SEPTIC SYSTEM SUBMISSION REVIEWS: TIPS AND BEST PRACTICES FOR ONSITE WASTEWATER PROFESSIONALS

Presented by: Bucks, Chester, and Montgomery County Health Departments

DISCLAIMER

- This presentation does not represent nor tries to represent the positions held by the Department of Environmental Protection. In lieu, this presentation is the collaboration of best practices held by the local agencies of Bucks, Chester, and Montgomery Counties.

KNOW YOUR AUDIENCE…

- Is there anyone who is not an SEO?
- Who are regulatory SEOs?
- Who are soil consultants?
- Who are installers?
- Who has been a certified SEO for over 10 years? 20 years? …
- Who conducts PSMA septic certifications?
- SEO and a member of PSMA?
- Who is awake?

SITE SUITABILITY – SOIL TESTING

Chapter 73 and other regulations

Municipal Act 537 Plans and Ordinances

Health Department Policies

CHAPTERS 73 AND OTHER REGULATIONS

73.12 Site Location

(a) Slope, floodway, rock outcrops, limestone.

(b) 4-year fill sites or sited in or on undisturbed soils.

73.13 Minimum Horizontal Isolation Distances

(a) Between a named feature and tanks.

(b) Between a named feature and the perimeter of the aggregate in the absorption area.

(c) Between a named feature and the wetted perimeter of the spray field.

CHAPTERS 73 AND OTHER REGULATIONS

73.14 Site Investigation and 73.15 Percolation tests

(a) At least one excavation (pit) to profile.

(unless otherwise stated – spray, Alternate listing)

(b) Limiting Zone location and depth or absence of a Limiting Zone.

(c) Percolation test conducted at each proposed septic system site (if required).

(d) Percolation rate.

Other Regulations

(a) New Land Development

(b) Repairs (BTG)

CRITICAL AND NON-CRITICAL ISOLATION DISTANCES

- Chapter 73.13 treats all isolation distance violations equally. When dealing with public health and environmental impacts, certain violations may have very different consequences. These differences helped create the concept of critical and non-critical isolation distances.

- Critical Isolation Distances
  - Minimum isolation distance from an absorption area (or spray field) to a well (72.33)
  - Vertical isolation distance to the limiting zone
  - Downsizing an absorption area below the already provided for in section 73.16{c} or in the Alternate System Technology Listing

MUNICIPAL ACT 537 PLANS AND ORDINANCES
WHAT ARE YOU WORKING WITH….

- Designated Public Sewer area, but public sewer not accessible
- Septic System Priority Chart
- Sewage Management Plan (additional Isolation distances)
- Other ordinances that may hinder delineating a proposed septic system site (trees, scenic roads, etc.)
- Elected officials – Do they know what ACT 537 is?

HEALTH DEPARTMENT POLICIES AND PROCEDURES

Interpretations of

- Act 537
- Chapters 71,72,73
- PA DEP policies

Health Department's SOPs

- Subdivisions with existing dwellings/septic systems
- Rocky sites
- Reduction in absorption area sizing

SEO preferences (because we are all different people)

WHAT IS A "COMPLETE" SUBMISSION

- A complete submission is a permit which has the necessary components for issuance. The components do not need to be correct or hold accurate information, they just need to be present. Inaccurate information will be denied, and corrections will be requested.
- Examples of components may include, but are not limited to the following:
  - System specifications
  - Plot plans
  - Tank specifications
  - Dosing information
  - Site testing
  - DEP permit application

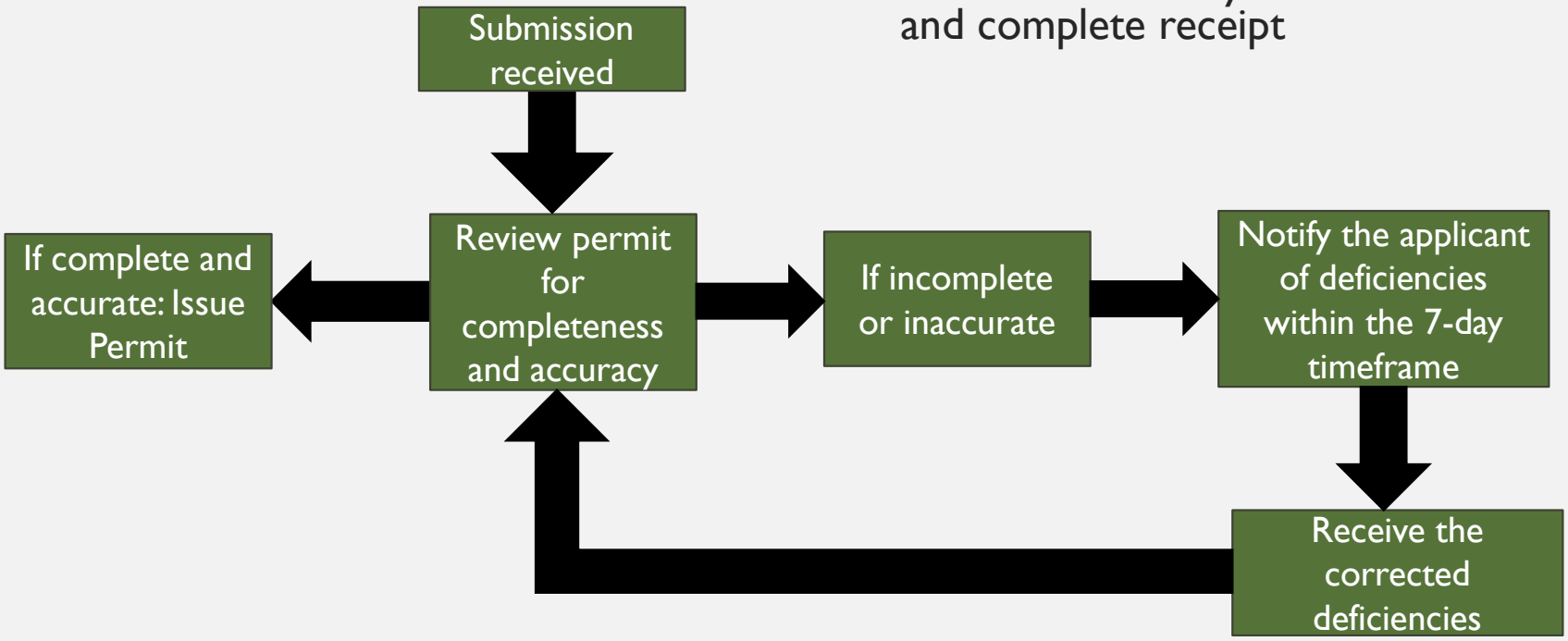
WHAT IS AN "UNACCEPTABLE" SUBMISSION

- An unacceptable submission is either incomplete or is denied due to incorrect aspects of the design.
- An incomplete submission is a permit that is lacking the necessary documentation for issuance.
- A denied submission is a permit that has inaccuracies or information that cannot be verified by the reviewer.
- Either way, the sewage enforcement officer must notify the applicant of the deficiencies and request the needed information.

CONVENTIONAL PERMIT TIMEFRAMES

§ 72.25. Issuance of permits.

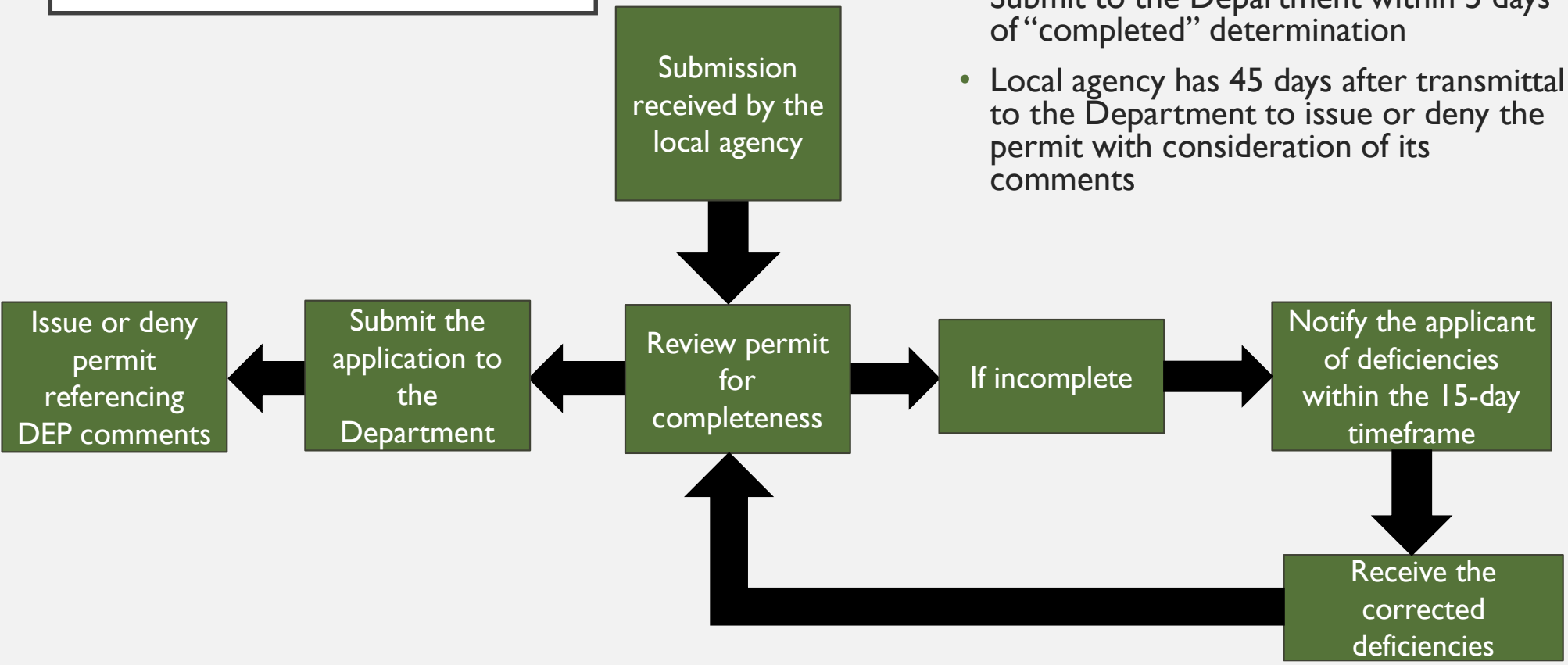
- Review for completeness within 7 days of receipt
- Issue or deny within 7 days of complete receipt
- Issue within 15 days of a corrected and complete receipt



ALTERNATE PERMIT TIMEFRAMES (DEP)

§ 72.25. Issuance of permits.

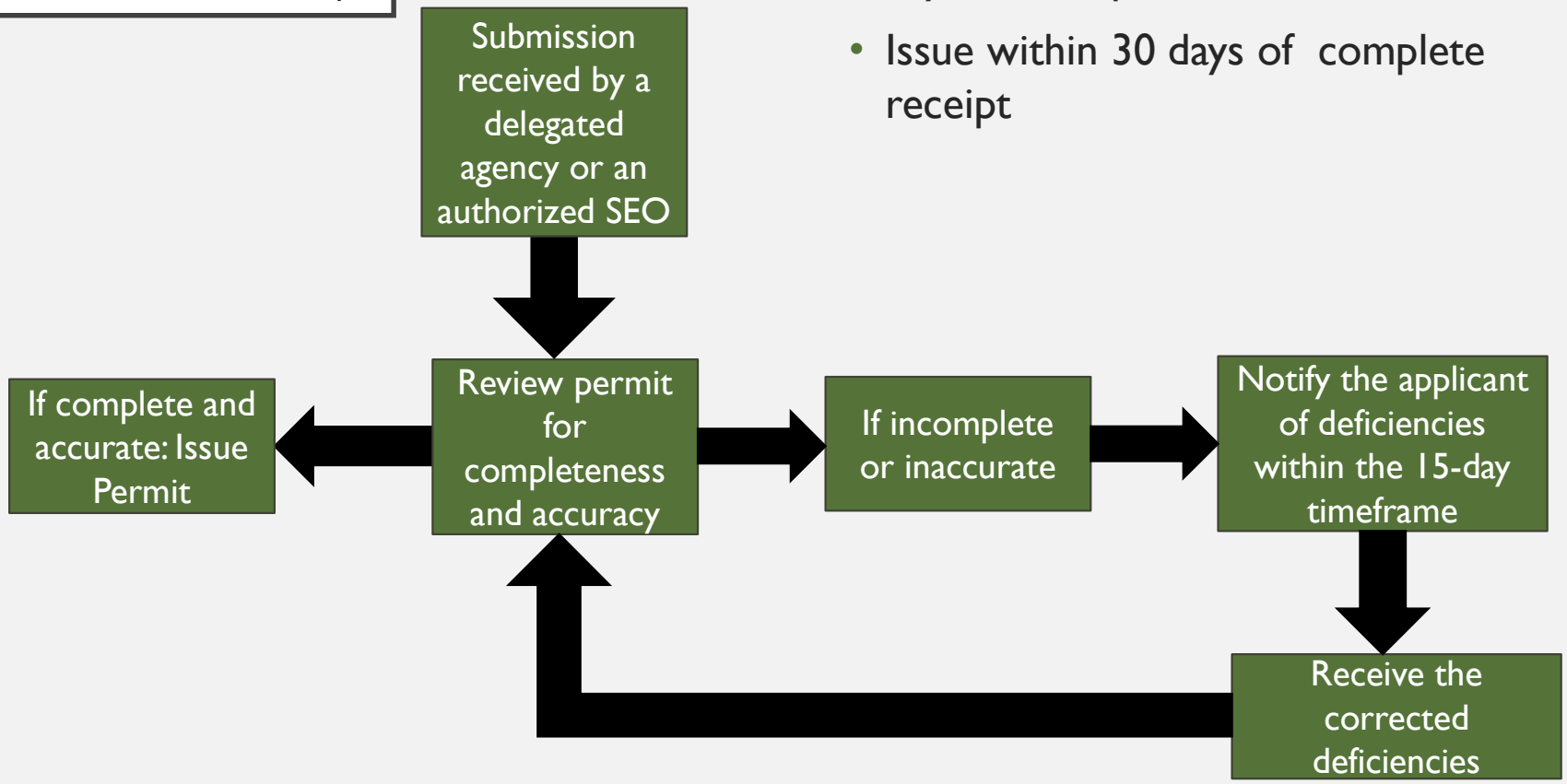
- Review for completeness within 15 days of receipt
- Submit to the Department within 5 days of "completed" determination
- Local agency has 45 days after transmittal to the Department to issue or deny the permit with consideration of its comments



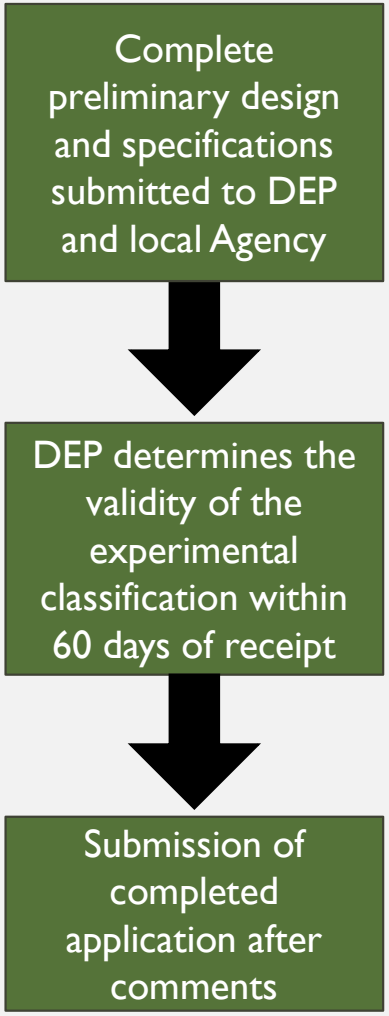
ALTERNATE PERMIT TIMEFRAMES (AUTHORIZED SEO)

§ 72.25. Issuance of permits.

- Review for completeness within 15 days of receipt
- Issue within 30 days of complete receipt



EXPERIMENTAL PERMIT TIMEFRAMES



§ 72.25. Issuance of permits.

- Submission of preliminary design to local agency and DEP 60 days before official application
- DEP will provide comments within the 60-day timeframe

HEALTH DEPARTMENT PROCESSES

- It is important to understand the operations of the local agency that is receiving the permit documentation.
  - Electronic documentation vs paper documentation
  - Electronic signatures vs physical signatures
  - Electronic payments vs check payments
- Regardless all local agencies operate in manner that is consistent with the regulatory requirements. As such, it is important you work with the framework that is available to expedite the process of issuance.

ELECTRONIC DOCUMENTATION VS PAPER DOCUMENTATION

- Pro: Faster to receive and process
- Pro: Ease of transmitting duplicates
- Pro: Potentially able to access through different means
- Con: May be hard to discern originality

- Pro: Physically stored, without dependency on servers being active
- Pro: Ease of ensuring originality and lack of tampering
- Con: Potentially only has one copy, if lost or damaged

ELECTRONIC SIGNATURES VS PHYSICAL SIGNATURES

- Pro: Can be signed from any location at any time
- Pro: Can have end user data to help verify the location and IP of the signer
- Con: May be limited to only certain electronic signature types
- Pro: Higher confidence in the validity of the signer
- Pro: Strong precedence in legitimacy in court
- Con: Getting physical documentation to multiple parties within different areas (mail)

ELECTRONIC PAYMENTS VS CHECK PAYMENTS

- Pros: More flexibility on when payments can be made throughout the process
- Pros: Easy to input payment corrections at a moments notice
- Con: It most likely has nonrefundable processing fee

- Pros: You get confirmation it is received if delivered in person.
- Pros: You can make alterations at the payment location with advisory from SEO
- Cons: Limited to when the check can reach the office to receive the payment.

HEALTH DEPARTMENT PROCESSES

Health Department processes can vary as long as they meet regulatory requirements.

The framework used may be a combination of electronic and physical.

Physical and electronic processes each have their advantages and challenges.

Consider the framework available to you when you try to achieve permit issuances.

REVIEWING THE SUBMISSION

Conventional Systems

Alternate Systems

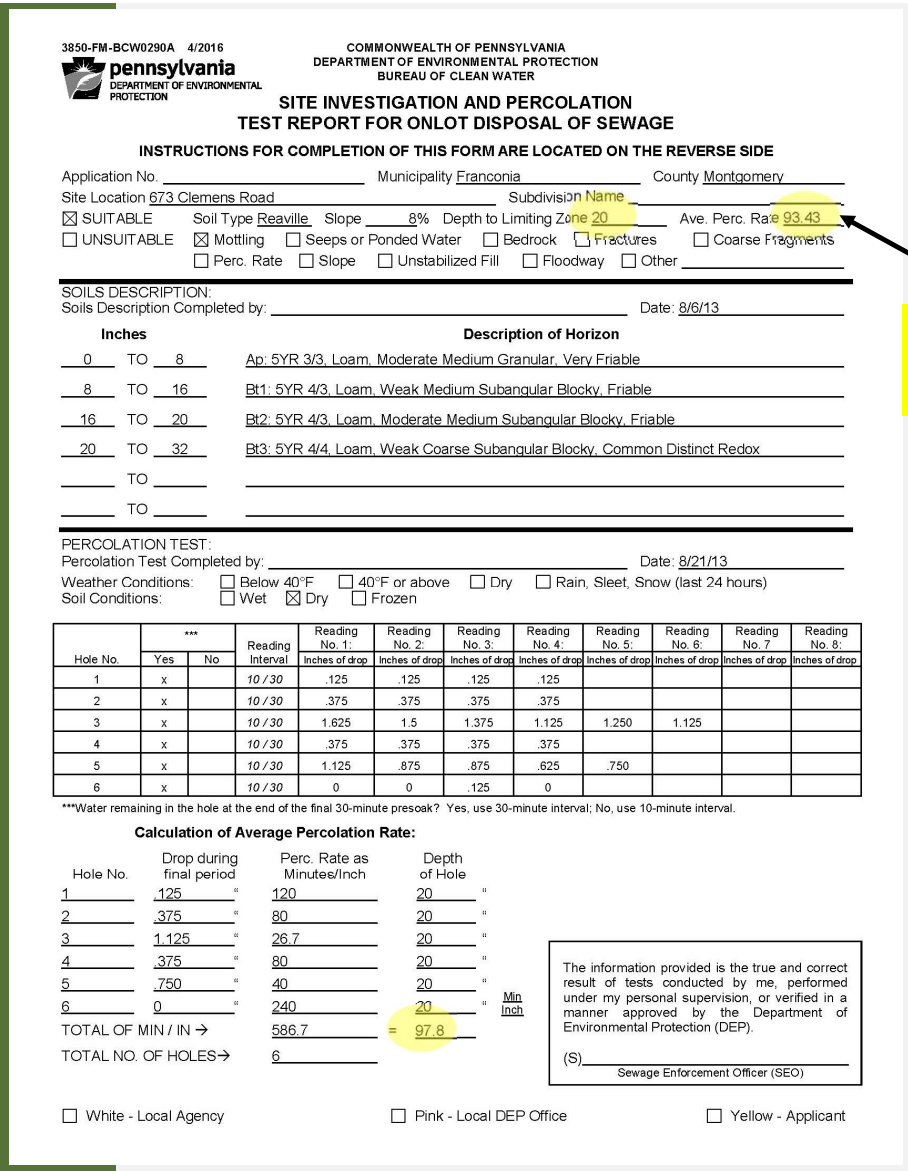
START WITH THE 290-A

- Compare your field notes to the information submitted by the applicant on the 290-A and make sure they match up.
- Check that each soil probe has a 290-A form filled out per DEP.
- Verify that the percolation test readings are accurate and the last four readings have stabilized.
- Do the math!
- **The system design starts from the information on the 290-A**.

290-A

Confirm Limiting Zone matches field notes.

Verify correct perc rate per hole values and calculate perc rate for site.



3850-FM-BCW0290A 4/2016

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF CLEAN WATER

SITE INVESTIGATION AND PERCOLATION TEST REPORT FOR ONLOT DISPOSAL OF SEWAGE

INSTRUCTIONS FOR COMPLETION OF THIS FORM ARE LOCATED ON THE REVERSE SIDE

Application No. _____ Municipality Franconia County Montgomery

Site Location 673 Clemens Road Subdivision Name _____

☒ SUITABLE Soil Type Reaville Slope 8% Depth to Limiting Zone 20 Ave. Perc. Rate 93.43

☐ UNSUITABLE ☒ Mottling ☐ Seeps or Ponded Water ☐ Bedrock ☐ Fractures ☐ Coarse Fragments

☐ Perc. Rate ☐ Slope ☐ Unstabilized Fill ☐ Floodway ☐ Other _____

SOILS DESCRIPTION:

Soils Description Completed by: _____ Date: 8/6/13

Inches			Description of Horizon
0	TO	8	Ap: 5YR 3/3, Loam, Moderate Medium Granular, Very Friable
8	TO	16	Bt1: 5YR 4/3, Loam, Weak Medium Subangular Blocky, Friable
16	TO	20	Bt2: 5YR 4/3, Loam, Moderate Medium Subangular Blocky, Friable
20	TO	32	Bt3: 5YR 4/4, Loam, Weak Coarse Subangular Blocky, Common Distinct Redox
	TO		
	TO		

PERCOLATION TEST:

Percolation Test Completed by: _____ Date: 8/21/13

Weather Conditions: ☐ Below 40°F ☐ 40°F or above ☐ Dry ☐ Rain, Sleet, Snow (last 24 hours)

Soil Conditions: ☐ Wet ☒ Dry ☐ Frozen

Hole No.	*** Yes	*** No	Reading Interval	Reading No. 1: Inches of drop	Reading No. 2: Inches of drop	Reading No. 3: Inches of drop	Reading No. 4: Inches of drop	Reading No. 5: Inches of drop	Reading No. 6: Inches of drop	Reading No. 7 Inches of drop	Reading No. 8: Inches of drop
1	x		10 / 30	.125	.125	.125	.125				
2	x		10 / 30	.375	.375	.375	.375				
3	x		10 / 30	1.625	1.5	1.375	1.125	1.250	1.125		
4	x		10 / 30	.375	.375	.375	.375				
5	x		10 / 30	1.125	.875	.875	.625	.750			
6	x		10 / 30	0	0	.125	0				

***Water remaining in the hole at the end of the final 30-minute presoak? Yes, use 30-minute interval; No, use 10-minute interval.

Calculation of Average Percolation Rate:

Hole No.	Drop during final period	Perc. Rate as Minutes/Inch	Depth of Hole	
1	.125 "	120	20 "	
2	.375 "	80	20 "	
3	1.125 "	26.7	20 "	
4	.375 "	80	20 "	
5	.750 "	40	20 "	
6	0 "	240	20 "	Min / Inch
TOTAL OF MIN / IN →		586.7	= 97.8	
TOTAL NO. OF HOLES →		6		

The information provided is the true and correct result of tests conducted by me, performed under my personal supervision, or verified in a manner approved by the Department of Environmental Protection (DEP).

(S)_____
Sewage Enforcement Officer (SEO)

☐ White - Local Agency ☐ Pink - Local DEP Office ☐ Yellow - Applicant

Does not match!

COMPARE 290-A TO SYSTEM DESIGN

- Limiting Zone
- Bedrooms
- Soil Morph report
- Questions to ask: is the minimum size being met? Has a size reduction been taken?

Perc Rate		93.44	min/in	
Limiting Zone		20	in	
Slope		10.10%	*	
Proposed Bedrooms		4		
Design Flow		500	gpd	
Aggregate Area	Required	((93.44 - 90) x (0.017) + 2.82) x 500	1439.24	sf (min.)
	Provided	19' X 76' =	1444	sf
Septic Tank Capacity	(3.5(500-400)) + 900 =	900 gal (min.)		
	Proposed 2 Comp. Tank =	1500 gal		

SITE TESTING DATA

TEST PIT NUMBER	LIMITING ZONE	TYPE
1	25	M
2	21	R

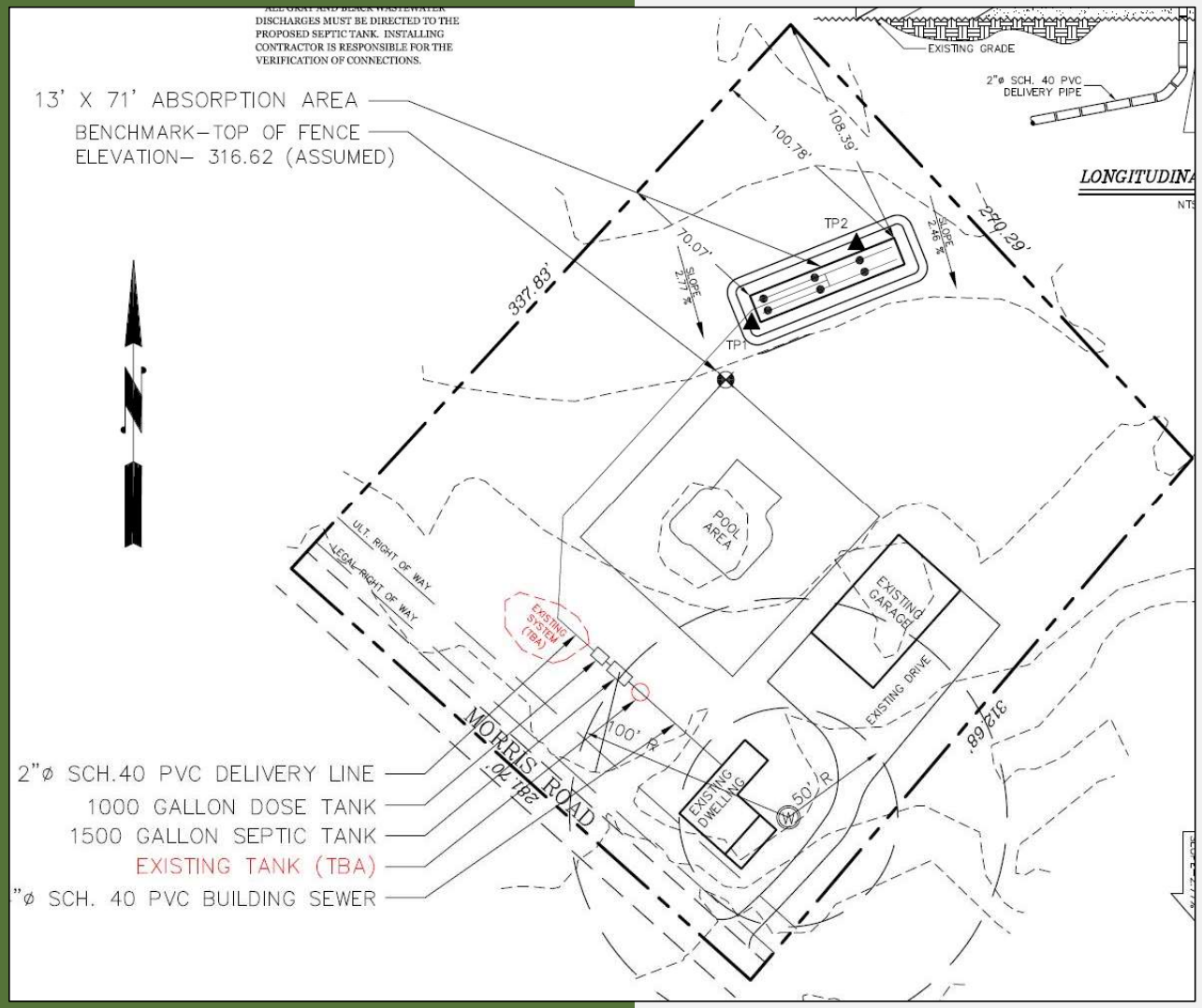
DESIGN PARAMETERS

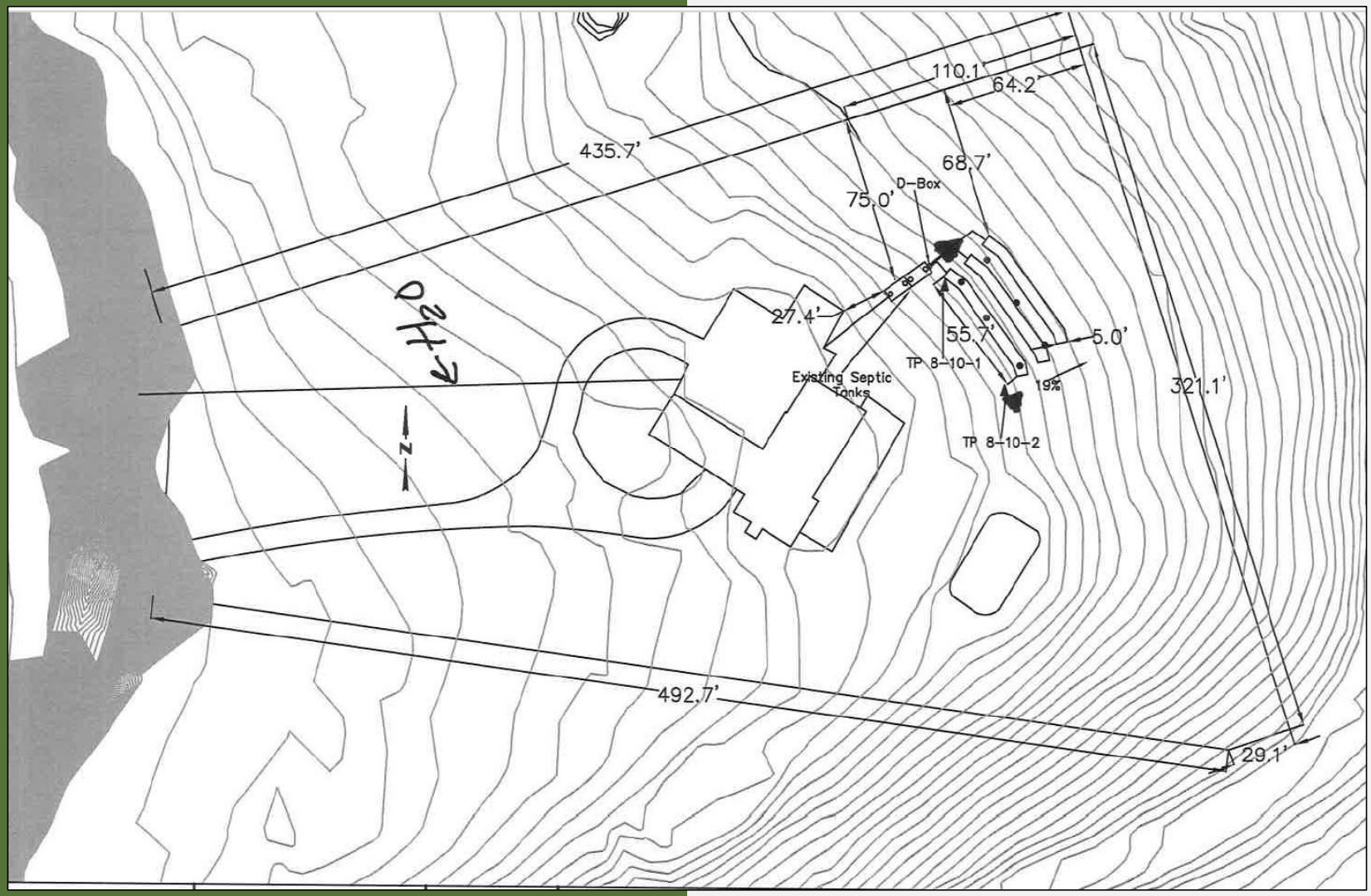
BEDROOMS	4	QUAN.
PERCOLATION RATE	42.9	MPI
PEAK GALLONS PER DAY	500	GAL
AREA REQUIRED PER GALLON	1.83	SQ. FT.
MIN. ABSORPTION AREA	916.4	SQ. FT
ABSORPTION AREA WIDTH	13	FEET
ABSORPTION AREA LENGTH	71	FEET
ABSORPTION AREA PROVIDED	923	SQ. FT

M=MOTTLING, R=ROCK, ISFV-INSUFFICIENT FINES TO FILL THE VOIDS, S-SEEPS

THE PLOT PLAN: QUESTIONS TO ASK YOURSELF

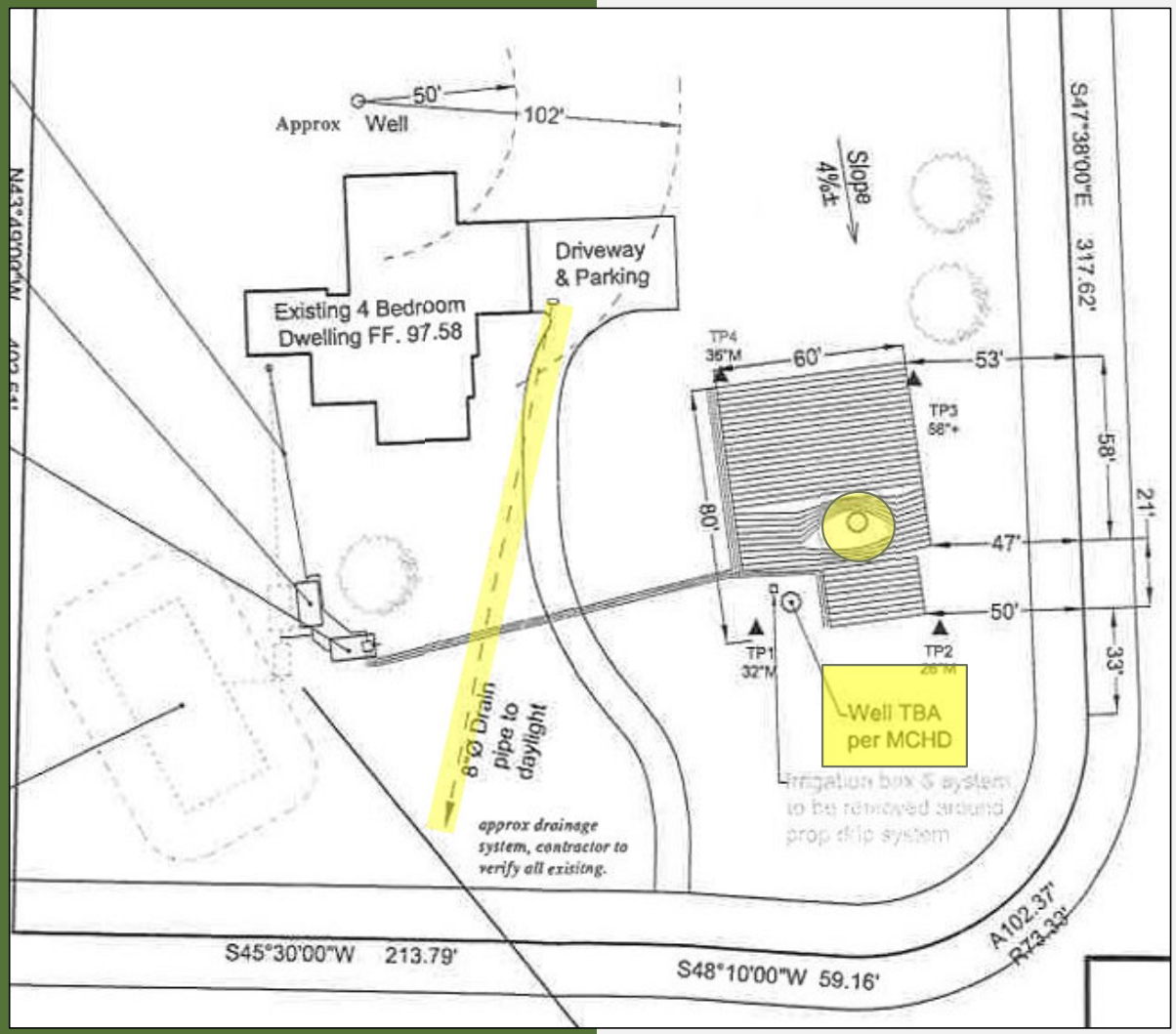
- Does it meet minimum isolation distances? If the plan is to-scale, use an engineer ruler to verify.
- Does the absorption area cover the site testing area?
- Is the direction and percentage of slope on the plan and is the site on-contour?
- Are there neighboring well arcs shown on the plan that could impact the septic system component locations?
- Are the property lines clearly marked and accurate?


ALL GRAY AND BLACK WASTEWATER DISCHARGES MUST BE DIRECTED TO THE PROPOSED SEPTIC TANK. INSTALLING CONTRACTOR IS RESPONSIBLE FOR THE VERIFICATION OF CONNECTIONS.
13' X 71' ABSORPTION AREA
BENCHMARK–TOP OF FENCE
ELEVATION– 316.62 (ASSUMED)
EXISTING GRADE
2"ø SCH. 40 PVC DELIVERY PIPE
LONGITUDINA
NTS
100.78'
108.39'
270.29'
337.83'
70.07'
SLOPE 2.71%
SLOPE 4.46%
TP1
TP2
POOL AREA
ULT. RIGHT OF WAY
LEGAL RIGHT OF WAY
EXISTING SYSTEM (TBA)
EXISTING GARAGE
EXISTING DRIVE
312.68'
100' R
50' R
EXISTING DWELLING
MORRIS ROAD
2"ø SCH.40 PVC DELIVERY LINE
1000 GALLON DOSE TANK
1500 GALLON SEPTIC TANK
EXISTING TANK (TBA)
"ø SCH. 40 PVC BUILDING SEWER


110.1'
64.2'
435.7'
68.7'
D-Box
75.0'
27.4'
55.7'
5.0'
TP 8-10-1
19%
Existing Septic Tanks
TP 8-10-2
321.1'
492.7'
29.1'
N

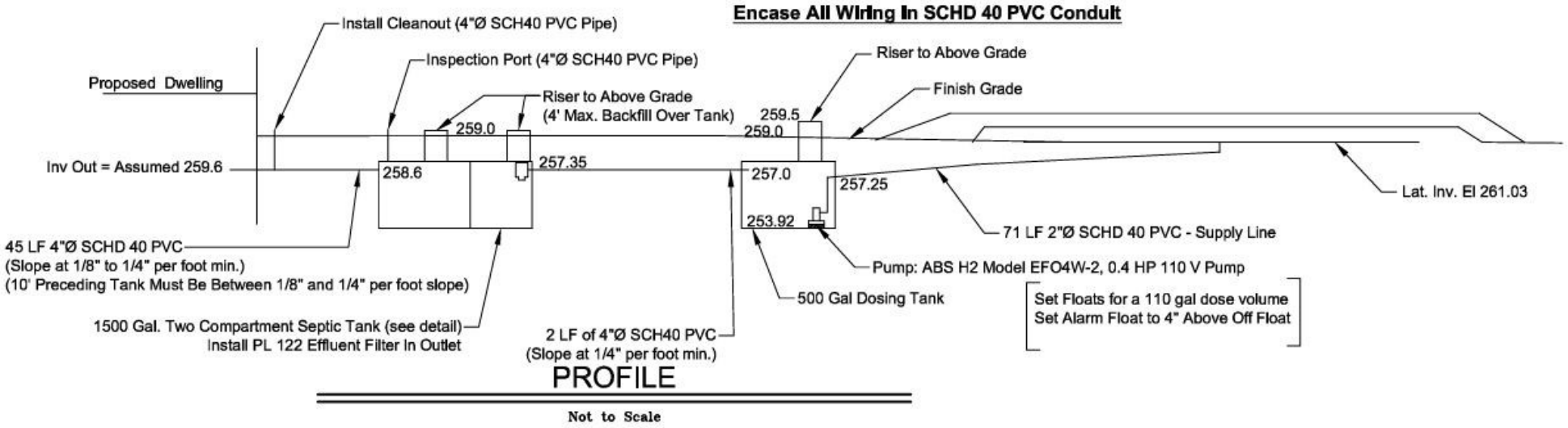
OTHER PLOT PLAN CONSIDERATIONS

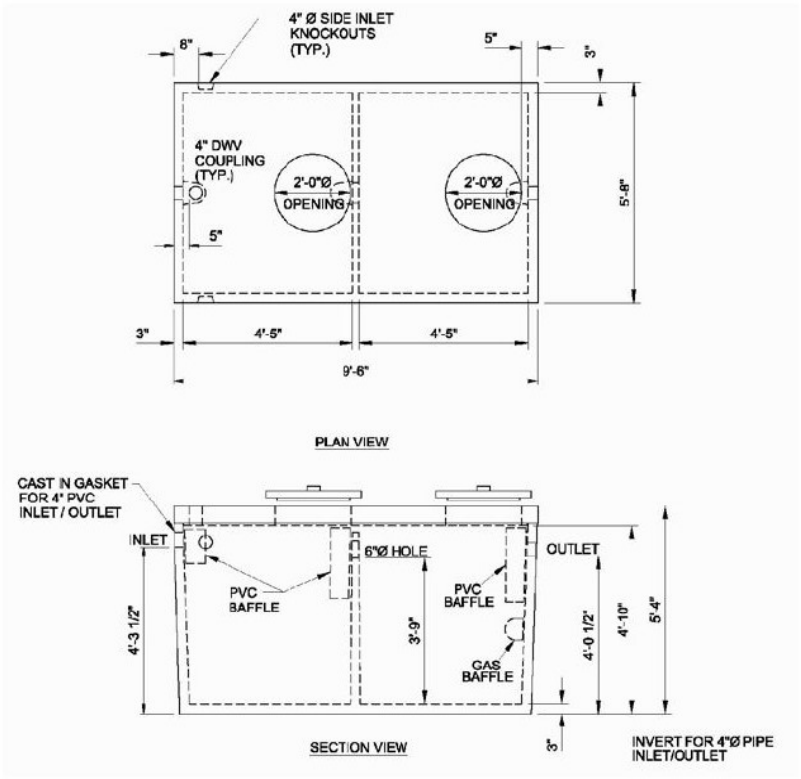
- There will be some site conditions that may not be listed as an isolation distance but are helpful to have on the plan for all involved to be aware of. These may include:
  - Rock outcrops or large boulders
  - Large trees
  - Existing septic system components
  - Current downspout locations
  - Existing malfunction areas
  - Sheds or other unoccupied buildings
  - Fences


Approx Well
50'
102'
Slope 4%±
S47°38'00"E 317.62'
Driveway & Parking
Existing 4 Bedroom Dwelling FF. 97.58
TP4 36"M
60'
53'
TP3 58"+
58'
21'
80'
47'
50'
TP1 32"M
TP2
33'
Well TBA per MCHD
Irrigation box & system to be removed and new drip system
8"Ø Drain pipe to daylight
approx drainage system, contractor to verify all existing.
S45°30'00"W 213.79'
S48°10'00"W 59.16'
A102.37'
R73.33'

INDIVIDUAL SYSTEM COMPONENT DRAWINGS

- Tanks
  - Verify sizing.
  - Check for elevations and dimensions. This information can be crucial to the installation process.
  - Make sure that the internal components are shown, such as baffles, effluent filter, pump and electrical components, etc.
  - Does it show the building sewer requirements?


Encase All Wiring In SCHD 40 PVC Conduit
Install Cleanout (4"Ø SCH40 PVC Pipe)
Inspection Port (4"Ø SCH40 PVC Pipe)
Riser to Above Grade
Riser to Above Grade
(4' Max. Backfill Over Tank)
Finish Grade
Proposed Dwelling
259.5
259.0
259.0
Inv Out = Assumed 259.6
258.6
257.35
257.0
257.25
Lat. Inv. El 261.03
253.92
45 LF 4"Ø SCHD 40 PVC
(Slope at 1/8" to 1/4" per foot min.)
(10' Preceding Tank Must Be Between 1/8" and 1/4" per foot slope)
71 LF 2"Ø SCHD 40 PVC - Supply Line
Pump: ABS H2 Model EFO4W-2, 0.4 HP 110 V Pump
500 Gal Dosing Tank
Set Floats for a 110 gal dose volume
Set Alarm Float to 4" Above Off Float
1500 Gal. Two Compartment Septic Tank (see detail)
Install PL 122 Effluent Filter In Outlet
2 LF of 4"Ø SCH40 PVC
(Slope at 1/4" per foot min.)
PROFILE
Not to Scale



1250 GALLON TWO-COMPARTMENT SEPTIC TANK

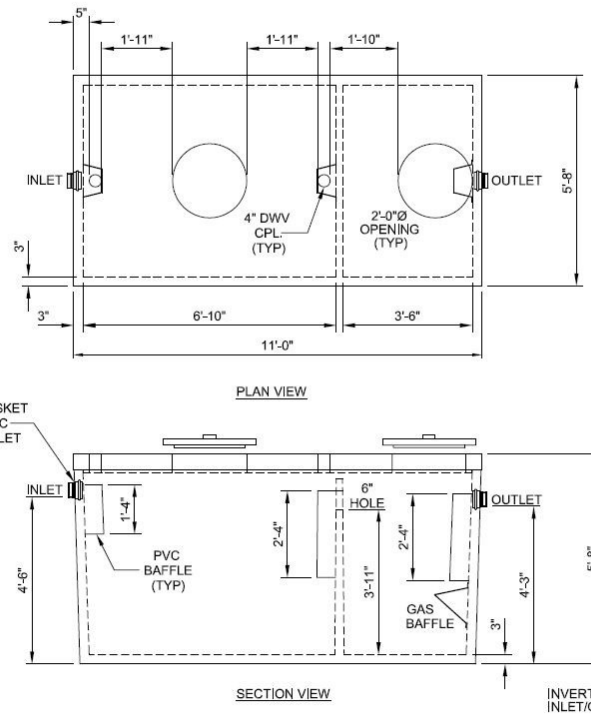
Not to Scale

OR

1500 GALLON TWO COMPARTMENT SEPTIC TANK

SPECIFICATIONS:
- CONCRETE STRENGTH: 4000 PSI MIN @ 28 DAYS
- REINFORCING CONFORMS TO ASTM A615 & A185
- DESIGN: MAXIMUM EARTH COVER IS 4'-0"; NO TRAFFIC LOADS
- 1" CONSEAL BUTYL RUBBER GASKET PROVIDED FOR JOINT
- APPROXIMATE WEIGHT: TANK - 4.63 TONS, LID - 2.10 TONS

INCOM SUPPLY
A Division of Wehrung's



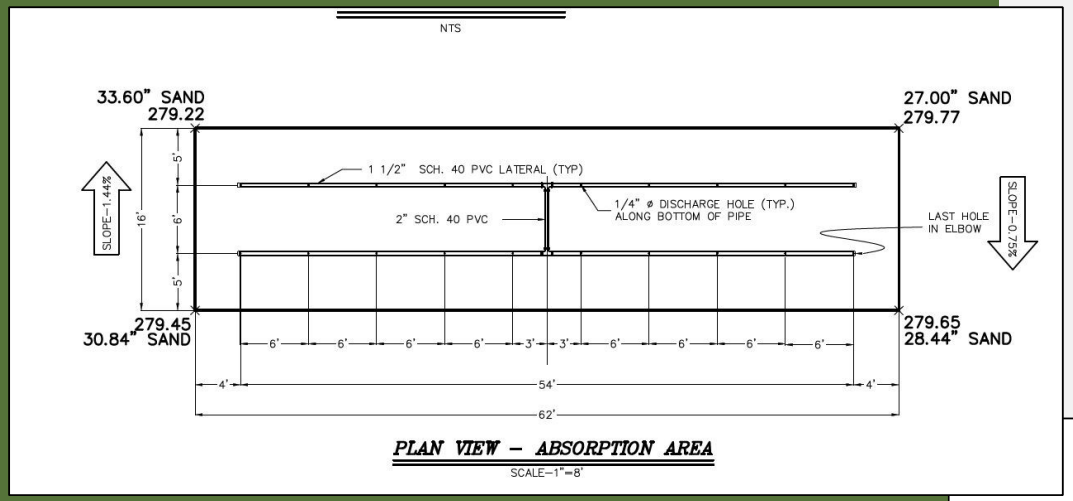
4/2013

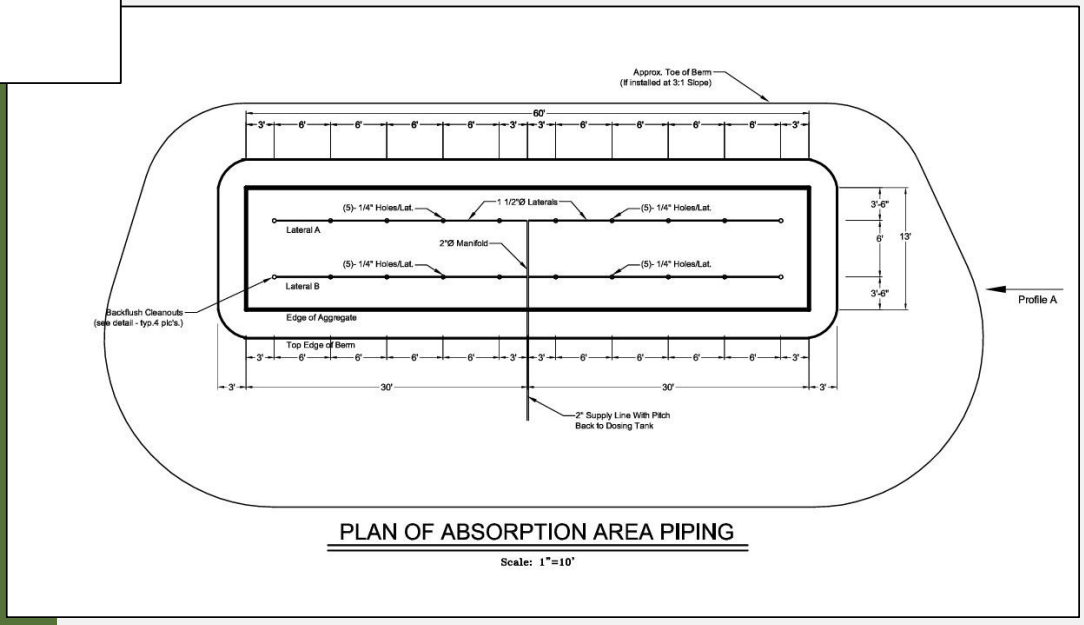
208 Durham Road, Ottsville, PA 18942
(610) 847-7203 F (610) 847-1046

INDIVIDUAL SYSTEM COMPONENT DRAWINGS

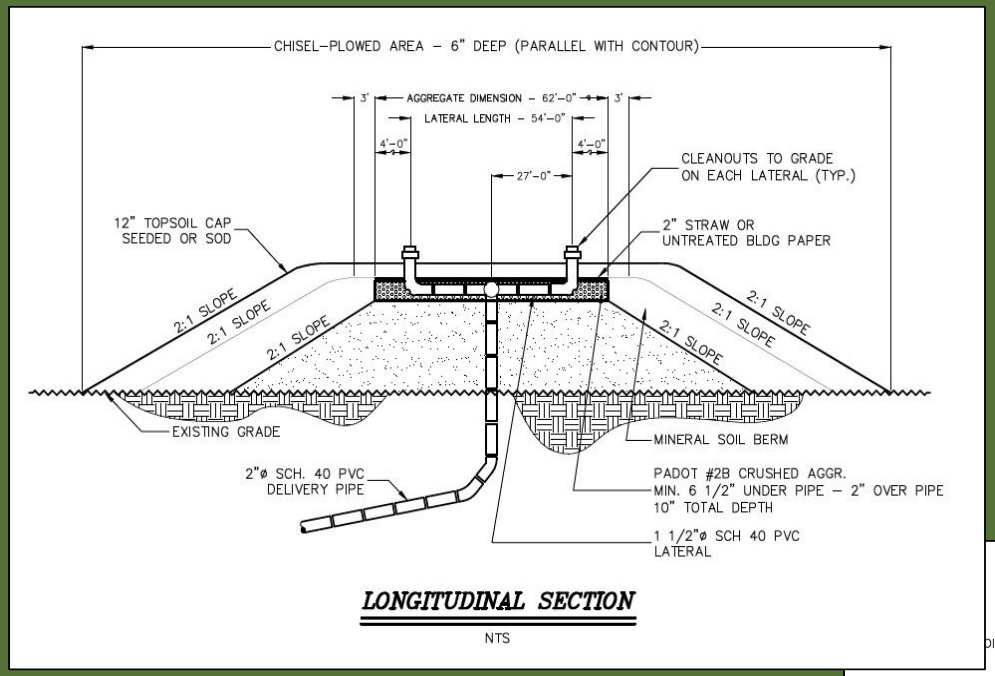
- Absorption Area
  - Typically, an overhead view and at least one cross section are submitted.
  - Lateral details
  - Aggregate material specifications
  - Sand or stone depth
  - Check the depths of aggregate on the cross section and compare them to the elevations for consistency.

Overhead View



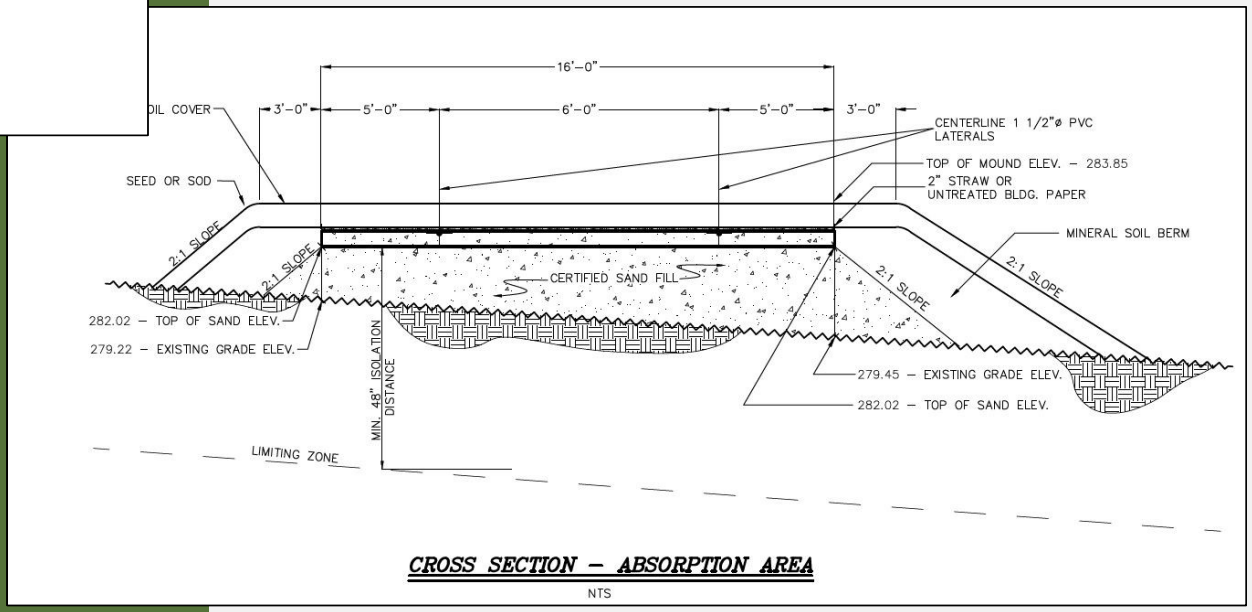


Cross Section- Two different views



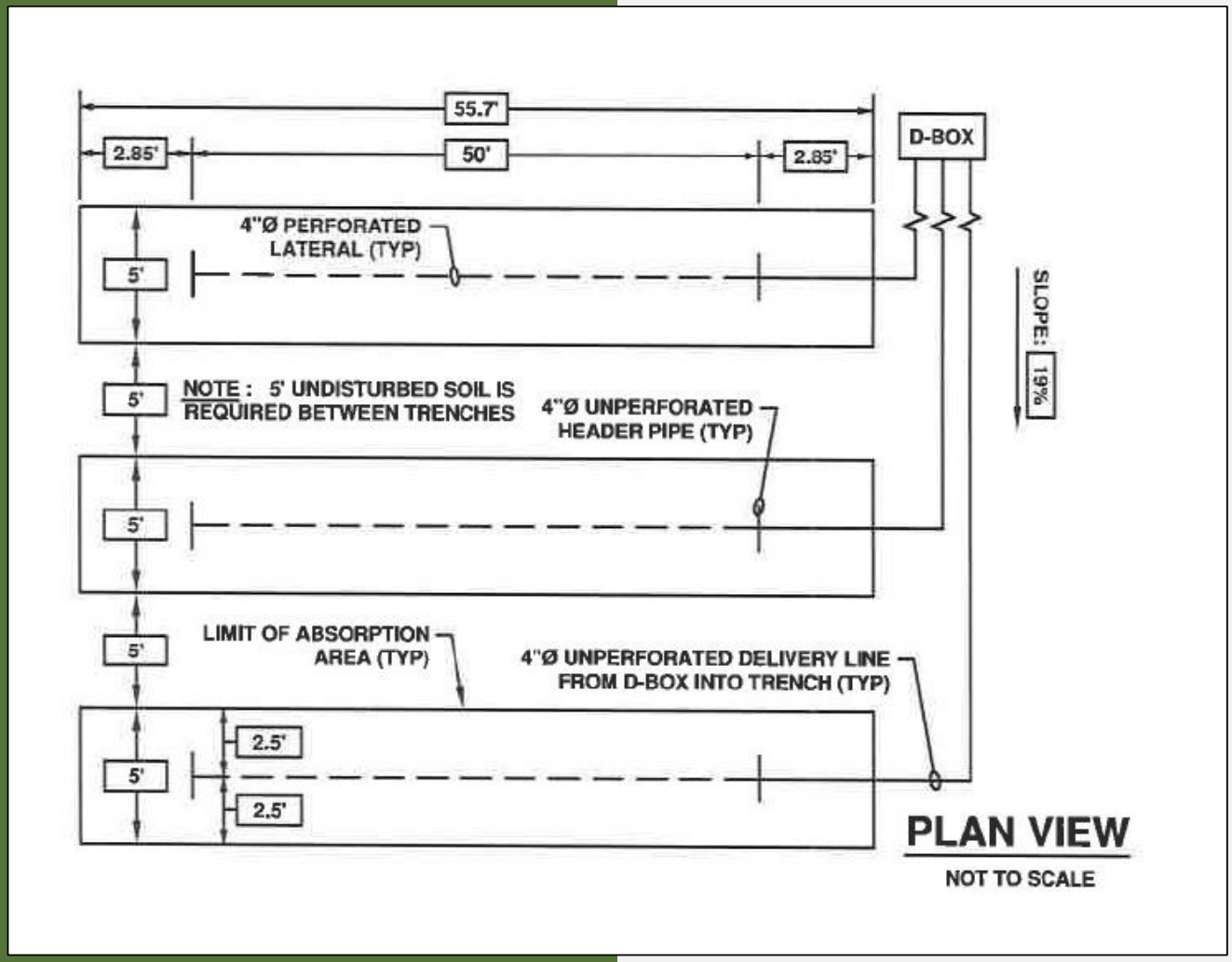
LONGITUDINAL SECTION

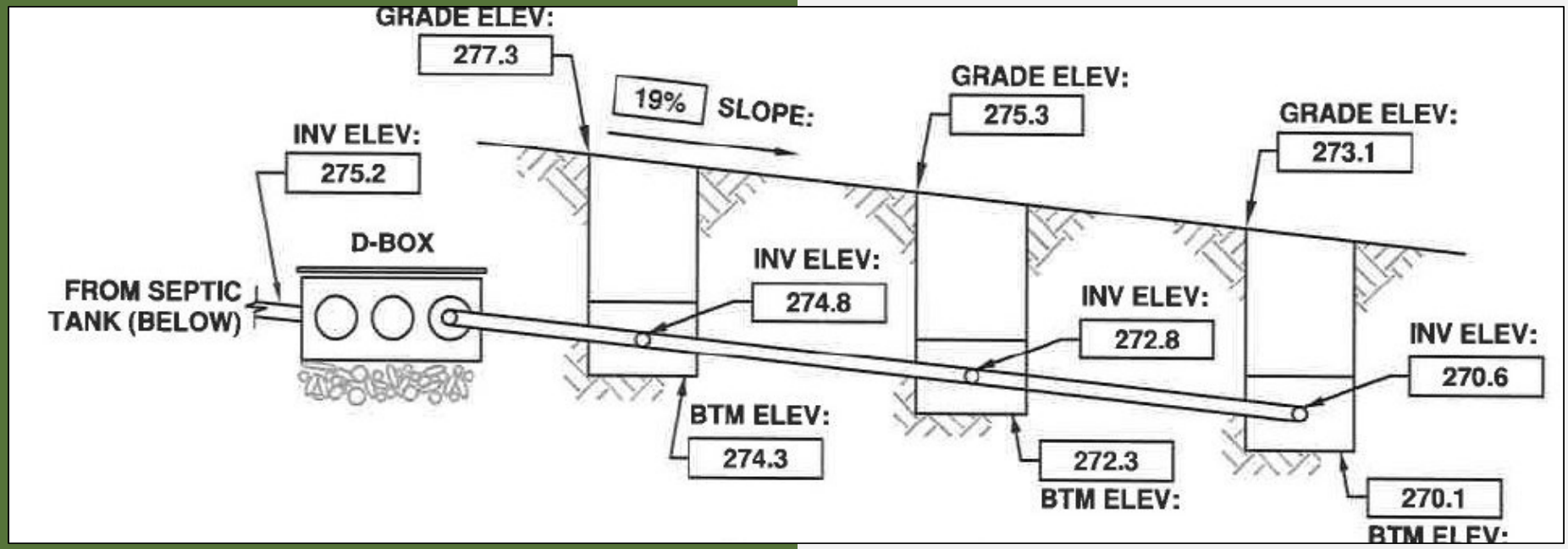
NTS



CROSS SECTION - ABSORPTION AREA

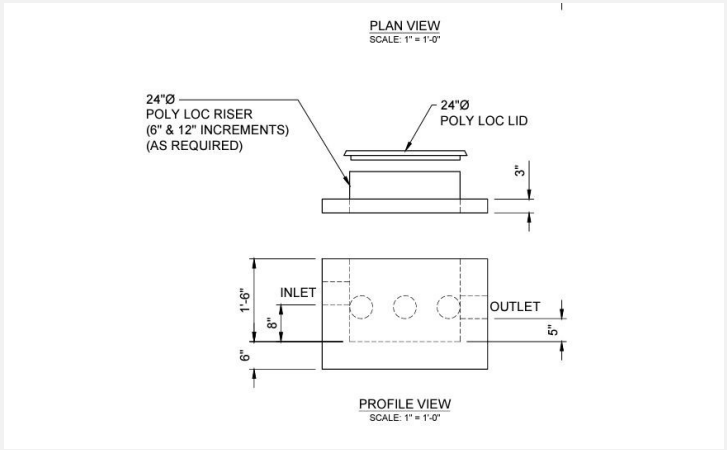
NTS

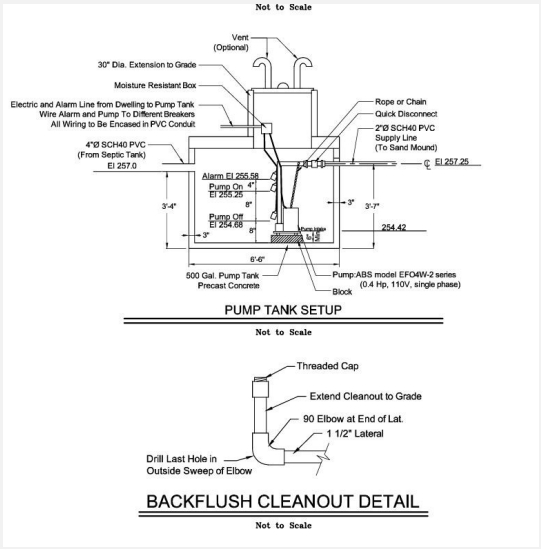

55.7'
2.85'
50'
2.85'
D-BOX
4"Ø PERFORATED LATERAL (TYP)
5'
SLOPE: 19%
5'
NOTE : 5' UNDISTURBED SOIL IS REQUIRED BETWEEN TRENCHES
4"Ø UNPERFORATED HEADER PIPE (TYP)
5'
5'
LIMIT OF ABSORPTION AREA (TYP)
4"Ø UNPERFORATED DELIVERY LINE FROM D-BOX INTO TRENCH (TYP)
2.5'
5'
2.5'
PLAN VIEW
NOT TO SCALE


GRADE ELEV:
277.3
19% SLOPE:
GRADE ELEV:
275.3
GRADE ELEV:
273.1
INV ELEV:
275.2
D-BOX
FROM SEPTIC
TANK (BELOW)
INV ELEV:
274.8
INV ELEV:
272.8
INV ELEV:
270.6
BTM ELEV:
274.3
272.3
BTM ELEV:
270.1
BTM ELEV:

OTHER IMAGES

- Plans may also include other images to further represent individual system components such as a d-box, hydraulic unit, control boxes, cleanout details, etc.





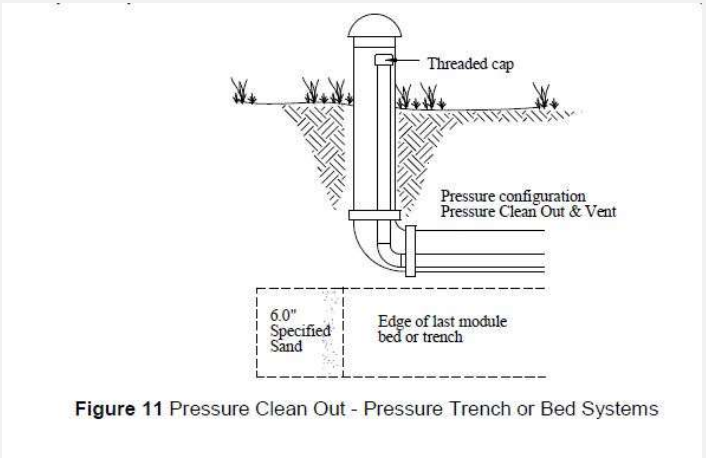


Figure 11 Pressure Clean Out - Pressure Trench or Bed Systems

CALCULATIONS

- Not enough time to go over specifics!
- Many charts and tools can be used to make calculations simpler. Excel spreadsheets can be particularly helpful to speed the process of reviewing the calculations.
- It is important to know which values would be considered minimum values, as some consultants will add in "fudge factor" as safeguards.
- Confirm that you have the most updated values to use in formulas (for example the updated drip dispersal flow 0.61 vs 0.65).
- Important to learn how to do them by hand first so that any abnormalities would stand out to you in a spreadsheet format.

SITE CHECK: PERMIT REVIEW IN THE FIELD

- Visit the site to see the stakeout in person.
- Measure the isolation distances that could impact the system design, especially the well and neighboring wells.
- Locate the site testing and compare location to the plan given.
- Note any site conditions that should be included on the plan.

REVIEWING ALTERNATE SYSTEMS

- Key points
  - Routinely check the DEP Alternate Listing Website for any changes (dates of changes are listed on website)
  - Be mindful of alternate technology that allows for up to 40% size reduction and the individual requirements of each
    - Pre-treatment: Advantex Treatment System, Ecoflo Biofilters and Ecoflo EC7 Biofilters, Puraflo Peat Biofilter, Sigulair HKC
    - Absorption Area: Leaching Chambers, Eljen

REVIEWING ALTERNATE SYSTEMS

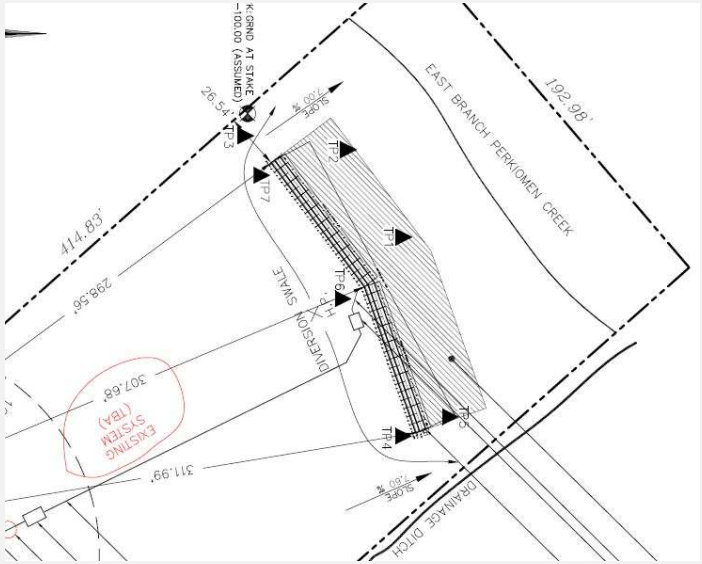
- Know the **permitting requirements** of alternate system components
  - As the permit issuing SEO, have you taken the appropriate DEP sponsored training course or have written DEP permission to issue the permit?
  - Is it required and has the consultant/designer submitted the soil classification document (Soil Morph Report) from the soil scientist?
  - Has warranty information been provided if needed?
  - Does the plan need to be submitted to DEP for review and comment?

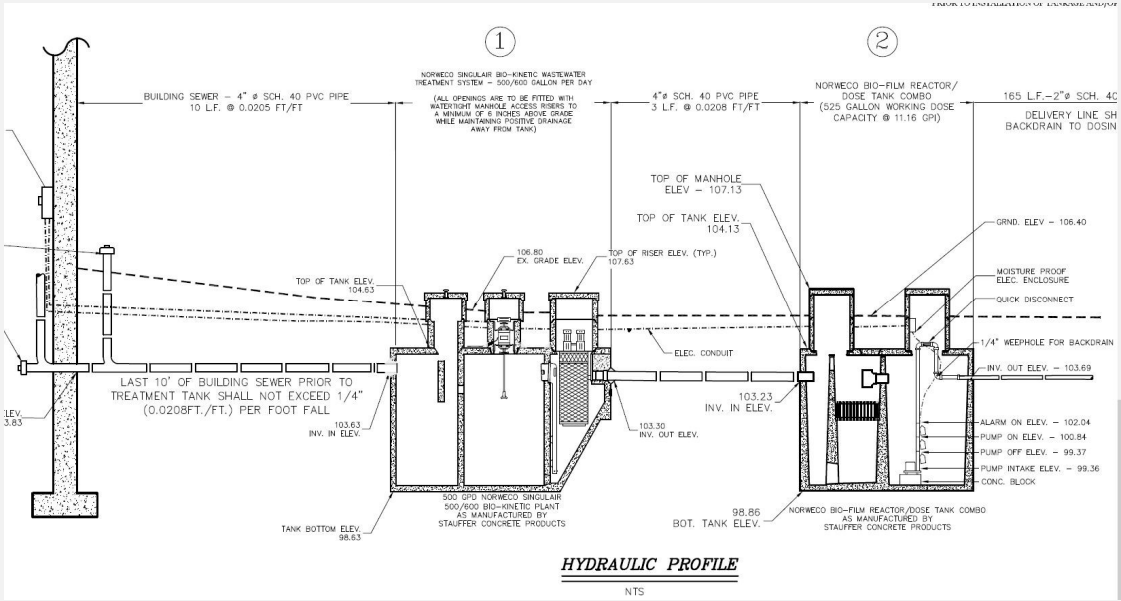
REVIEWING ALTERNATE SYSTEMS

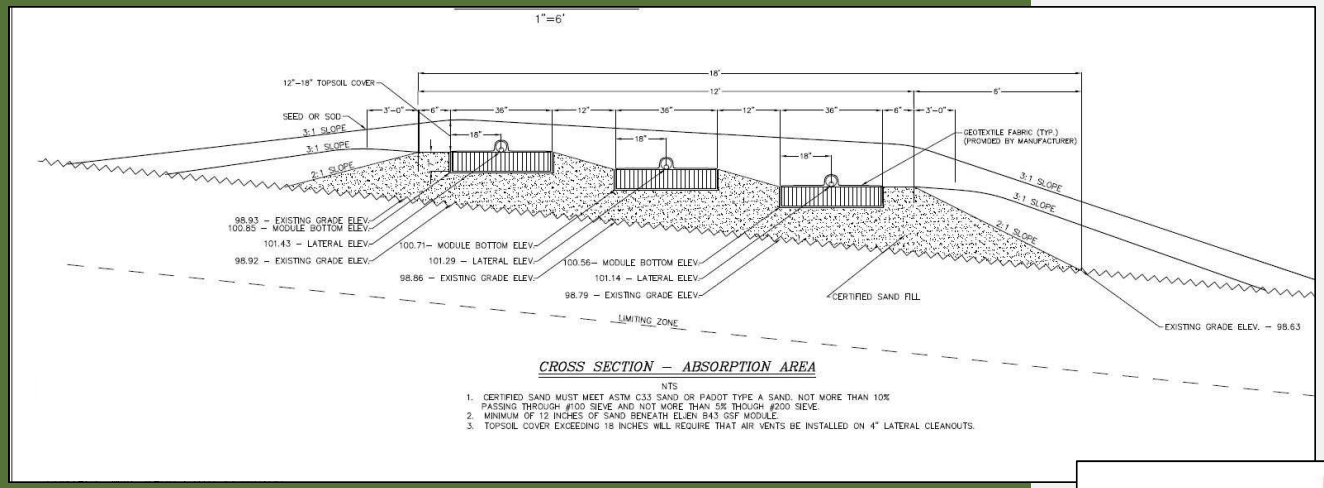
- Confirm that minimum maintenance standards have been met.
- Know the difference between the following:
  - Named service provider
  - Maintenance agreement- two party
  - Service contract
  - Township O&M agreement- for "site-specific alternate" or experimental systems

REVIEWING ALTERNATE SYSTEMS

- Some alternate systems would require additional plan views with components specific to the alternate technology.





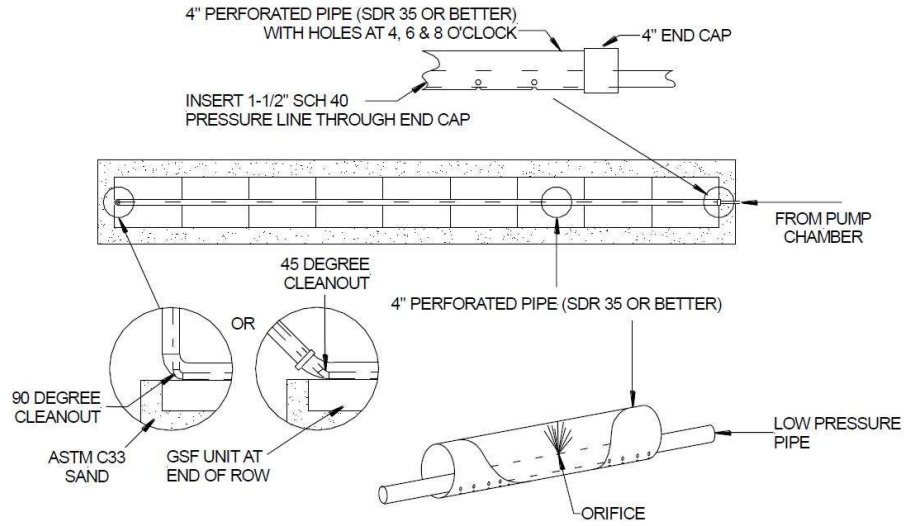


CROSS SECTION - ABSORPTION AREA

NTS

1. CERTIFIED SAND MUST MEET ASTM C33 SAND OR PADOT TYPE A SAND, NOT MORE THAN 10% PASSING THROUGH #100 SIEVE AND NOT MORE THAN 5% THOUGH #200 SIEVE.
2. MINIMUM OF 12 INCHES OF SAND BENEATH ELJEN 843 GSF MODULE.
3. TOPSOIL COVER EXCEEDING 18 INCHES WILL REQUIRE THAT AIR VENTS BE INSTALLED ON 4" LATERAL CLEANOUTS.

FIGURE 17: PRESSURE PIPE PLACEMENT



QUESTIONS

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