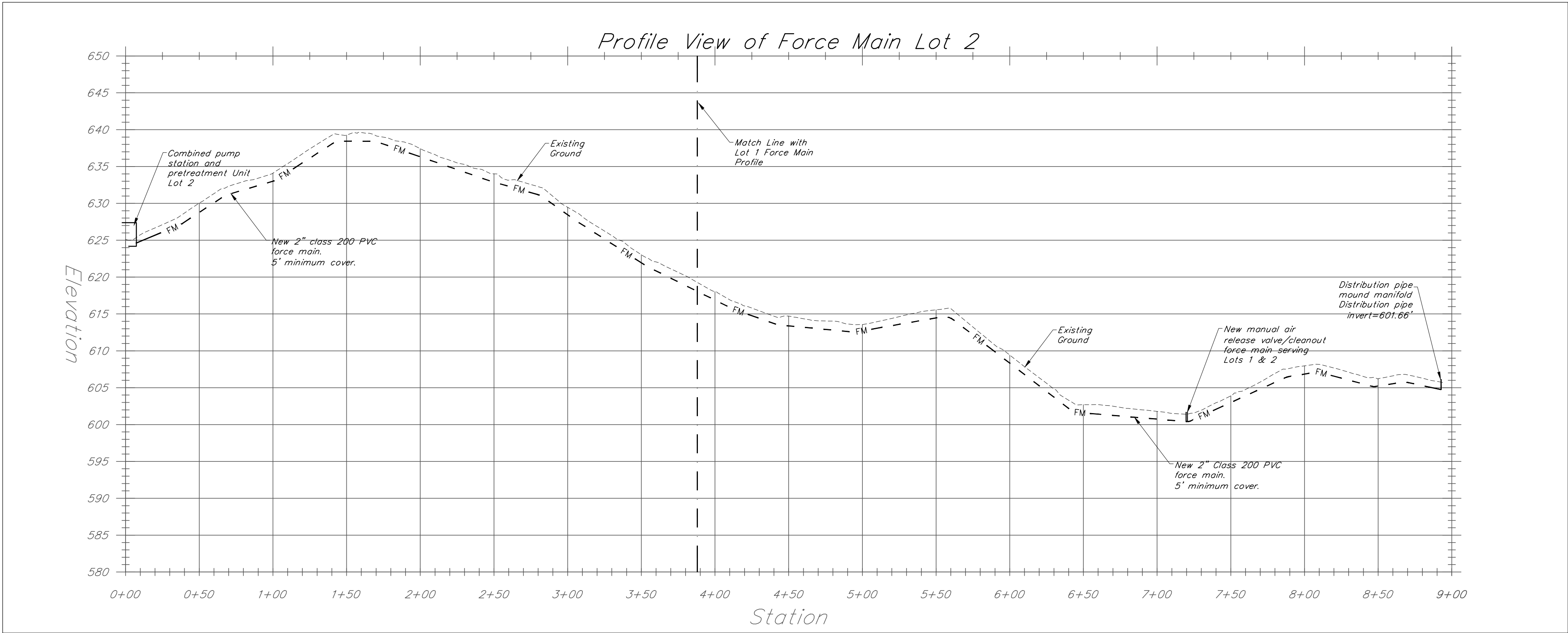
Drawing Title

Wastewater Disposal  
Plan

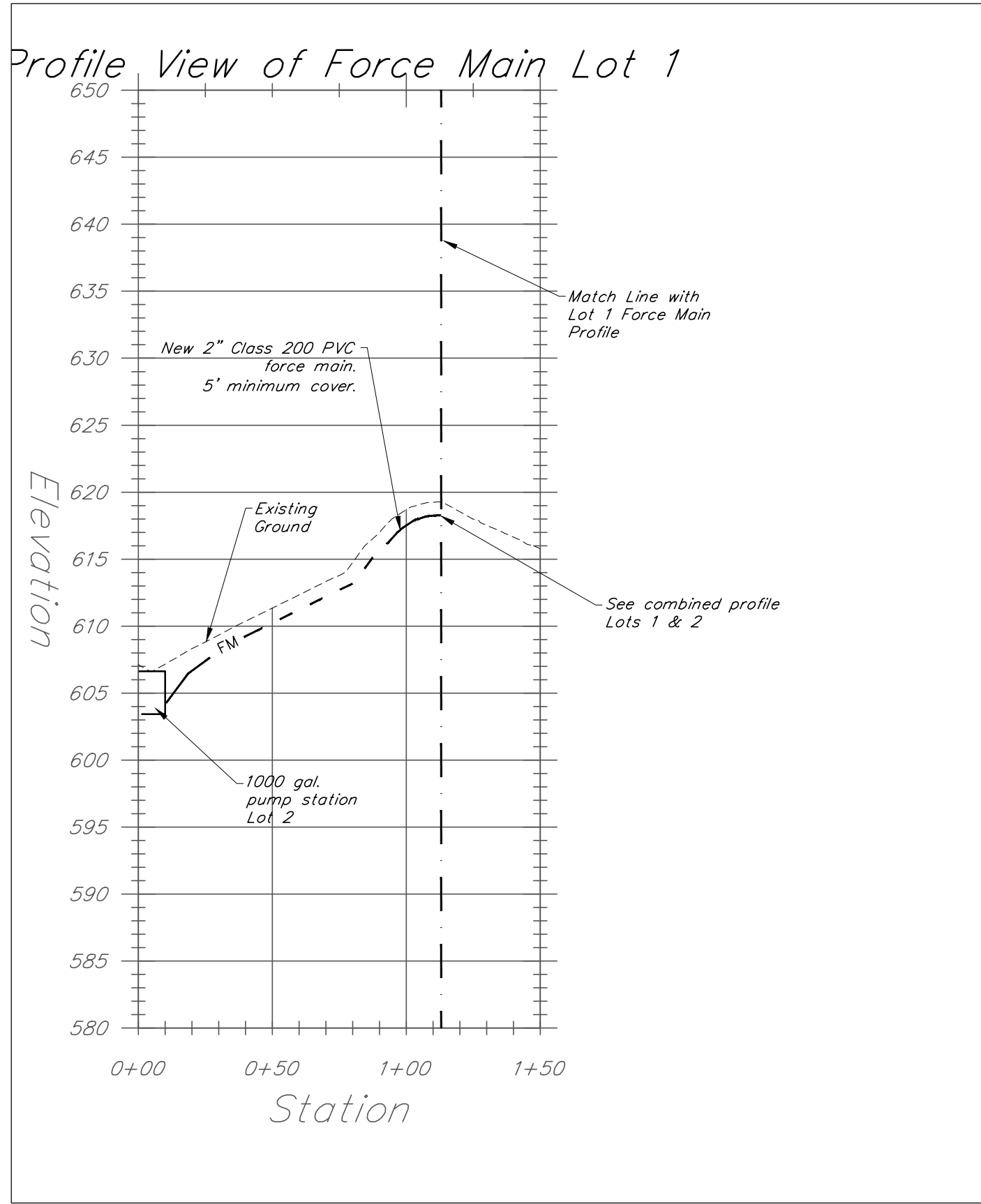
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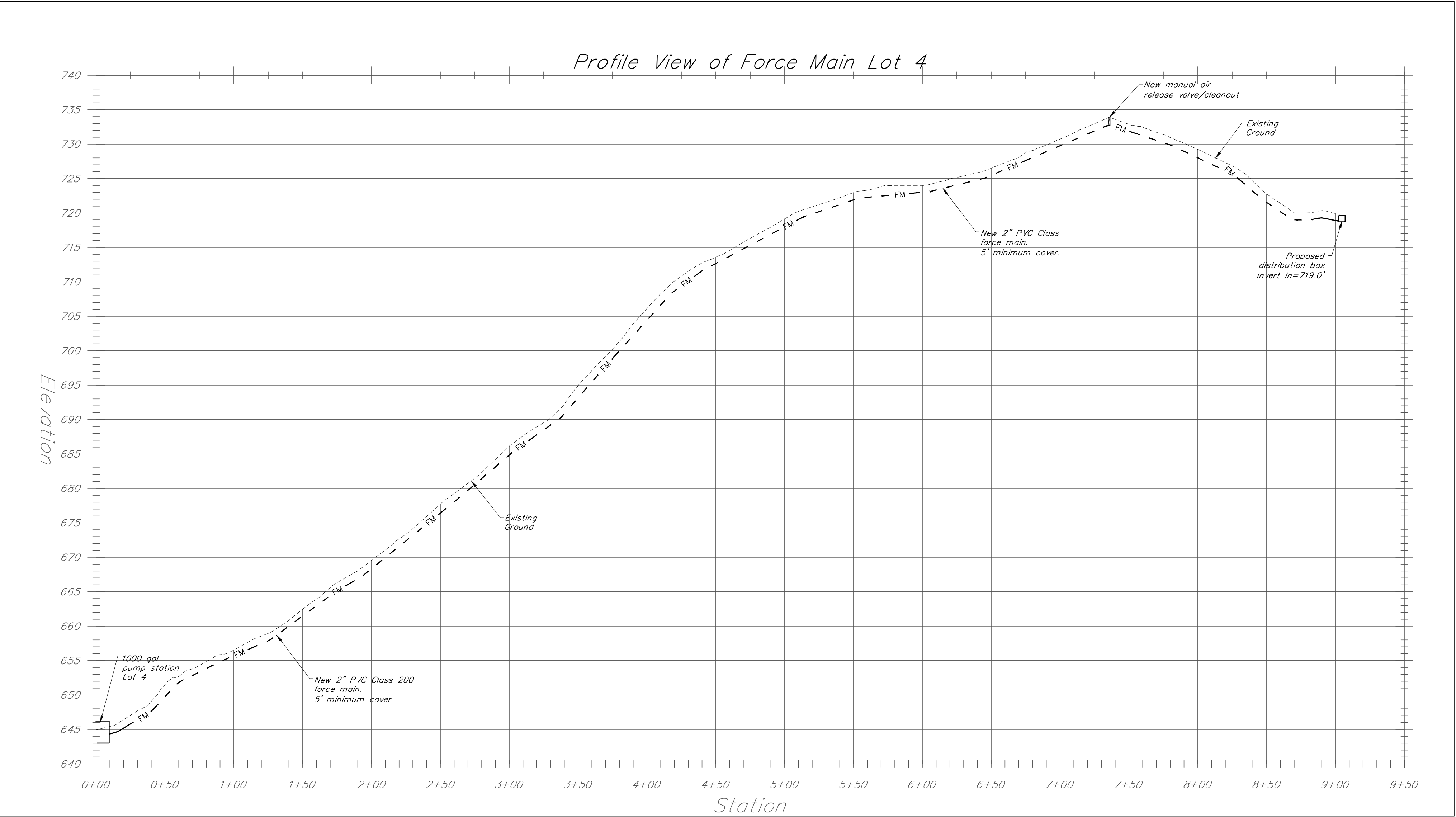




Force Main Profile Lot 1 & 2  
1" = 50' Horizontal  
1" = 10' Vertical



Force Main Profile Lot 2  
1" = 50' Horizontal  
1" = 10' Vertical

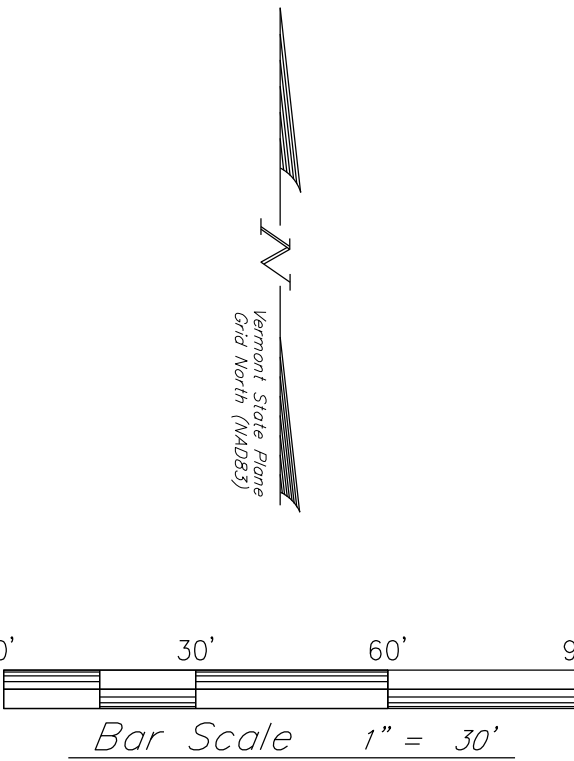
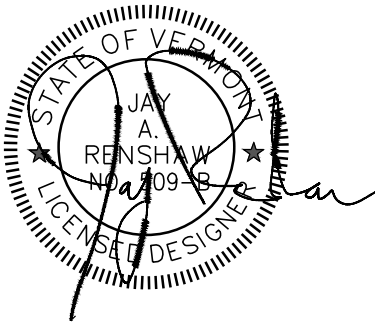


Force Main Profile Lot 4  
1" = 50' Horizontal  
1" = 10' Vertical

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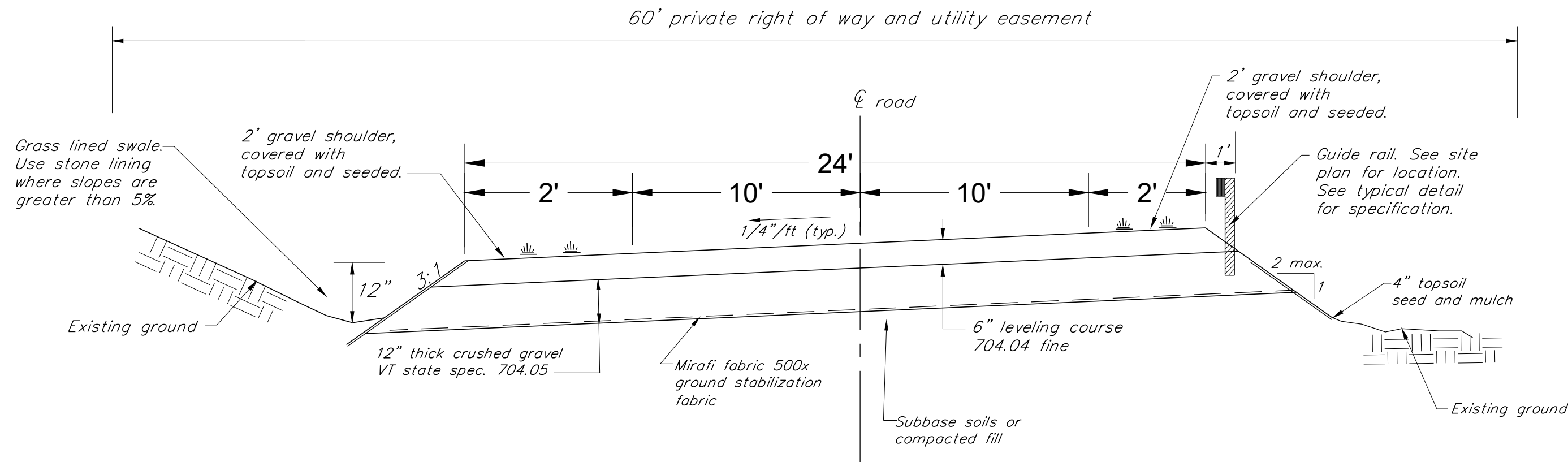
Revisions		
No.	Date	Description

Drawing Title  
**Wastewater Disposal  
Profile Plan**

Drawing No.  
**C-9.0**

For Permit Review

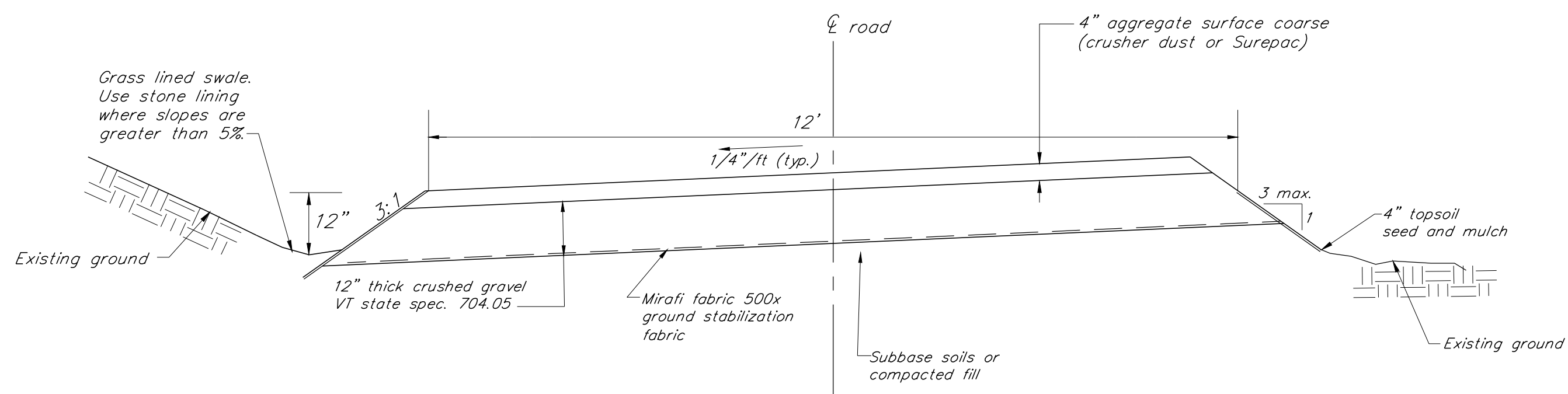




Typical Section

Private Road

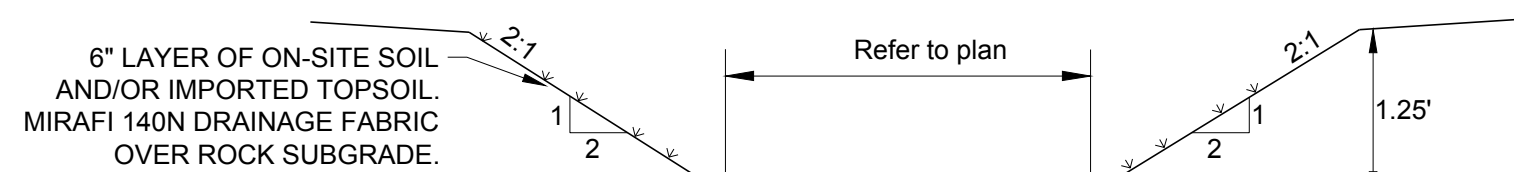
N.T.S.



Typical Section

12' Driveway

N.T.S.



#### NOTES

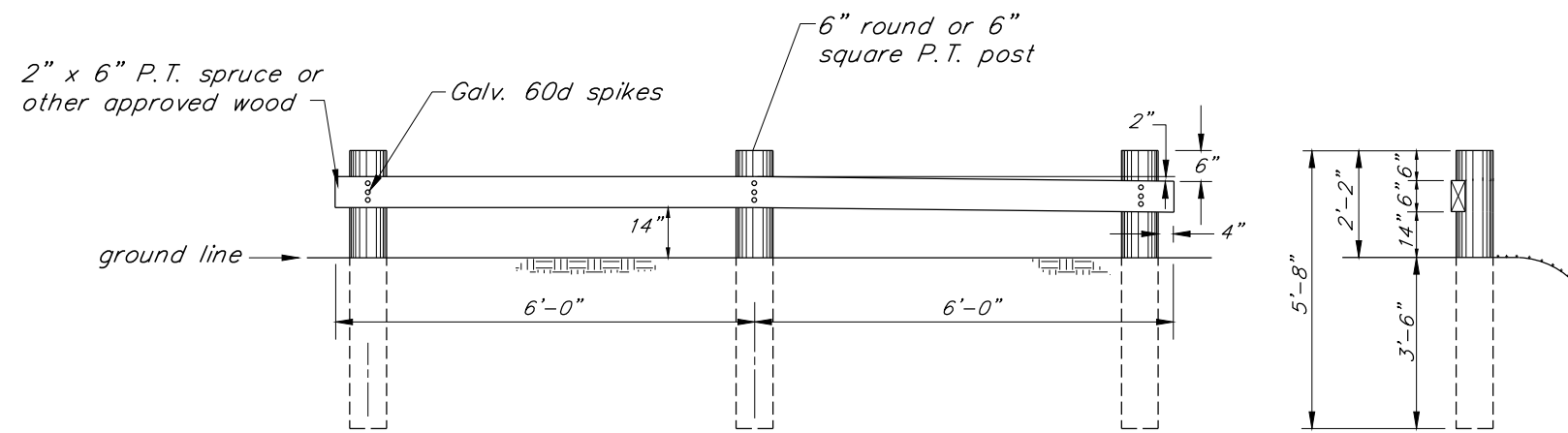
1. TYPICAL GRASSED SWALE. SEE PLAN VIEW FOR LOCATIONS.
2. TYPICAL SIDE SLOPES TO BE 2:1.
3. DURING CONSTRUCTION TEMPORARILY SEEDED AND HEAVILY MULCHED. EROSION CONTROL BLANKET MAY BE NECESSARY IN STEEPER SLOPES, INSTALL BLANKET IF EROSION PERSISTS AND/OR GRASS IS HAVING DIFFICULTY GERMINATING. POST CONSTRUCTION CONTRACTOR SHALL RE-GRADE ANY EROSION, REMOVE BUILD UP SEDIMENTS, PERMANENT SEED AND HEAVILY RE-MULCH.
4. CROSS-SECTION SHALL BE EXCAVATED TO NEAT LINES AND GRADES. OVER-EXCAVATED AREAS SHALL BE BACKFILLED WITH MOIST SOIL COMPACTED TO DENSITY OF SURROUNDING MATERIAL.
5. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF IN APPROVED UPLAND AREA SUCH THAT IT DOES NOT INTERFERE WITH FUNCTION.

GRASS SWALE CROSS SECTION

N.T.S.

#### Road & Driveway Construction Notes

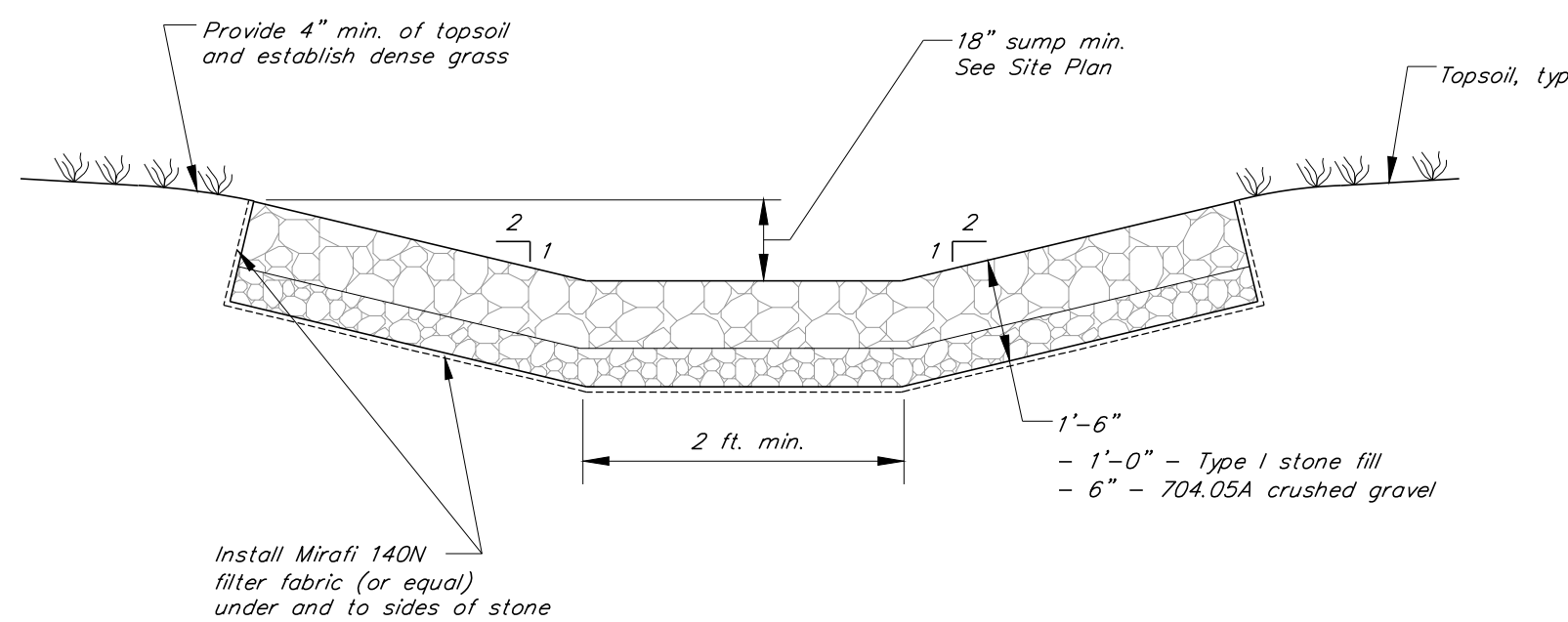
1. New road shall be constructed to the line and grade shown on the drawings. The road and utility locations shall detailed unless otherwise shown.
2. Methods for construction of sub-base shall conform to Vt. Highway Specs. (2018), 203.12 "subgrade" in all respects or as determined by the Engineer.
3. Gravel sub-base for pavement shall conform to Vt. Highway Specs. (2018), 704.04.
4. Leveling course shall conform to Vt. Highway Specs. (2018), 704.05 table 704.05A, fine. Shoulders shall conform to section 704.12, Aggregate for Shoulders.
5. Any sub-base or subgrade disturbed by Contractor, or rendered unsuitable by construction machinery shall be removed and replaced with approved granular backfill. Sub-base shall have 95% of maximum compaction density before road construction.
6. The Contractor shall be responsible for all compaction tests for the road, foundations and utility trenches.
7. Fill material for road embankment shall be approved by the Engineer. Fill shall be placed in 6" lifts and wetted and compacted with satisfactory compaction equipment. The Contractor shall perform a compaction test every 100' at the limits of the filling operation at every 12" of lift and shall recompact areas with less than 95% of maximum density, (Standard Proctor).
8. The Contractor shall furnish a loaded 10 wheeled dump truck for proof rolling the subgrade in the presence of the Engineer. The Engineer may request additional subgrade soils to be excavated and additional gravel base if results of proof roll show wheel rutting more than 2" deep, or shoving of the subgrade soil by the trucks wheels.
9. Road in fill sections shall be placed and compacted a minimum of 3 feet above top of any utility to be installed, before trench is excavated for pipe placement. In trenches, and cut sections the Contractor shall provide all necessary sheeting, shoring and bracing to maintain compliance with all OSHA/VOSHA regulations. Trench compaction tests shall be every 150 feet along the trench at every 12" of lift. Compaction shall be 90% of Standard Proctor outside of the Right of Way and 95% Standard Proctor within the Right of Way limits.



Planks 16" in length to be used whenever possible. Posts 6" square may be used in place of round posts. First and last post of each section to be set back 12" from the general line of the posts, when 4 or more post are required. All wood members shall be pressure treated.

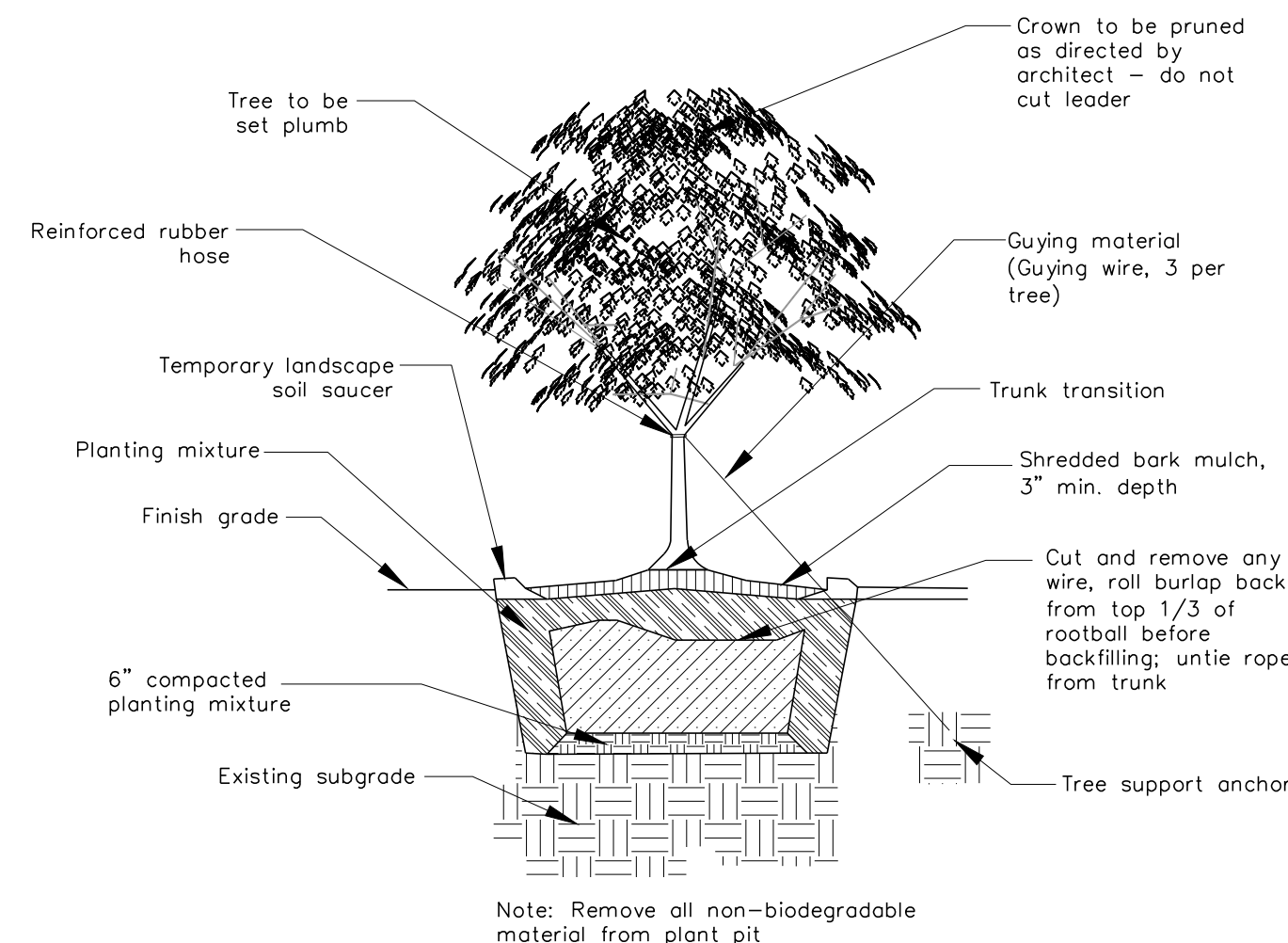
Guide Rail Detail

N.T.S.



STONE SWALE CROSS SECTION

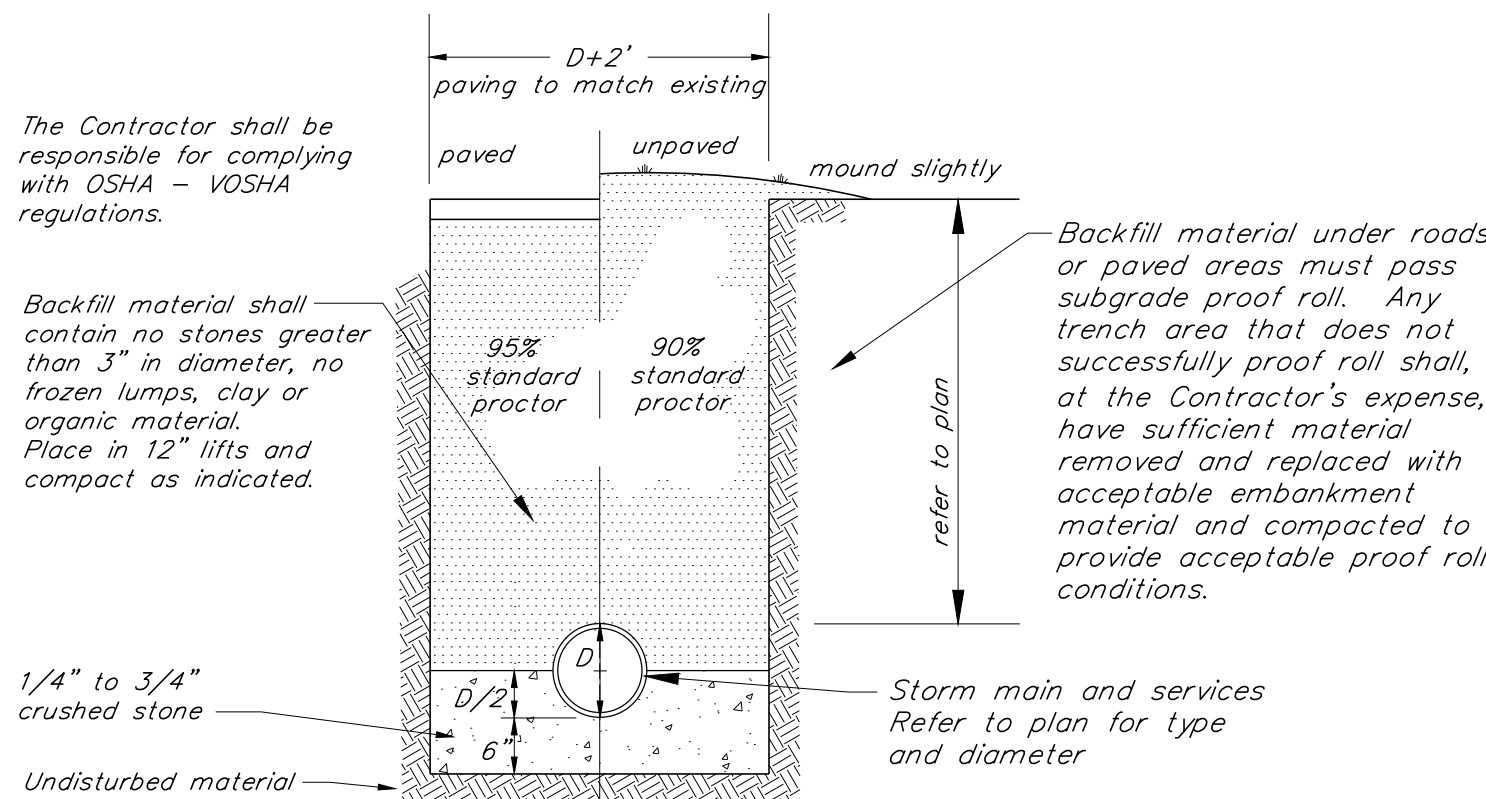
N.T.S.



Typical Tree Planting in Landscape Detail

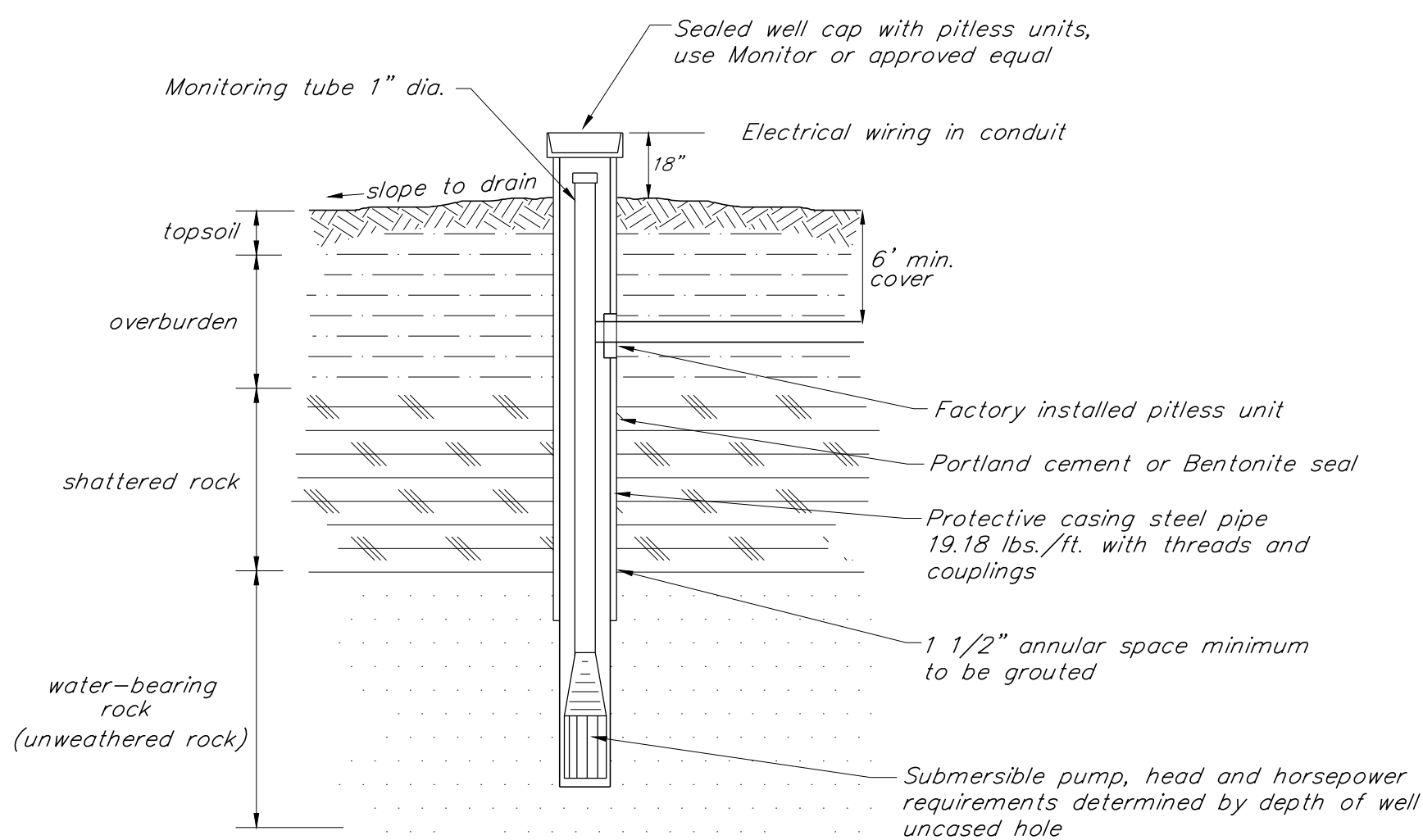
N.T.S.

PVC SDR 35 pipe shall not be installed when the temperature drops below 32° F or goes above 100° F unless prior approval is obtained from the Engineer. Extra care is required when handling PVC pipe during cold weather. PVC pipe shall not be stored outside and exposed to prolonged periods of sunlight as pipe discoloration and reduction in pipe impact strength will occur. If PVC pipe is to be stored on site for 1 month or longer it shall be covered with canvas or other opaque material.



Typical Storm Trench Detail

N.T.S.



Note: Complete water system shall be installed and tested in accordance with the latest AWWA standards and Vermont Health Regulations.

Typical Drilled Well Section

N.T.S.

# Randall Farm Subdivison

East Hill Road  
Richmond, Vermont



164 Main Street, Suite 201  
Colchester, Vermont 05446  
P: (802) 878-0375  
www.krebsandlansing.com

#### STAMP:



#### Project:

Randall Farm  
5 Lot Subdivision  
Peggy M. Farr  
Revocable Trust

#### Project No.

19327

#### Scale

N.T.S.

#### Drawn by

JAR/SWH

#### Checked by

#### Date

03/19/2021

#### Revisions

No.	Date	Description
1	04/21/2021	5 lot subdivision

#### Drawing Title

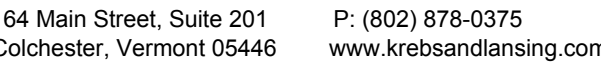
Road & Driveway  
Details

#### Drawing No.

CD-1



East Hill Road  
Richmond, Vermont



Randall Farm  
5 Lot Subdivision  
Peggy M. Farr  
Revocable Trust

Revisions		
No.	Date	Description
1	04/21/2021	5 lot subdivision

Drawing No.

**CD-2**



DP ID	BOTTOM POND ELEV. (FT.)	6" ORIFICE OUTLET ELEV. (FT.)	12" SECONDARY ORIFICE OUTLET ELEV. (FT.)	BROAD CRESTED WEIR OVERFLOW ELEV. (FT.)	TOP OF POND ELEV. (FT.)
#1	624.0'	624.0'	625.5'	626.25'	627.0'
#2	605.75'	605.75'	607.0'	608.25'	609.0'

N.T.S

CONSTRUCTION SEQUENCE:

CONSTRUCTION CAN BE STARTED NO LATER THAN SEPTEMBER 1ST. IF SIDE SLOPES AND BANKS CANNOT BE REVEGETATED AND STABILIZED BY THE END OF THE GROWING SEASON, BASIN CONSTRUCTION SHOULD BE DELAYED TO THE FOLLOWING GROWING SEASON. SEEDING MUST OCCUR BEFORE SEPTEMBER 15TH OR OTHER STABILIZATION MEASURES MUST BE IMPLEMENTED BEFORE WINTER. DO NOT DISCHARGE STORMWATER TO THE BASIN UNTIL THE BASIN IS FULLY STABILIZED OR PROVIDES A SEDIMENT BARRIER AT THE OUTLET.

CONSTRUCTION OVERSIGHT:

- EMBANKMENT FILLS SHALL BE FREE OF FROZEN SOIL, ROCKS OVER 6" SOD, BRUSH STUMPS, TREE ROOTS, WOOD, OR OTHER PERISHABLE MATERIALS. EMBANKMENT FILLS SHALL BE COMPACTED USING METHODS THAT WOULD GUARANTEE A FILL DENSITY OF 90% OF THE MAXIMUM DENSITY AS DETERMINED BY STANDARD PROCTOR (ASTM-698). FILLS SHALL BE CONSTRUCTED IN 12" LIFTS.
- ALL AREAS OF CONCENTRATED FLOW IN OR OUT OF THE BASIN ARE TO BE ARMORED IN STONE RIP-RAP.
- ALL MATERIAL USED FOR THE CONSTRUCTION OF THE BASIN MUST BE CONFIRMED AS SUITABLE BY THE DESIGN ENGINEER.
- INSPECTION OF THE DRY POND BY A PROFESSIONAL ENGINEER SHALL CONSIST AT A MINIMUM OF WEEKLY SITE VISITS TO THE SITE TO INSPECT EACH DRY POND. THIS SHALL INCLUDE MATERIAL AND PLACEMENT, FROM INITIAL GROUND DISTURBANCE TO FINAL STABILIZATION OF THE POND SIDESLOPES. INSPECTIONS SHALL INCLUDE WITNESSING THE INSTALLATION OF ALL INLET AND OUTLET PIPES, OUTLET STRUCTURES, BERMS, AND EMERGENCY SPILLWAYS.









General Notes

1. The Contractor shall be responsible for the complete systems as shown and detailed.
2. The location of underground utilities is not warranted to be exact or complete. All off-site backfill, sheering and shoring, dewatering, clearing and grubbing, erosion control, dust control, traffic control, grading and landscaping and all other incidentals shall be included as part of the required work.
3. Repair of all disturbed areas, grading, seeding, mulching, repair of roads and curbs, paving and other incidentals are included as part of the required work.
4. The methods and materials of construction shall conform to the Environmental Protection Rule specifications and shall be in conformance with all permits and approvals issued for this project.
5. All disturbed areas shall be loamed, seeded, mulched and maintained by the Contractor until permanent ground cover is established.
6. Once new subgrade is exposed, Contractor shall take every precaution to keep equipment off exposed area and to avoid compaction of the soil.

Inground System Construction Notes

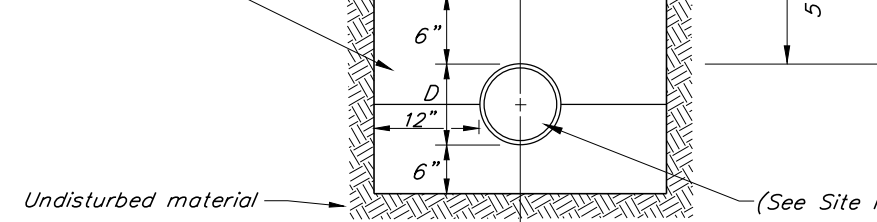
1. The Contractor shall submit samples of stone and a sieve analysis of any sand required for Engineer's approval before construction begins.
2. The Contractor shall notify the Engineer 24 hours in advance of the beginning of construction. Work shall not proceed during periods of prolonged rain, when frost is in the ground or when temperatures are below 32 degrees F.
3. Plans are void if Engineer is not present during the construction of the disposal systems. All procedures shall be in accordance with the current State of Vermont Environmental Protection Rules.
4. Any defects in the construction or performance of the wastewater disposal system shall be corrected and retested by the Contractor at no additional expense to the Owner.
5. The Contractor is responsible for the complete system as shown and detailed. Disturbed areas shall be topsoiled, graded, seeded and mulched, and maintained until permanent ground cover is established.

Construction Requirements & Materials

- (A) Excavation of the trenches shall not result in compacted or smeared soils. When trenches have been excavated, the sides and bottom shall be raked to scarify any smeared soil surfaces.
- (B) Construction equipment not needed to construct the system should be kept off the area to be used for the absorption trench system to prevent undesirable compaction of the soils. Construction shall not be initiated when the soil moisture content is high. (If a fragment of soil occurring approximately 9" below the surface can easily be rolled into a wire, the soil moisture content is too high for construction purposes).
- (C) A minimum of 18 inches of crushed stone shall be placed below the distribution pipe invert. All crushed stone used shall be clean, washed, durable and sized between three-fourths (3/4) of an inch to one and one-half (1.5) inches in diameter.
- (D) The distribution piping shall be carefully placed on the bedding at a uniform slope and must be placed along the center line of each trench. The ends of distribution lines (laterals) shall be capped or plugged but, when they are at equal elevations, they should be connected. Pipes used for distribution lines shall be rigid plastic pipe, schedule 40 or 80, one-inch diameter or greater, and meet the American Society for Testing and Materials (ASTM) standards or those of an equivalent testing laboratory. Fittings used in the disposal field shall be compatible with the materials used in the distribution lines.
- (E) After the placement of crushed stone and the distribution piping, the field must be topped with filter fabric to prevent soil from migrating into the stone, but permitting free aeration. Six (6) to twelve (12) inches of soil shall be placed on top of the filter fabric. The top several inches shall be top soil and the field(s) must be seeded with grass to stabilize the field, prevent erosion and maximize aeration.

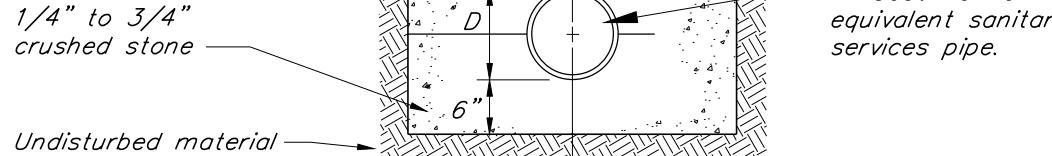
The Contractor shall be responsible for complying with OSHA - VOSHA regulations.

Backfill material shall contain no stones greater than 3" in diameter, no frozen lumps, clay or organic material. Place in 12" lifts and compact as indicated. Sand cushion 70X.03



The Contractor shall be responsible for complying with OSHA - VOSHA regulations.

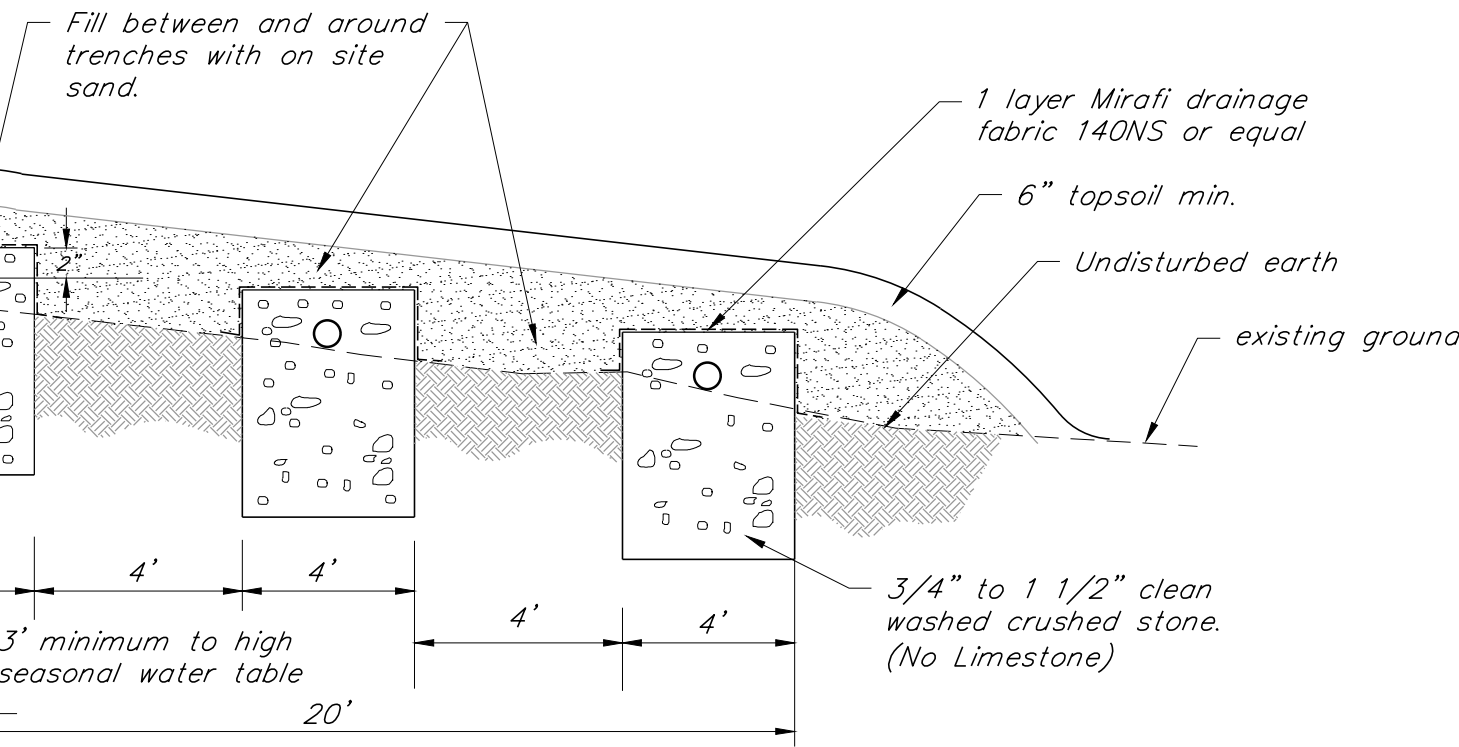
Backfill material shall contain no stones greater than 3" in diameter, no frozen lumps, clay or organic material. Place in 12" lifts and compact as indicated.



Typical Sanitary Trench Detail

N.T.S.

4" PVC SDR 35 perforated distribution pipe



Leach Line Trench Section Lots 3 & 4 Primary and Replacement In-Ground Trenches

N.T.S.

NOTES

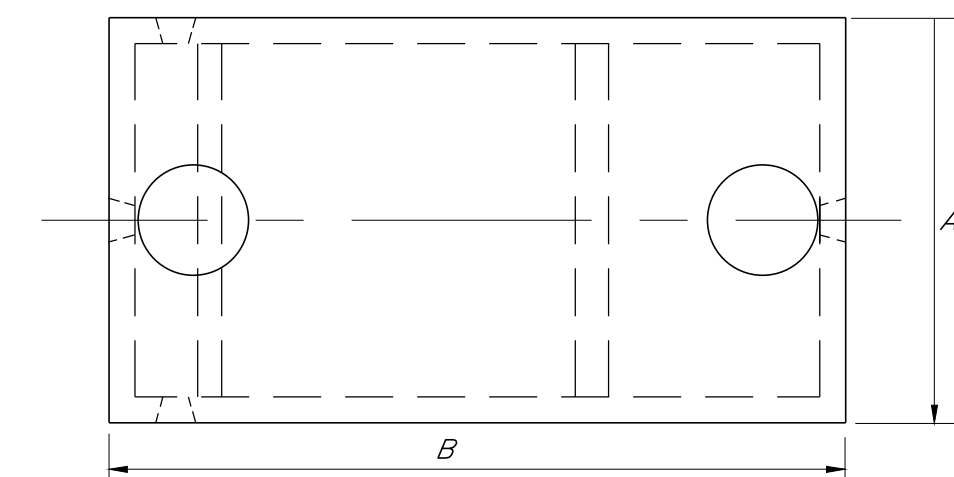
1. Concrete 4000 PSI @ 28 days.
2. Inlet baffle and outlet baffle are precast with top section of tank.
3. Keyed joint sealed with asphalt cement or equivalent.
4. Excavation must be at least 12" wider and longer than tank.
5. One compartment tank shown smooth bottom tank available.
6. Conduct 24hr leakage test in accordance with ANR EPR Chapter 1.
7. Three inlet positions standard.
8. Check manufacturers specs. for measurements.
9. Outlet filter required.

Verify tank dimensions with manufacturer prior to installation.

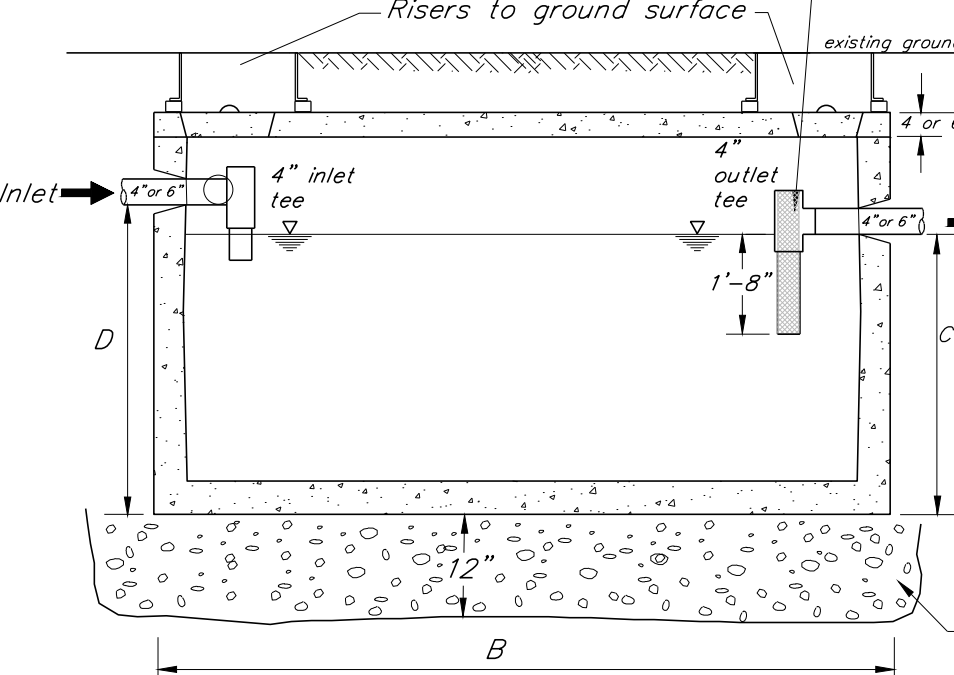
Tank size	A	B	C	D	E
1500 gal	73.5"	122.5"	53"	56"	67"

Force Main Trench Detail

N.T.S.



Outlet filter required. Filter shall prevent passage of solids larger in size than 1/8".



To Serve Lot 3 & Lot 4

1500 Gallon Single Compartment Septic Tank

N.T.S.

System Maintenance Notes

1. At least twice a year, depth of sludge and scum in septic tanks should be measured. The tank should be pumped if: 1) The sludge is closer than (12") twelve inches to the outlet baffle. 2) The scum layer is closer than (3") three inches to septic tank outlet baffle. Following septic tank cleaning in units over 1000 gallons, all interior surfaces of the tank shall be inspected for leaks and cracks.
2. At least twice a year dosing tanks, pump stations and distribution boxes should be opened and settled solids removed as necessary and checked for levelness. Thoroughly clean any components with solids buildup.
3. Toxic or hazardous materials should, in general, not be disposed of in septic systems. These substances may pass through the system in an unaltered state and contaminate groundwater or remain in the septicage and subsequently contaminate the soil.
4. A continuous log of inspections and observations shall be kept. The log shall note all cleanings and other required maintenance.

Testing Notes - Septic Tank

The Contractor shall leak test the new pump station and septic tank utilizing one of the following procedures:

- a) If groundwater is above any joint or penetration, the Contractor shall test the septic tank infiltration. The test shall consist of observing the structures for any sign of infiltration for 2 hours with the sidewalls exposed. Any sign of infiltration shall be repaired from the outside with hydraulic cement in a manner approved by the Engineer. The Contractor shall then backfill the structures and provide anchorage against floatation and test on additional 24 hours.
- b) If groundwater is below the bottom of the tanks, the Contractor shall conduct a 24 hour exfiltration test with the sidewalls of the structure exposed. The Contractor shall be responsible for all anchorage against floatation. There shall be no infiltration or exfiltration.
- c) The Contractor shall provide all necessary manpower, materials and equipment for testing and shall notify the Engineer, the Town of Richmond, and the Owner 24 hours in advance of testing. All re-testing and repairs, if needed, shall be provided by the Contractor at no expense to the Owner.

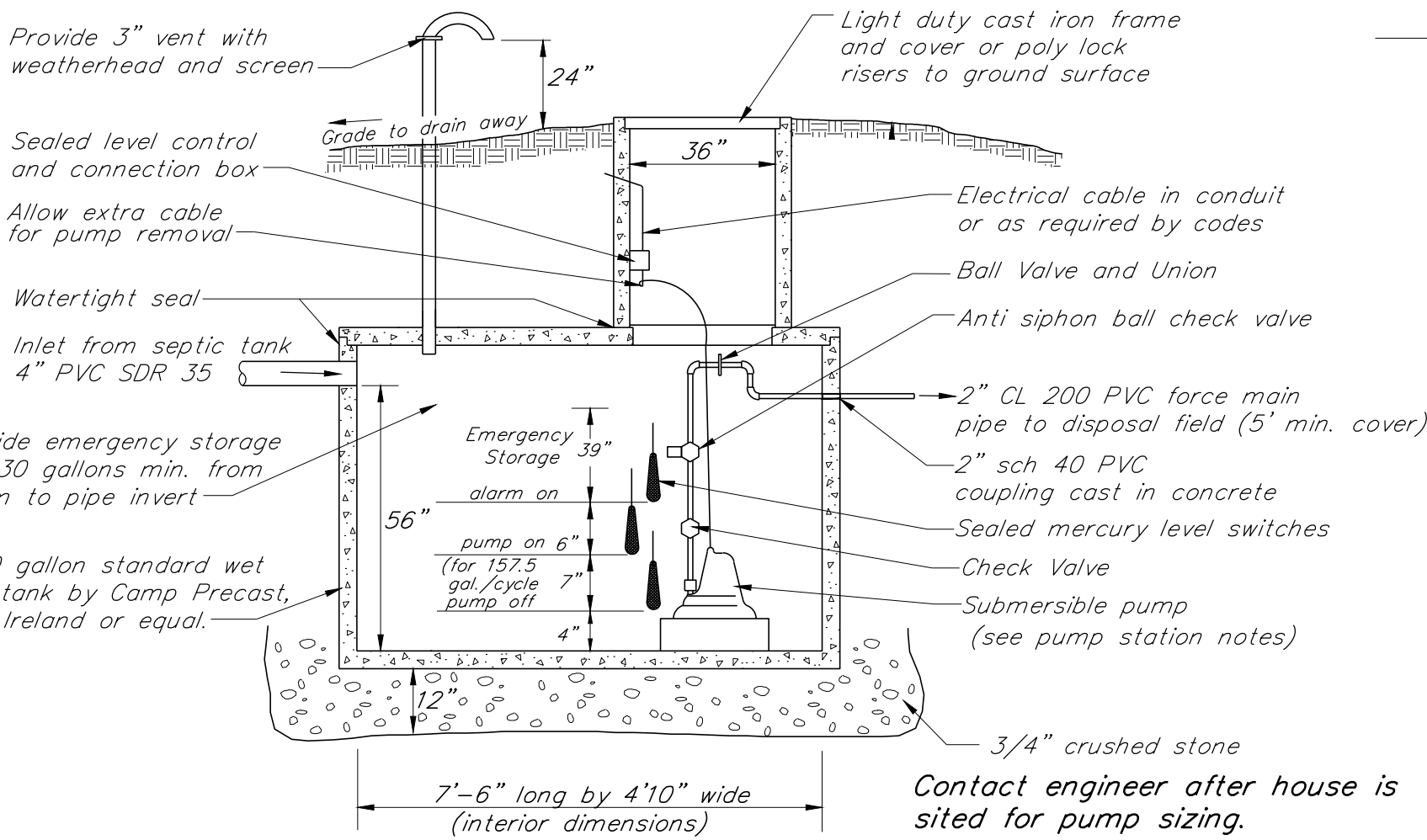
Basis of Design

Design Flow:

- 1 single family 4 bedrooms = (3 bedrooms \* 140 G.P.D.) + (1 bedrooms \* 70 G.P.D.) = 490 G.P.D. + 1 bedroom accessory unit = 140 G.P.D. TOTAL = 630 G.P.D.

Simplex Pump Station Design:

Volume of wetwell = 1264 gals  
Volume of wetwell per foot = 1264 gals/4.67 feet = 271 gals/feet  
4 pump cycles per day  
Volume of pump cycles = 630 gals/4 cycles = 157.5 gals/cycle  
Height of pump cycle = (157.5 gals)/(271 gals/foot) = 0.58 feet (7 inches)  
Minimum volume of emergency storage = 630 gal (volume for 1 day)  
Emergency storage will be in wetwell  
Height of emergency storage = 630 gals/(271 gals/foot) = 2.32 feet  
Elevation floor and rim to be determined before construction  
Elevation of invert in = 4.67' above floor  
Elevation of Alarm = 1.42' (17.0") above floor  
Elevation of Pump off = 0.33' (4") above floor  
Elevation of Pump on = 0.92' (11") above floor  
Volume of emergency storage provided = (4.67'-1.42') \* 271 gals/foot = 881 gallons > 630 gallons, therefore OK



To Serve Lot 3 & Lot 4

630 GPD Simplex Pump Station

N.T.S.

Lot 3 Primary In-ground Trench Elevations Information

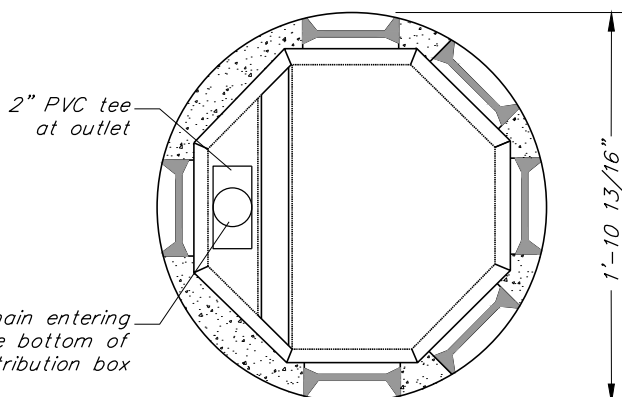
TRENCH NO.	EXISTING GROUND	BOTTOM STONE	PIPE INVERT	TOP STONE	FINISH GRADE
(P3-1)	680.0'	679.00'	680.00'	680.50'	681.00'
(P3-2)	681.50'	680.50'	681.50'	682.00'	682.50'
(P3-3)	683.00	682.00'	683.00	683.50	684.00'

Lot 4 Primary In-ground Trench Elevations Information

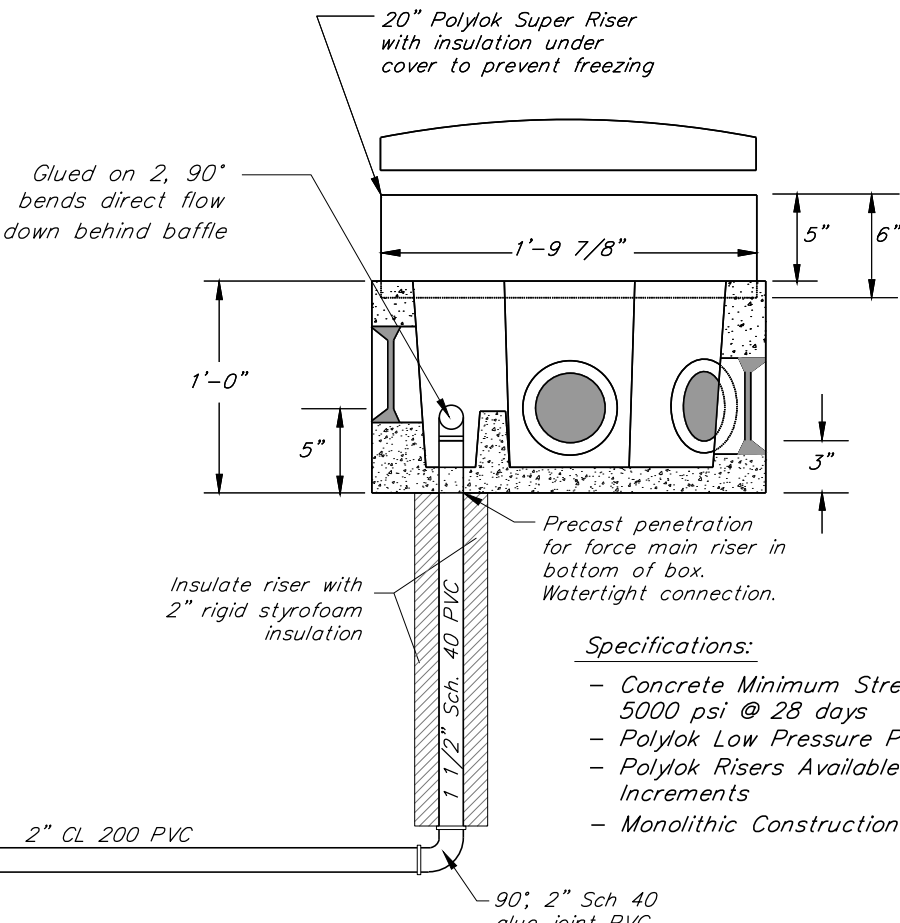
TRENCH NO.	EXISTING GROUND	BOTTOM STONE	PIPE INVERT	TOP STONE	FINISH GRADE
(P4-1)	715.50'	714.50'	715.50'	716.00'	716.50'
(P4-2)	717.50'	716.50'	717.50'	718.00'	718.50'
(P4-3)	719.00'	718.00'	719.00'	719.50'	720.00'

Pump Station Notes

1. The Contractor shall test tank for water tightness prior to backfill and shall anchor tank as required due to high seasonal groundwater table.
2. All penetrations and joints on tank shall have watertight seals.
3. The Contractor shall provide all necessary unions, fittings, etc. for easy pump removal.
4. The pump station shall include all the necessary controls, switches, fittings and appurtenances to make the station complete.
5. The Contractor shall provide an audible and flashing alarm and fused disconnect switch to be installed inside house or building. All necessary cable and wiring shall be supplied by the Contractor.
6. Provide a 4" solid concrete block under pump.
7. The Contractor shall use Schedule 80 PVC with solvent weld joints for all piping inside pump station.
8. See lot information below for pump specifications.
9. All electrical equipment shall comply with the National Electric Code and other applicable codes.
10. Any modifications to pump station design or location must be approved by the Engineer.



PLAN



SECTION

Precast Distribution Box (5 Outlet Gravity Round)

(N.T.S.)

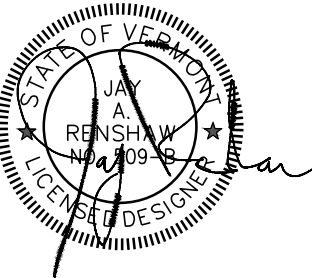
Randall Farm Subdivison

East Hill Road  
Richmond, Vermont



164 Main Street, Suite 201  
Colchester, Vermont 05446  
P: (802) 878-0375  
www.krebsandlansing.com

STAMP:



Project:

Randall Farm  
5 Lot Subdivision  
Peggy M. Farr  
Revocable Trust

Project No.

19327

Scale

N.T.S.

Drawn by

JAR/SWH

Checked by

Date 06/14/2021

Revisions

No.	Date	Description

Drawing Title

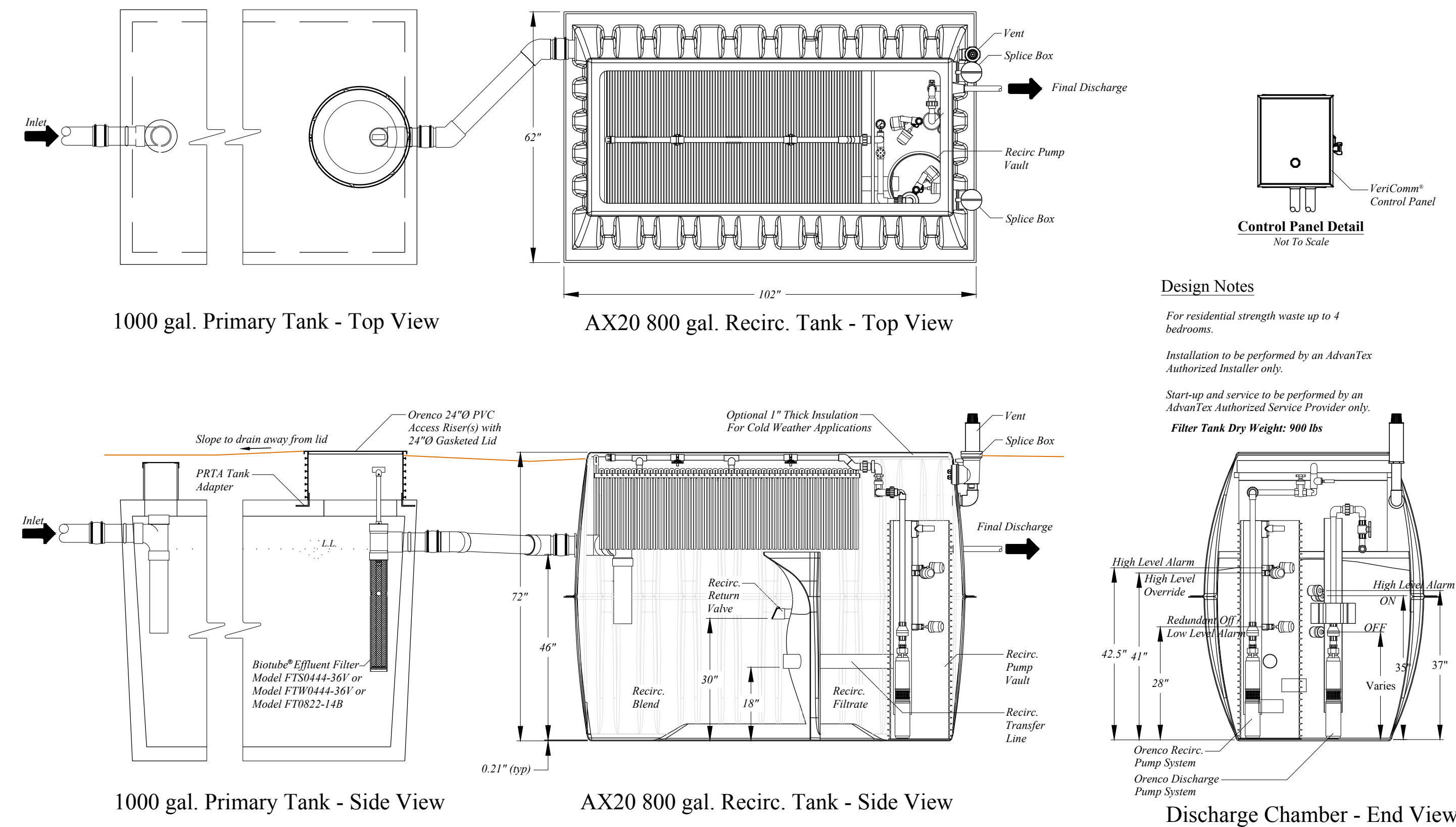
Wastewater Disposal Details

Drawing No.

CD-4



AX20RT Treatment System - Pump Discharge



Advantex AX20RT-Mode 1B Treatment System Basis of Design

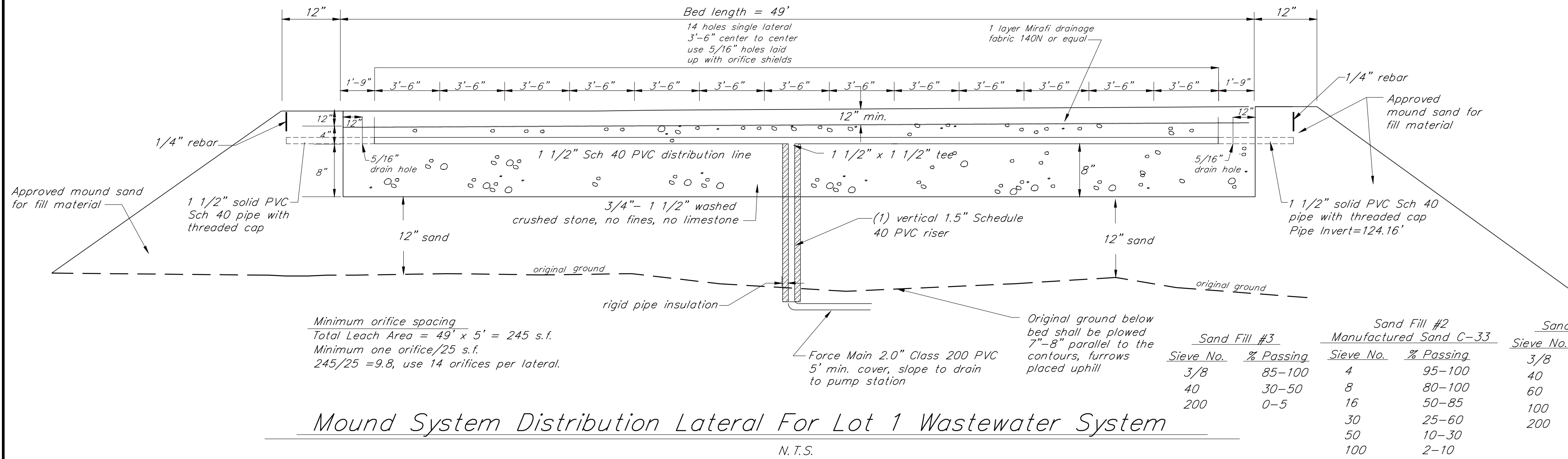
Lot 1 490 GPD Pump Station Requirements  
Design Q = 490 gal/day (4 bedroom single family residence)  
Use Advantex AX20RT-Mode 1B Treatment (combined pump station & pretreatment unit)  
4 pump cycles per day  
Volume of pump cycles = 490 gals/4 cycles = 122.5g gals/cycle  
Minimum volume of emergency storage = 490 gal (volume for 1 day)  
Emergency storage will be in wetwell in the Advantex AX-20-1B Treatment System.  
According to Manufacturer specifications it has sufficient emergency storage for 4 bedroom residence  
Contact Engineer after house is sited for pump sizing.

Lot 1 Mound Elevation Information

	Native Existing Ground	Bottom Stone	Pipe Invert	Top Stone	Finish Grade
Replacement	600.00'	601.00'	601.66'	602.00'	603.00'

1' min. cover, 4" shall be topsoil with seed and mulch, finish to a condition suitable for mowing

Wastewater Mound Bed Section For Lot 1 Wastewater System



Minimum orifice spacing  
Total Leach Area = 49' x 5' = 245 s.f.  
Minimum one orifice/25 s.f.  
245/25 = 9.8, use 14 orifices per lateral.

Mound System Distribution Lateral For Lot 1 Wastewater System

N.T.S.

CONTACT ENGINEER FOR PUMP SIZING INFORMATION PRIOR TO INSTALLATION

Pump/Pretreatment Station Notes

- The Contractor shall test tank for water tightness prior to backfill and shall anchor tank as required due to high seasonal groundwater table.
- All penetrations and joints on tank shall have watertight seals.
- The Contractor shall provide all necessary unions, fittings, etc. for easy pump removal.
- The pump station shall include all the necessary controls, switches, fittings and appurtenances to make the station complete.
- The Contractor shall provide an audible and flashing alarm and fused disconnect switch to be installed inside house or building. All necessary cable and wiring shall be supplied by the Contractor.
- The Contractor shall use Schedule 80 PVC with solvent weld joints for all piping inside pump station.
- All electrical equipment shall comply with the National Electric Code and other applicable codes.
- Any modifications to pump station design or location must be approved by the Engineer.

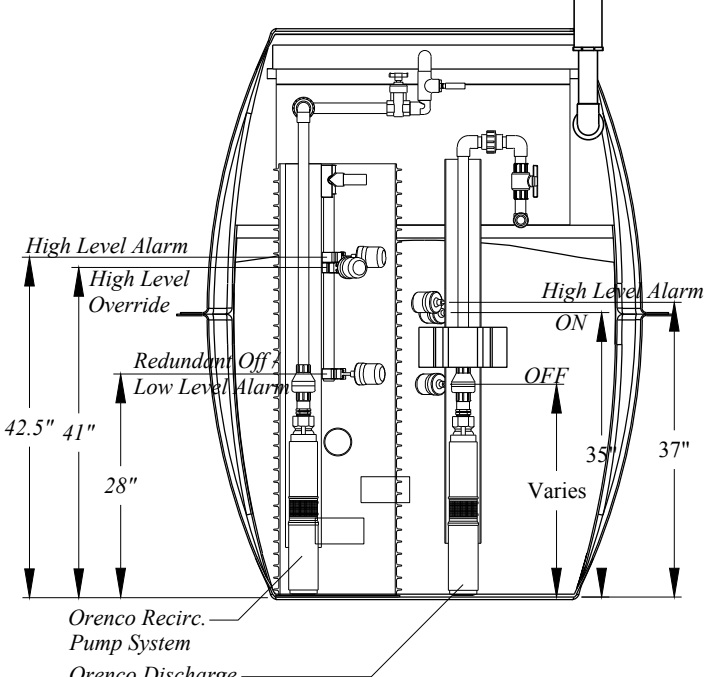
Design Notes

For residential strength waste up to 4 bedrooms.

Installation to be performed by an AdvanTex Authorized Installer only.

Start-up and service to be performed by an AdvanTex Authorized Service Provider only.

Filter Tank Dry Weight: 900 lbs



Discharge Chamber - End View

VERMONT  
State of Vermont  
Department of Environmental Conservation  
WASTEWATER SYSTEM AND POTABLE WATER SUPPLY  
INNOVATIVE AND ALTERNATIVE (IA) TECHNOLOGY  
GENERAL USE APPROVAL PERMIT  
LAWS/REGULATIONS INVOLVED  
At 15 V.S.A. 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 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Average Day Demand = 4 bedrooms (3 \* 140 GPD x 3 bedrooms + 70 GPD per add'l bedroom) = 490 GPD  
+ 1 bedroom accessory apartment (1 \* 140 GPD x 1 bedroom) = 140 GPD

$$\text{Maximum Day Demand} \frac{630 \text{ G.P.D.}}{720 \text{ min./perday}} = .88 \text{ G.P.M.}$$

Source capacity = Not required for projects with maximum day demand under 2 GPM or less

Minimum pump Capacity = 10 G.P.M.

*The well is not located in a flood plain*

*For a Proposed 4 Bedroom Single Family Residence*

Proposed 4th bedroom based on (1 person/bedroom)  $1 * 70 \text{ gals/day/bedroom} = 70 \text{ gpd}$

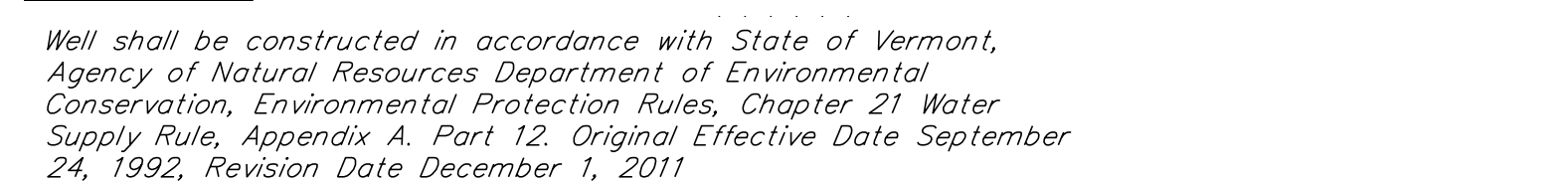
720 min./day

Minimum Pump Capacity = 5 G.P.M.

*The proposed well is not located in a flood plain*

	<u>Edge of System</u>	<u>Septic Tank</u>	<u>Sewer</u>
<i>(Contact Engineer for any Clarifications or conflicts)</i>			
Drilled well serving 1 home – up slope of system	100	50	50
Drilled well serving 1 home – down slope of system	200	50	50
Lake and pond impoundment – standing water	50	25	25
River, streams	50	25	10
Drainage swales, roadway ditches	25	—	—
Main or municipal water lines	50	50	10
Service water lines	25	25	10
Roadways, driveways, parking lots	10 (25 downslope)	5	—
Top of embankment or slope > 30%	25	10	—
Property line	25	10	10
Trees	10	10	10
Other disposal field or replacement area	10	—	—
Foundation, footing drains, curtain drains	35 (75 downslope)	10	—
Suction water line	100	50	50

Note:  
These distances may be increased if necessary to provide adequate protection.



The Contractor shall be responsible for complying with OSHA – VOSH regulations.

Backfill material shall contain no stones greater than 3" in diameter, no frozen lumps, clay or organic material. Place in 12" lifts and compact as indicated.

Crushed stone or sand fill in ledge excavation areas

Undisturbed material

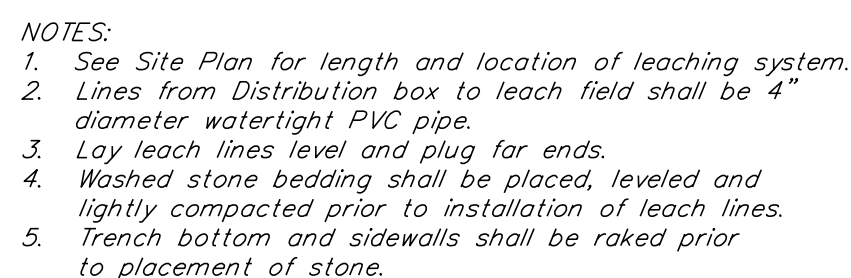
Use existing trench excavation for bedding in areas without ledge unless directed to use crushed stone or sand bedding by the engineer.

Diagram labels and dimensions:

- D+2" (width of paving area)
- paving to match existing
- paved
- unpaved
- ground slightly
- 95% standard proctor (for both paved and unpaved areas)
- 6" min. cover (typical)
- 2" (vertical dimension for bedding)
- D" (width of bedding area)
- 6" (vertical dimension for bedding)
- 1" K copper or 200 CTS polyethylene water service

NOTE	
Depth of cover	Insulation thickness
4'-6" to 5'-0"	2"
4'-0" to 4'-6"	4"

Diagram illustrating a trench installation. The trench is shown with a width of 12 inches and a depth of 1 foot. The pipe is labeled "Solid 4" SDR 35 pipe from distribution box". The trench is labeled "Key trench into existing ground minimum 6"". The existing ground is labeled "existing ground". The native soil is labeled "native soil".



*N.T.S.*



1. *The Contractor shall test tank for water tightness prior to backfill and shall anchor tank as required due to high seasonal groundwater table.*
2. *All penetrations and joints on tank shall have watertight seals.*
3. *The Contractor shall provide all necessary unions, fittings, etc. for easy pump removal.*
4. *The pump station shall include all the necessary controls, switches, fittings and appurtenances to make the station complete.*
5. *The Contractor shall provide an audible and flashing alarm fused disconnect switch to be installed inside house or building. All necessary cable and wiring shall be supplied by the Contractor.*
6. *Provide a 4" solid concrete block under pump.*
7. *The Contractor shall use Schedule 80 PVC with solvent weld joints for all piping inside pump station.*
8. *See lot information below for pump specifications.*
9. *All electrical equipment shall comply with the National Electric Code and other applicable codes.*
10. *Any modifications to pump station design or location must be approved by the Engineer.*



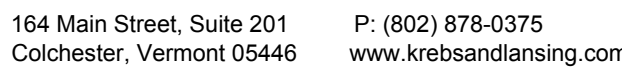
TRENCH NO.	EXISTING GROUND	BOTTOM STONE	PIPE INVERT	TOP STONE	FINISH GRADE
(P2-1)	605.25'	604.75'	605.25'	605.75'	606.25'
(P2-2)	603.80'	603.30'	603.80'	604.30'	604.80'



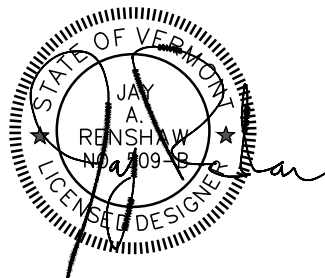
*N. T. S.*

*For Permit Review*

East Hill Road  
Richmond, Vermont



STAMP:



Project:

Randall Farm  
5 Lot Subdivision  
Peggy M. Farr  
Revocable Trust

Project No.

19327

Scale

N.T.S

Drawn by

JAR/S

Checked by

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Date \_\_\_\_\_

06/14/2021

## Revisions

No.	Date	Description
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Drawing Title

## Wastewater Disposal Details

Drawing No

# CD-6



Force Main Pressure/Leakage Test

Upon completion of construction of a force main, the line shall be pressure and leakage tested in accordance with the following procedure.

Pressure Test

After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 x the highest working pressure in the section.

Test Pressure Restrictions:

- 1. Not to be less than 50 psi at the highest point along the test section.
- 2. Not exceed pipe or thrust restraint design pressures.
- 3. Be of at least 2 hour duration.
- 4. Not vary by more than 5 psi.
- 5. Not exceed twice the rated pressure of the valves when the pressure boundary of the test section includes closed gate valves.

Pressurization. Each valved section of pipe shall be filled with water slowly and the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe.

Air Removal. Before applying the specified test pressure, air shall be expelled completely from the pipe and valves.

Examination. All exposed pipe, fittings, valves, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, or valves, that are discovered following the pressure test shall be repaired or replaced with sound material and the test shall be repeated.

Leakage Test

A leakage test shall be conducted concurrently with the pressure test.

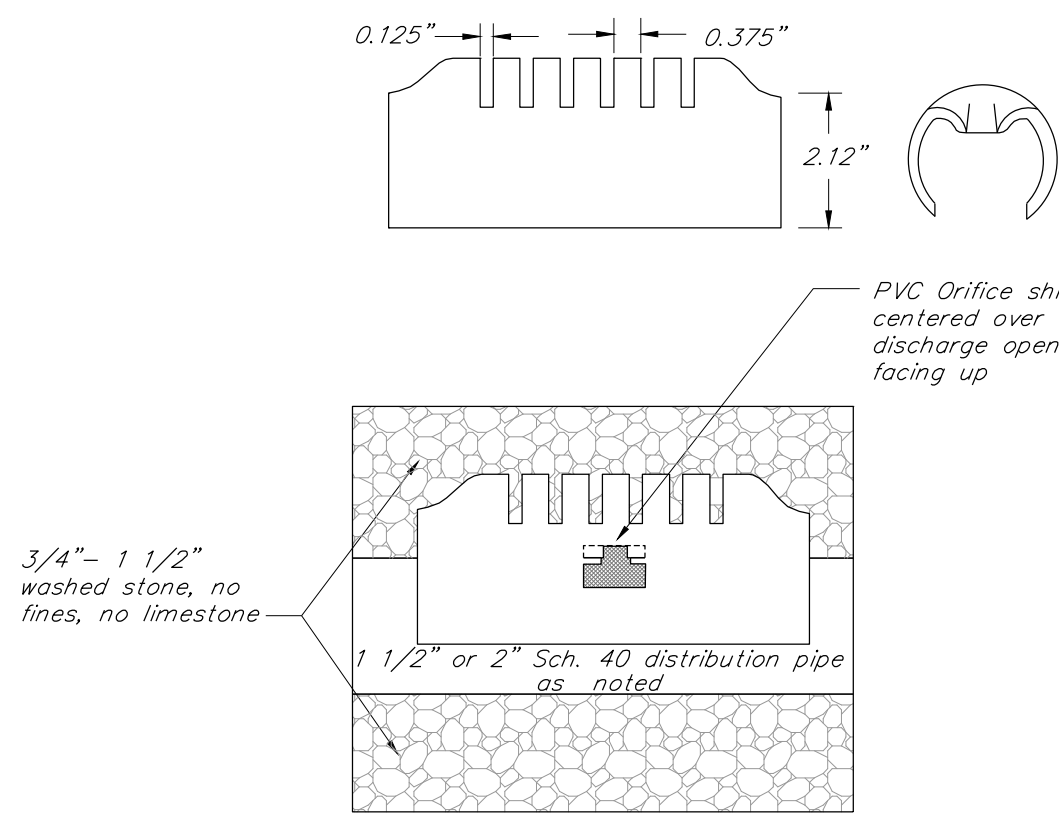
Leakage Defined. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

Allowable Leakage. No pipe installation will be accepted if leakage is greater than that determined by the following formula:

L = (N \* D \* sqrt(P)) / 7400

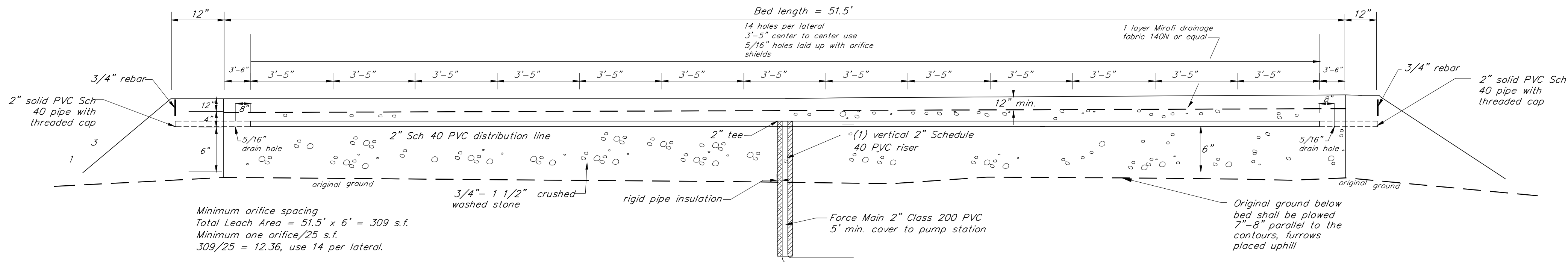
L is the allowable leakage, in gallons per hour; N is the number of joints in the length of pipeline tested; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gage.

Sections which fail the pressure/leakage test shall be repaired and retested by the contractor at no additional expense to the owner.



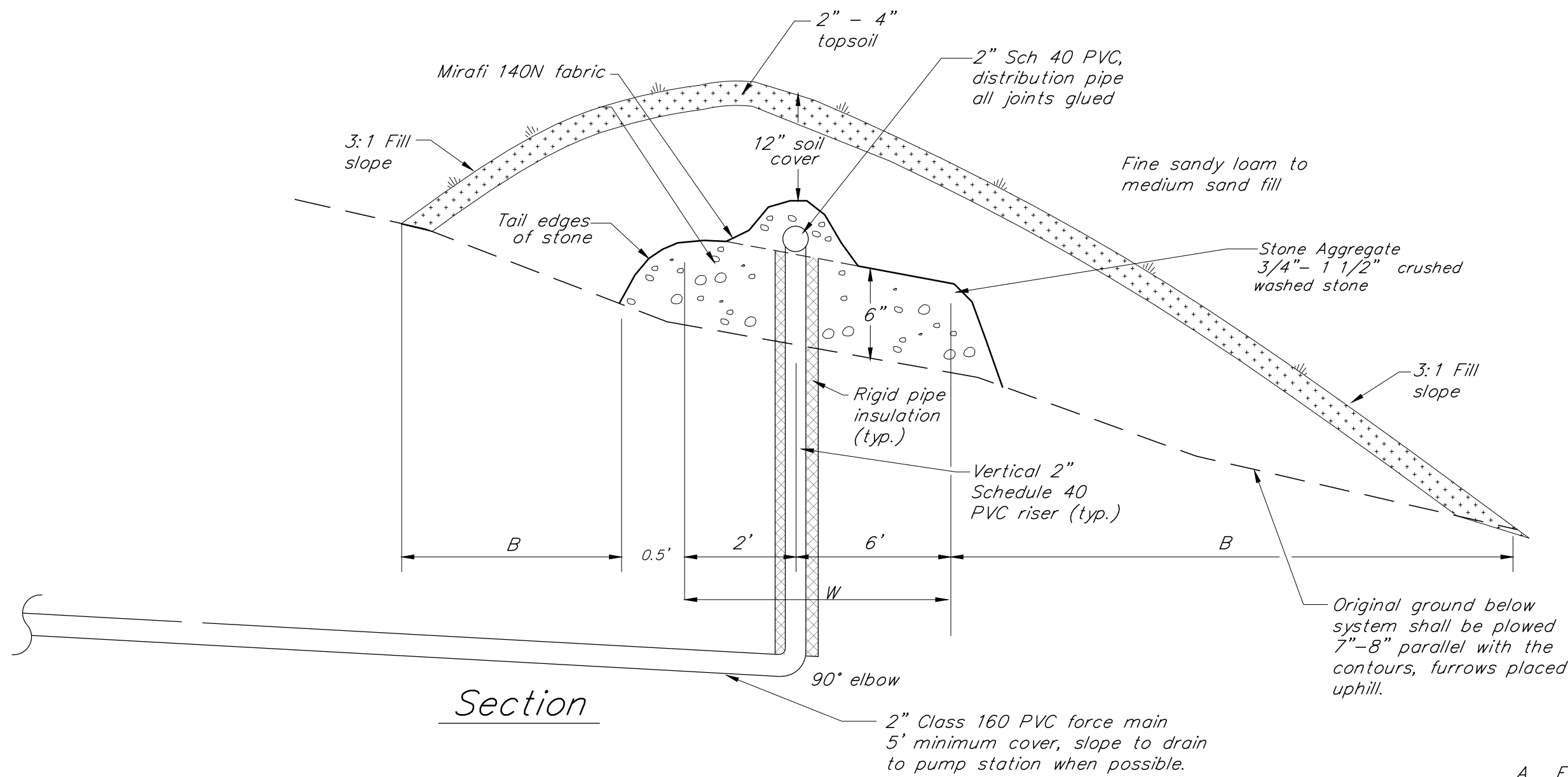
Typical Orifice Shield

N.T.S.



At-Grade Distribution Lateral Replacement System Lot 2

N.T.S.

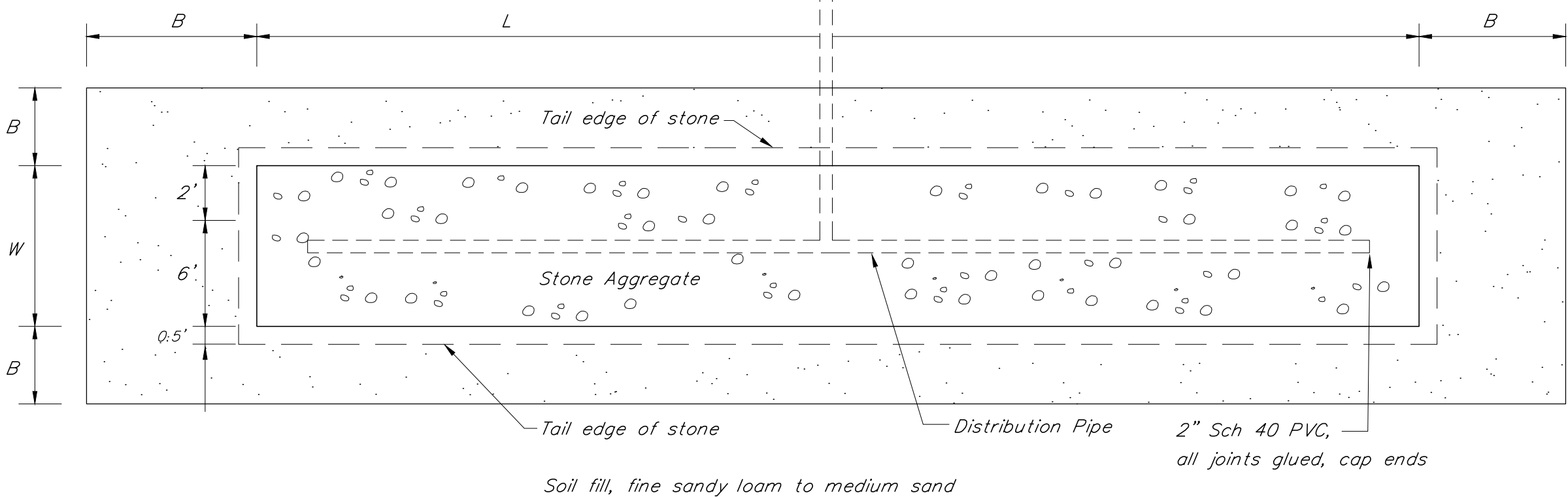


Section

- A. Effective infiltration area (min. 6 inch stone) = 6'
- B. Side slope (3:1)
- L. System Length = 51.5'
- W. System Width = 8'

Pretreated Effluent At-Grade System - Lot 1 Replacement

N.T.S.



Plan

At-Grade System Construction Practices:

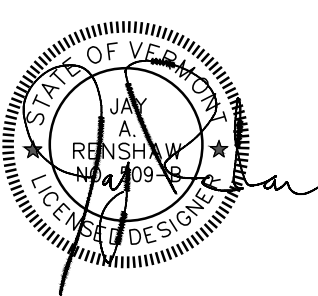
- a. The surface water diversion swale (mandatory for sites with slopes of 3 to 12 percent) should be installed prior to constructing the at-grade system to keep surface water runoff away from the system area while it is under construction.
- b. Construction of the system and/or tilling shall not take place when the soil moisture is high in the system area. If the soil at 9 inches below grade can be rolled into the shape of a wire, the soil moisture content is too high for construction to begin.
- c. To prevent compaction, construction equipment shall not be moved across and downslope of the system area before and after tilling.
- d. Vegetation shall be cut close to the ground and removed from the area to be tilled. Tree stumps shall be cut flush with the ground and the roots left in place. On wooded sites, the forest litter should be raked off if more than one inch thick. The system area shall be tilled, preferably by mold board or chisel plow to a depth of 6 to 8 inches, parallel to ground contour. During plowing, the soil should be thrown upslope to provide a proper interface between the soil and stone aggregate. If the site cannot be plowed, a backhoe bucket fitted with chisel teeth may be used to "till" the site by creating furrows that are parallel to ground contour.
- e. The force main may be installed before tilling or after tilling when the force main enters the system at the upslope of the system. When the force main enters the system at the downslope side, the force main should be installed before tilling. If practical, force mains should connect to the distribution pipe from the ends of the distribution pipe or from the upslope side of the system. In either situation, the force main should be installed by working from the upslope edge of the system.
- f. Upon completion of the tilling and before placing the stone aggregate, the qualified consultant shall inspect the site preparations.
- g. Construction should begin immediately after the tilling by placing the stone aggregate. The pressure distribution pipe should be laid level on top of the stone and caps installed at the ends of the pipe. Upon completion of the distribution piping, the qualified consultant shall test the system with clean water. The test shall show that a minimum pressure of 2.3 feet of head is present at the ends of the pipe and that the difference in discharge rate between the two orifices with the greatest difference in discharge rates not greater than 15 percent. After connecting the distribution pipe to the force main, the distribution pipe shall be covered with at least 2 inches of clean stone aggregate. The stone aggregate shall be covered completely with filter fabric or similar material (not building paper, straw, newspaper, plastic, tar paper, etc.).
- h. The stone aggregate shall be covered with a minimum of 12 inches of soil but not more than 18 inches, with the upper 4 to 6 inches of soil being loam and the remainder of the fill being of a fine sandy loam to medium sand texture. The soil cover shall be placed at a maximum slope of 3:1. A vegetated cover free of large brush and trees shall be maintained over the system.
- i. Prior to use of the system, the qualified consultant shall submit a written report to the Division stating that the system has been installed according to the approved plans and permit. The report shall specifically address the inspection of the site preparations and include numerical results of the orifice discharge rate comparison and pressure test.

Randall Farm Subdivison

East Hill Road  
Richmond, Vermont



STAMP:



Project:

Randall Farm  
5 Lot Subdivision  
Peggy M. Farr  
Revocable Trust

Project No.

19327

Scale

N.T.S.

Drawn by

JAR/SWH

Checked by

Date

06/14/2021

Revisions

No.	Date	Description

Drawing Title

Wastewater Disposal  
Details

Drawing No.

CD-7

For Permit Review



# Randall Farm Subdivison

East Hill Road  
Richmond, Vermont



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Wastewater Disposal  
Details

Drawing No.

CD-8