



**GROUND WATER DISCHARGES SECTION
EXISTING ON-SITE WASTEWATER SYSTEM FIELD INSPECTION REPORT**

Inspection Request Received From

Name: _____ Mailing Address: _____
 Telephone #: _____ City, State, Zip: _____

Owner (if different)

Name: _____ Mailing Address: _____
 Telephone #: _____ City, State, Zip: _____

Property

****ZONING CERTIFICATE MANDATORY****

Tax Map #: _____ Type of Structure: _____ Single Family Dwelling
 Subdivision (if appl): _____ Multi-Family
 City, State, Zip: _____ Community/Large
 Physical Address: _____ Commercial

Age of Structure: _____ # of Bedrooms: _____ # of Residents: _____

Occupied: ___ Yes ___ No Length of Vacancy: _____ Weeks _____ Months ___ N/A if occupied

Permit / System

Permit Available: ___ Yes ___ No Permit #: _____
 Age of System: _____
 System Type: ___ Full Depth Gravity ___ Full Depth LPP ___ Elevated Sand Mound
 ___ Capping Fill Gravity ___ Capping Fill LPP ___ Micro Drip Irrigation
 ___ Full Depth Pressure Dosed ___ Alternative System* ___ Seepage Pit
 ___ Capping Fill Pressure Dosed ___ Wisconsin at Grade ___ Cesspool

* All Innovative/Alternative systems including Advanced Treatment Unit's (ATU's) and alternative drainfield systems may only be inspected by a Class H licensee that has been certified through DNREC approved training for that ATU or alternative drainfield system. Proof of certification must be submitted to DNREC. **A Class H license alone is not adequate enough for this task.**

General Information

Pump Out

Date of Last Pump Out: _____
 Pumping Frequency: _____

Repairs

Repairs made to system? ___ Yes ___ No
 Was repair permit issued? ___ Yes ___ No
 Details _____

Name of System Maintainer

Water Service

___ Central Water ___ On-Site Well

Is this a second opinion inspection? ___ Yes ___ No
 Is there a water treatment system discharging into the systems? ___ Yes ___ No
 Does grey water discharges somewhere other than the septic system? ___ Yes ___ No
 If yes, location _____

Information Verification

I attest this information I have provided is true and accurate to the best of my knowledge

 Owner's/Requestor's Signature

 Date

For Kent & New Castle Counties - 89 Kings Highway, Dover, DE 19901 - (302) 739-9947 Tel / (302) 739-7764 Fax
 For Sussex County - 20653 DuPont Blvd, Unit 5, Georgetown, DE 19947 - (302) 856-4561 Tel / (302) 856-5088 Fax



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

EXISTING ON-SITE WASTEWATER SYSTEM
FIELD INSPECTION REPORT
EXAMPLE

ISSUED: JANUARY 1985
 REVISED: JANUARY 2012

EXHIBIT - A
(Sheet 1 of 5)



**GROUND WATER DISCHARGES SECTION
EXISTING ON-SITE WASTEWATER SYSTEM FIELD INSPECTION REPORT**

Inspection Data

Date: _____
 Site Condition: ___ Dry ___ Wet Recent Heavy Precipitation? ___ Yes ___ No
 Weather: ___ Sunny ___ Cloudy ___ Rain ___ Snow

Is there evidence that sewage has backed up into the structure? _____ Yes _____ No
 Do trees or tree roots appear to interfere with the system? _____ Yes _____ No
 Is there evidence or documentation of wastewater surfacing? _____ Yes _____ No
 Is any portion of the system below a deck, driveway, walkway, etc.? _____ Yes _____ No
 Was a visual inspection under the home for grey water performed? _____ Yes _____ No
 _____ No Access
 Was a flow test from each household fixture performed? _____ Yes _____ No
 _____ No Access

Treatment Tank(s)

**** PUMP OUT MANDATORY ****

___ Septic Tank	Capacity (gal) * _____	# of Compartments _____
	Material ** _____	Dimensions ___ x ___ x _____
___ Cesspool	Capacity (gal) * _____	# of Compartments _____
	Material ** _____	Dimensions ___ x ___ x _____
___ Other	Capacity (gal) * _____	# of Compartments _____
	Material ** _____	Dimensions ___ x ___ x _____
	Scum Thickness _____	Sludge Thickness _____

* Round: D" X D" / 292.5 X H" Rectangular: L" X W" / 231 X H" ** Specify Concrete, Metal, Other

	<u>S</u>	<u>SWC</u>	<u>U</u>		<u>S</u>	<u>SWC</u>	<u>U</u>
Tank	___	___	___	Liquid Level (Tank)	___	___	___
Top/Lids/Risers (if appl)	___	___	___	Effluent Filter	___ N/A	___	___
Baffles	___	___	___				

Name of pump company _____ Date of pump out _____

*** PUMPOUT DOCUMENTATION MAY BE REQUIRED ***

Does effluent from the absorption facility run back to the treatment tank? _____ Yes _____ No
 Is there evidence of effluent surfacing above the treatment tank(s)? _____ Yes _____ No

S = Satisfactory, SWC = Satisfactory With Concerns, U = Unsatisfactory

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AND ENVIRONMENTAL CONTROL

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EXHIBIT - A
(Sheet 2 of 5)



GROUND WATER DISCHARGES SECTION

EXISTING ON-SITE WASTEWATER SYSTEM FIELD INSPECTION REPORT

Distribution System							
	<u>S</u>	<u>SWC</u>	<u>U</u>		<u>S</u>	<u>SWC</u>	<u>U</u>
Distribution Box (if Existing)	_____	_____	_____	Liquid Level (D-Box)	_____	_____	_____
Diversion Box (if Existing)	_____	_____	_____	Liquid Level (Div-Box)	_____	_____	_____
Distribution Piping	_____	_____	_____	Top/Lid	_____	_____	_____
Baffles	_____	_____	_____				

S = Satisfactory, SWC = Satisfactory With Concerns, U = Unsatisfactory

Distribution Box level, allowing equal distribution? _____ Yes _____ No _____ N/A
 Is effluent above the lateral inverts in the distribution box? _____ Yes _____ No _____ N/A
 Does effluent from the absorption facility run back to the D-Box? _____ Yes _____ No _____ N/A
 Is there evidence of effluent surfacing above the D-Box? _____ Yes _____ No _____ N/A

Distribution Box Capacity (gal) * _____
 Material ** _____
 Dimensions _____ x _____ x _____

* Round: D" X D" / 292.5 X H" Rectangular: L" X W" / 231 X H"

** Specify Concrete, Metal, Other

Holding / Dosing Tank / Lift Station							
_____ Holding Tank	_____ Lift Station	_____ Dosing Tank	Gallons: _____				
			Material: _____				
			Dimensions: _____ x _____ x _____				
	<u>S</u>	<u>SWC</u>	<u>U</u>		<u>S</u>	<u>SWC</u>	<u>U</u>
Tank	_____	_____	_____	Electrical Connections	_____	_____	_____
Top/Lids/Risers (if appl)	_____	_____	_____	Timer _____ N/A	_____	_____	_____
Pump/Siphon Operat.	_____	_____	_____	Check Valve & Weep Hole	_____	_____	_____
Alarm	_____	_____	_____	Pump Elev. Off Tank Floor	_____	_____	_____
Vent Pipe	_____	_____	_____				

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Accumulated solids found in pump tank? _____ Yes _____ No
 Is alarm on separate circuit? _____ Yes _____ No
 Infiltration of surface waters? _____ Yes _____ No

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AND ENVIRONMENTAL CONTROL

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EXHIBIT - A
(Sheet 3 of 5)



**GROUND WATER DISCHARGES SECTION
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Absorption Facility

Located: Yes No More than one absorption facility: Yes No

How Many: _____ Total Sq Ft: _____

_____ Bed	_____ x _____	(approx. size) = _____	Sq Ft	
_____ Trenches	_____ x _____	(approx. size) = _____	Sq Ft	# of Trenches _____
_____ Seepage Pit	_____ x _____	(approx. size) = _____	Sq Ft	
_____ Cesspool	_____ x _____	(approx. size) = _____	Sq Ft	
_____ Other (describe)	_____			

Are there signs of previous absorption facility failure? Yes No

Are there any overflow lines? Yes No

Summary of System Component Inspections
Review "Overall Comments" for Summary of Ratings

	Satisfactory	Satisfactory With Concerns	Unsatisfactory
Treatment Tank(s)	_____	_____	_____
Holding/Dosing Tank/Lift Station	_____	_____	_____
Absorption Facility(ies)	_____	_____	_____
Distribution System	_____	_____	_____

Overall Comments (use additional paper if needed)
Include Comments for Satisfactory with Concerns & Unsatisfactory Ratings

Inspector

Name: _____ License #: _____
Signature: _____ Telephone #: _____
Date: _____

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EXHIBIT - A
(Sheet 4 of 5)



**GROUND WATER DISCHARGES SECTION
EXISTING ON-SITE WASTEWATER SYSTEM FIELD INSPECTION REPORT**

Scale Drawing of On-Site Wastewater Treatment & Disposal System Location or Attach Existing Permitted Plot Drawing

Scale
1" = _____'

North

-
- A site drawing to scale, straight edge must be used (no free-hand lines), must show a reference point such as numbered utility pole, telephone or electrical box, building(s), property corners or fixed survey markers, or GPS coordinates. A minimum of two (2) such reference points should be noted on the site sketch. Site sketch(es) shall be based on a whole number scale not to exceed 1 inch equals 100 feet. Acceptable scales are: 1 inch = 10, 20, 30, 40, 50, 60, or 100 feet.
 - A north directional arrow.
 - Indicate location of central water line or onsite well. All onsite wells must be measured from two (2) reference points or established survey control.
 - Identify each wastewater treatment and disposal system component.
 - Mark distances from fixed reference points (i.e. property corners, existing dwelling, etc.) or established survey control points for each wastewater treatment and disposal system component.
 - Should an existing approved permit drawing be available the drawing maybe used, but the inspector must either note on the drawing that "no changes were found" or clearly mark all the changes on the permit drawing.

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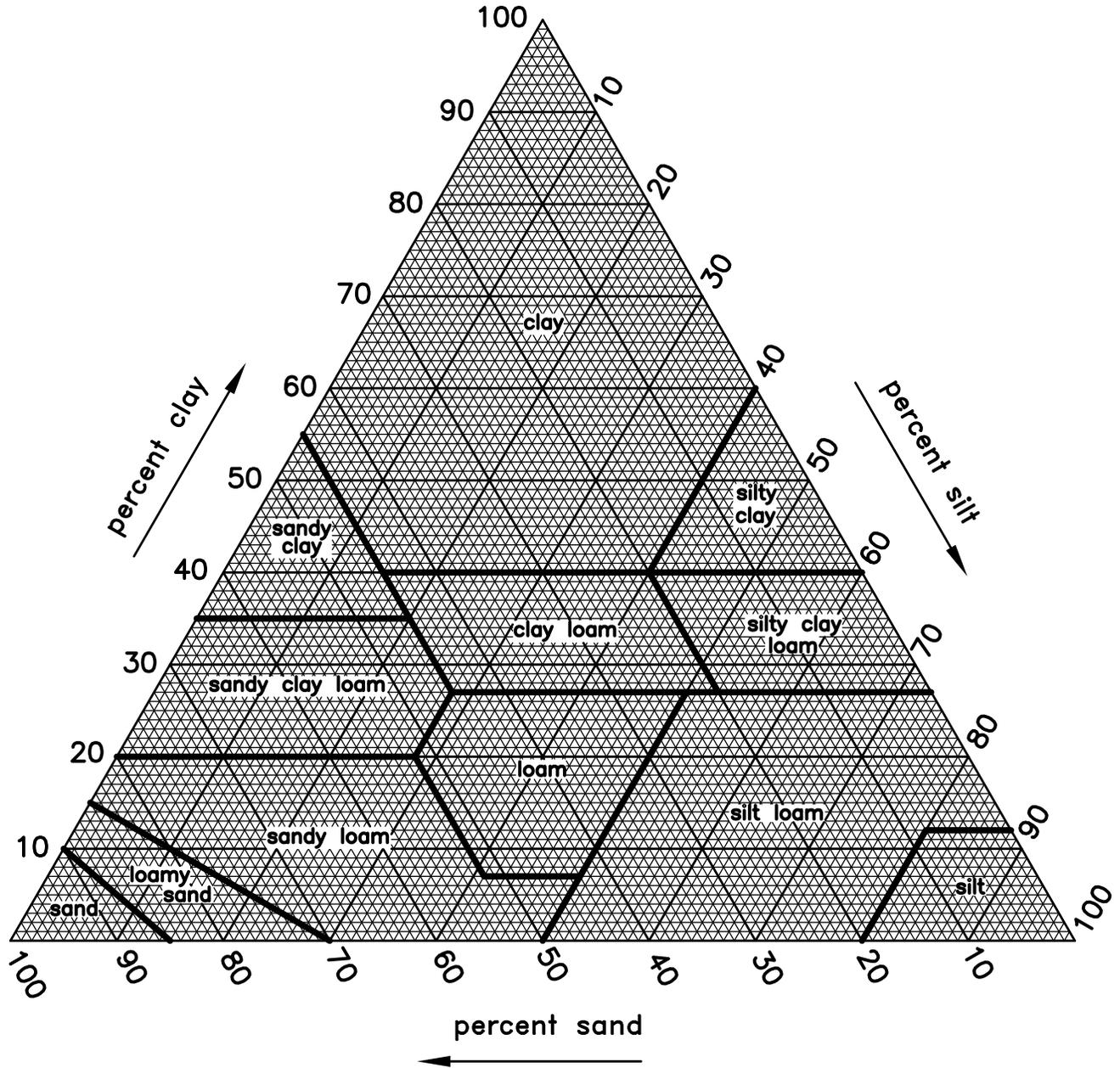
STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

**EXISTING ON-SITE WASTEWATER SYSTEM
FIELD INSPECTION REPORT
EXAMPLE**

ISSUED: JANUARY 1985
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**EXHIBIT - A
(Sheet 5 of 5)**

GUIDE FOR TEXTURAL CLASSIFICATION



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

TEXTURAL TRIANGLE
FOR
SOIL CLASSIFICATION

ISSUED: JANUARY 1985

REVISED: APRIL 2004

EXHIBIT - B

MINIMUM ISOLATION DISTANCES (FEET) FOR SMALL SYSTEMS

Components	Well	Water Supply Pressure Line	Watercourse	Dwellings and Property Lines	Other active on-lot systems	Top of Bank or Escarpment >25%
Septic tank Grease trap Distribution box Dosing chamber Diversion valve or box Advanced treatment unit	50	10	25	10 f	--	--
Disposal area	100 a, c, d, e, h, i	10	100 b	10 g	10	15

MINIMUM ISOLATION DISTANCES (FEET) FOR LARGE SYSTEMS

Components	Well	Water Supply Pressure Line	Watercourse	Dwellings & Property Lines	Other active on-lot systems	Top of Bank or Escarpment >25%
Spray field	100 d	10	100 j, k	150 k	10	--
Rapid Infiltration Basin	100 a, c, d, e	10	100 b	50 g	10	15
Treatment plant	10 d	10	10	10	--	--
Disposal area	100 a, c, d, e	10	100 b	50 g	10	15

NOTE: These isolation distances satisfy the requirements of the Ground Water Discharges Section and these regulations; however, County Codes and Pollution Control Strategies associated with Total Maximum Daily Load regulations may be more stringent.



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

MINIMUM ISOLATION DISTANCES

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - C
(Sheet 1 of 2)

Notes:

- a) Approval of a lesser distance to a minimum isolation distance of 50 feet may be approved by the Department as per the Delaware Regulations Governing the Construction and Use of Wells. The applicant shall provide documentation regarding well distances, depths, and construction to the Department upon request.
- b) Approval of a lesser distance to a minimum isolation of fifty (50) feet may be approved by the Department if the watercourse has not been designated for use as a public water supply or shellfish. There is no setback from an ephemeral watercourse. It is the sole responsibility of the Class D soil scientist to determine whether a watercourse, by definition, is ephemeral.
- c) For elevated sand mound and capping fill systems, distances shall be measured from the outer edge of the stone or gravel-less chamber. RIB's are measured from inside edge of berm.
- d) For public or industrial wells the minimum isolation distance shall be 150 feet.
- e) For replacement systems on lots created by plat or deed and recorded prior to April 8, 1984, an isolation distance of fifty (50) feet between domestic wells and absorption facility may be considered by the Department where the lot size will not allow an isolation distance of 100 feet. The well must be cased to a depth of forty (42) feet, exclusive of the screen, and pressure-grouted with either concrete or bentonite clay to a minimum depth of forty (40) feet. The applicant shall provide documentation regarding well distances, depths, and construction to the Department upon request.
- f) Except in the case of a septic tank for a central sewer system where the absorption facility is not located on the same lot as the septic tank, in which case the distance shall be five (5) feet from the interior lot or easement lines within a recorded subdivision.
- g) Except in the case of a central sewer system where the absorption facility can be five (5) feet from an interior lot or easement lines within a recorded subdivision.
- h) For replacement systems, the well isolation distance may be reduced from 100 feet to a minimum of 50 feet. (maximizing the distance) if and additional twelve (12) inches of suitable soil exists below or is added to (i.e. ESM). (i.e. 36 inch separation for gravity systems to 48 inch separation for well isolation reduction).
- i) The Department may reduce the well isolation distance from 100 feet to a minimum of 50 feet (maximizing the distance) if advanced treatment is incorporated.
- j) If effluent is treated to "Unlimited" access levels the well isolation distance may be reduced from 100 feet to 50 feet
- k) This includes the shoulder of internal and external roads or edge of the roadway if no shoulder is present.



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

MINIMUM ISOLATION DISTANCES

ISSUED: JANUARY 1985
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EXHIBIT - C
(Sheet 2 of 2)

TYPE OF ESTABLISHMENT	UNIT	GALLONS/UNIT/DAY
Airport	Person	5
Assembly Hall, Auditoriums, Indoor Theaters	Seat	3
Banquet Halls/Fire Halls/Community Centers	Seat	15
With bar & food	Seat	30
Barber Shop	Chair	50
Bar with minimum food prep	Seat	20
Bath House	Person	10
Beauty Shop	Chair	125
Boarding or rooming houses	Person	50
Staff	Person	15
Bowling Alley with no bar or restaurant	Lane	100
With bar or restaurant	Lane	200
Camps		
Work	Person	40
Summer	Person	40
Trailer without sewer hook-up	Site	50
Trailer with sewer hook-up	Site	75
Churches	Seat	5
Country Clubs	Person	100
Day Care	Child	10
Day Care Staff add	Person	15
Dentist Office	Chair	100
Office Staff add	Person	20
Dog Kennel	Dog	10
Factories	Person	25
with shower	Person	35
Hospitals	Bed	250+
Hotels	Room	120



TYPE OF ESTABLISHMENT	UNIT	GALLONS/UNIT/DAY
Laundromat	Machine	500
Marinas	Boat Slip	10
Marinas with restrooms	Boat Slip	30
Motels	Room	100
with kitchen	Room	150
Medical office buildings and clinics	Persons	
Doctors, nurses and medical staff		70
Office staff		20
Patients		7
Offices	Employee	20
Outdoor sporting facilities	Persons per day	5
Parks with beaches		
Lavatory waste only	Person	5
Bath house, showers, lavatories	Person	13
Picnic Grounds, Public Swimming Pools		
Picnic with toilets only	Person	5
Picnic with lavatories and showers	Person	11
Swimming Pools and Beaches with lavatories and showers	Person	13
Residential Dwellings	Bedroom	120
Restaurants	Seat	
24 hour service		40
18 hour service		30
12 hour service		20
Add for bars & cocktail lounges		5
Rest/Nursing/Assisted Living Homes	Bed	100



TYPE OF ESTABLISHMENT	UNIT	GALLONS/UNIT/DAY
Schools	Student	10
with gym, showers, cafeteria	Student	25
with cafeteria	Student	15
Boarding	Student	75
Non-resident staff	Staff	15
Service Station	Pump	50
with convenience store	Sq. ft.	0.1
Stores (Retail)	Sq. ft.	0.1
Theaters		
Drive-in	Space	10
Movie Theaters	Seat	4
Veterinarian	Patient	10



GREASE TRAP DESIGN CAPACITIES

TYPE OF FIXTURE	FLOW RATE (GPM)	GREASE RETENTION CAPACITY (LB)	REQUIRED CAPACITY PER FIXTURE CONNECTED TO TRAP (GAL)
Restaurant kitchen sink	15	30	50
Single-compartment sink	20	40	50
Double-compartment sink	25	50	62.5
Triple-compartment sink	30	60	75
2 single-compartment sinks	25	50	62.5
2 triple-compartment sinks	40	80	100
Dishwasher for restaurants			
Up to 30 gallons of water	15	30	50
Up to 50 gallons of water	25	50	62.5
50 to 100 gallons of water	40	80	100



STATE OF DELAWARE

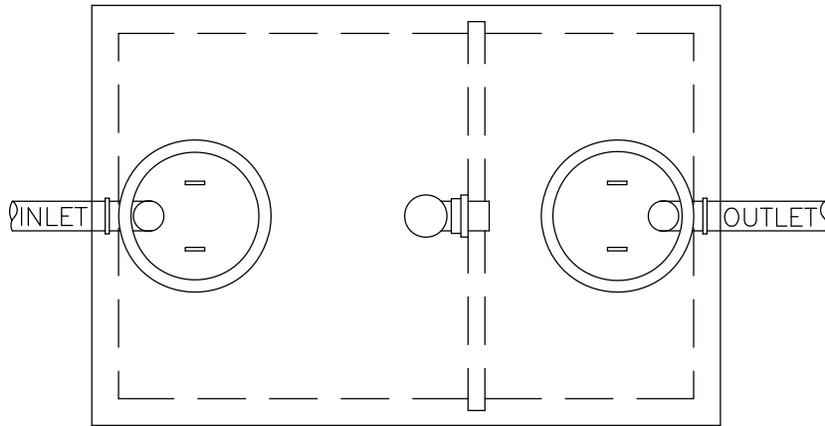
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

GREASE TRAP DESIGN CAPACITIES

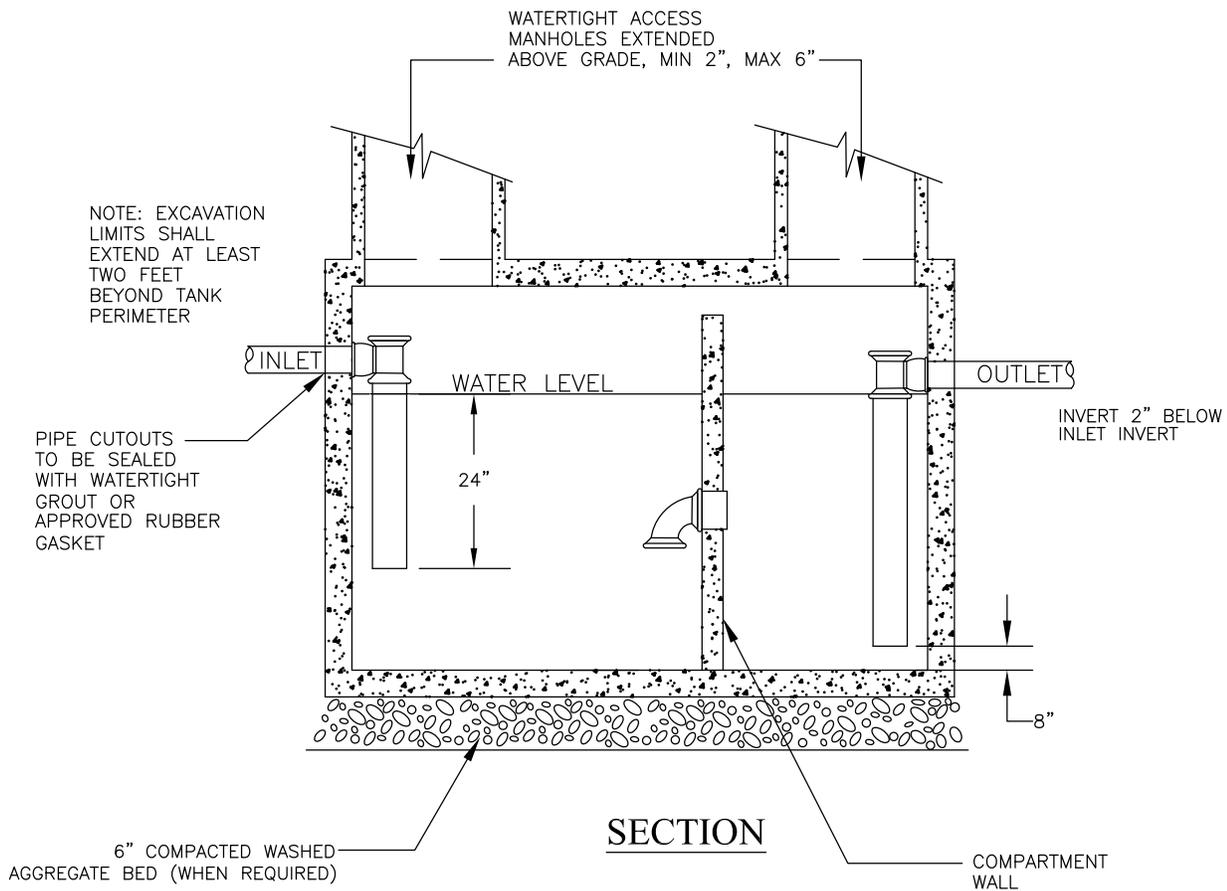
ISSUED: JANUARY 1985

REVISED: APRIL 2004

EXHIBIT - E



PLAN



SECTION



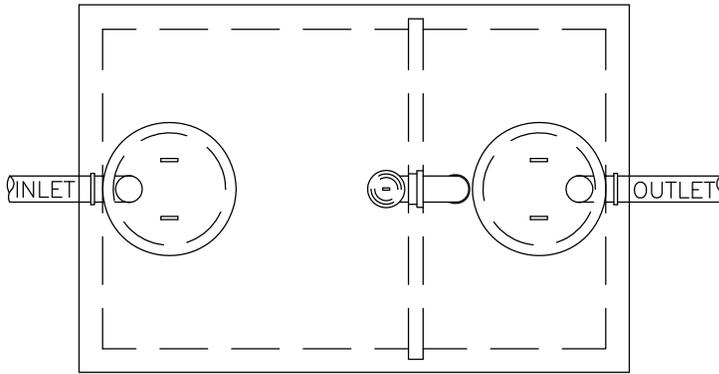
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

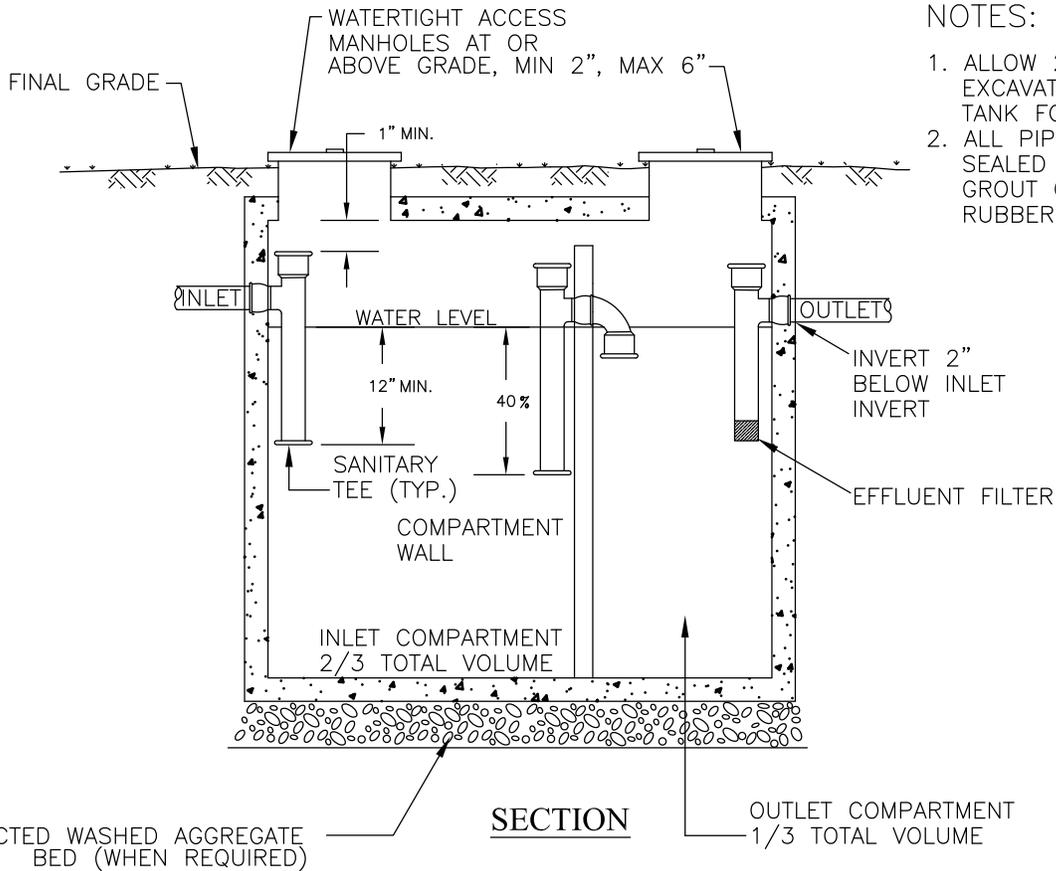
TYPICAL GREASE TRAP
(NOT TO SCALE)

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - F



PLAN



NOTES:

1. ALLOW 2' CLEARANCE IN EXCAVATION AROUND TANK FOR TAMPING.
2. ALL PIPE CUTOUTS TO BE SEALED WITH WATERTIGHT GROUT OR APPROVED RUBBER GASKET.



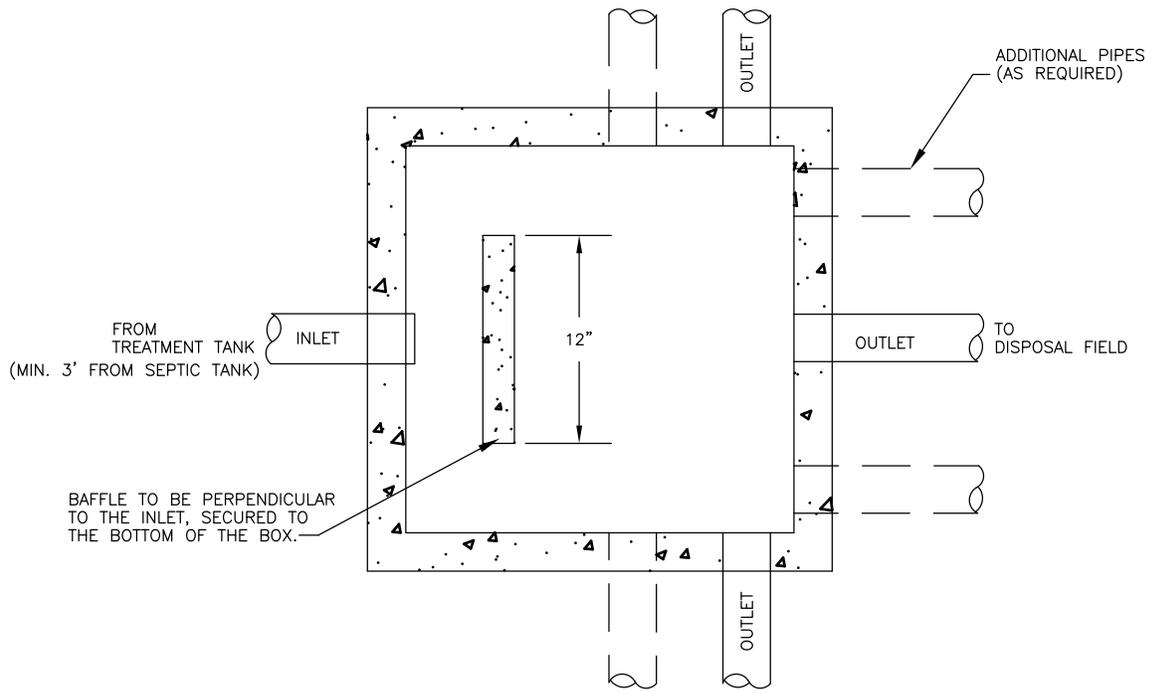
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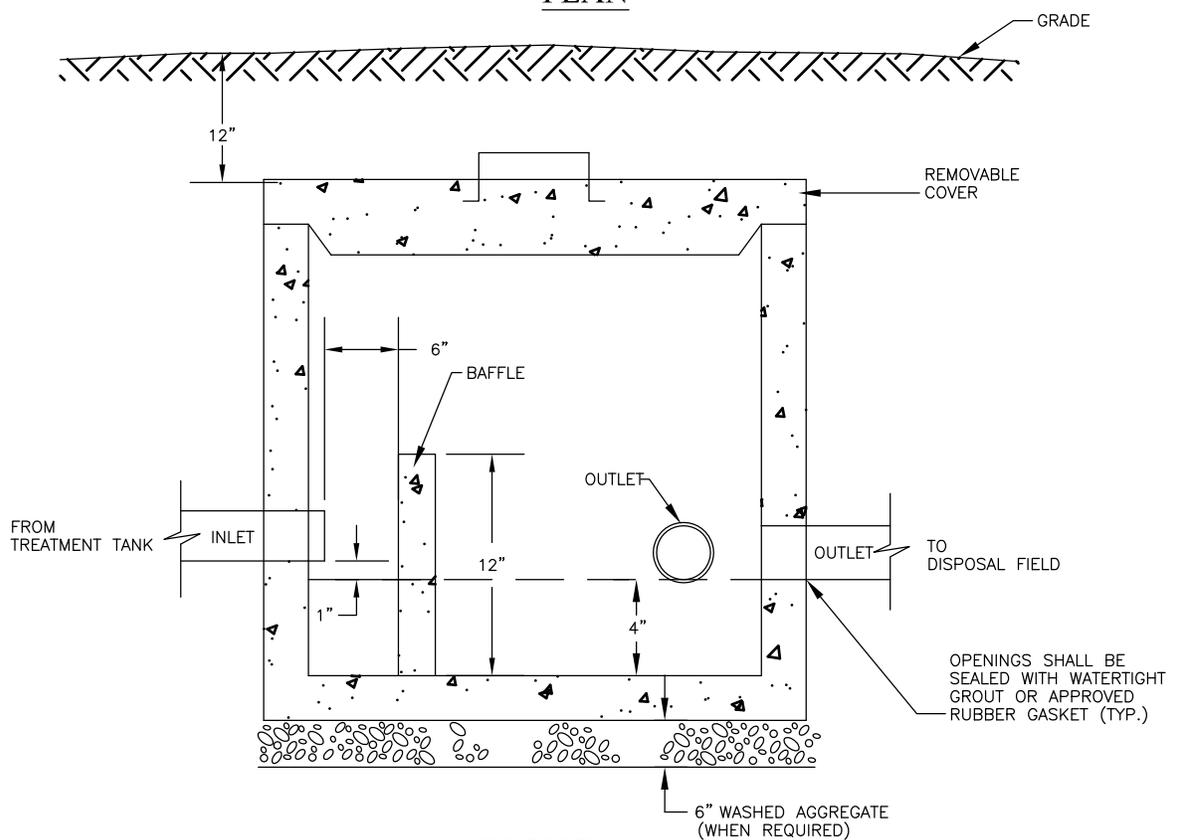
**TYPICAL TWO-COMPARTMENT
SEPTIC TANK**

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - G



PLAN



SECTION

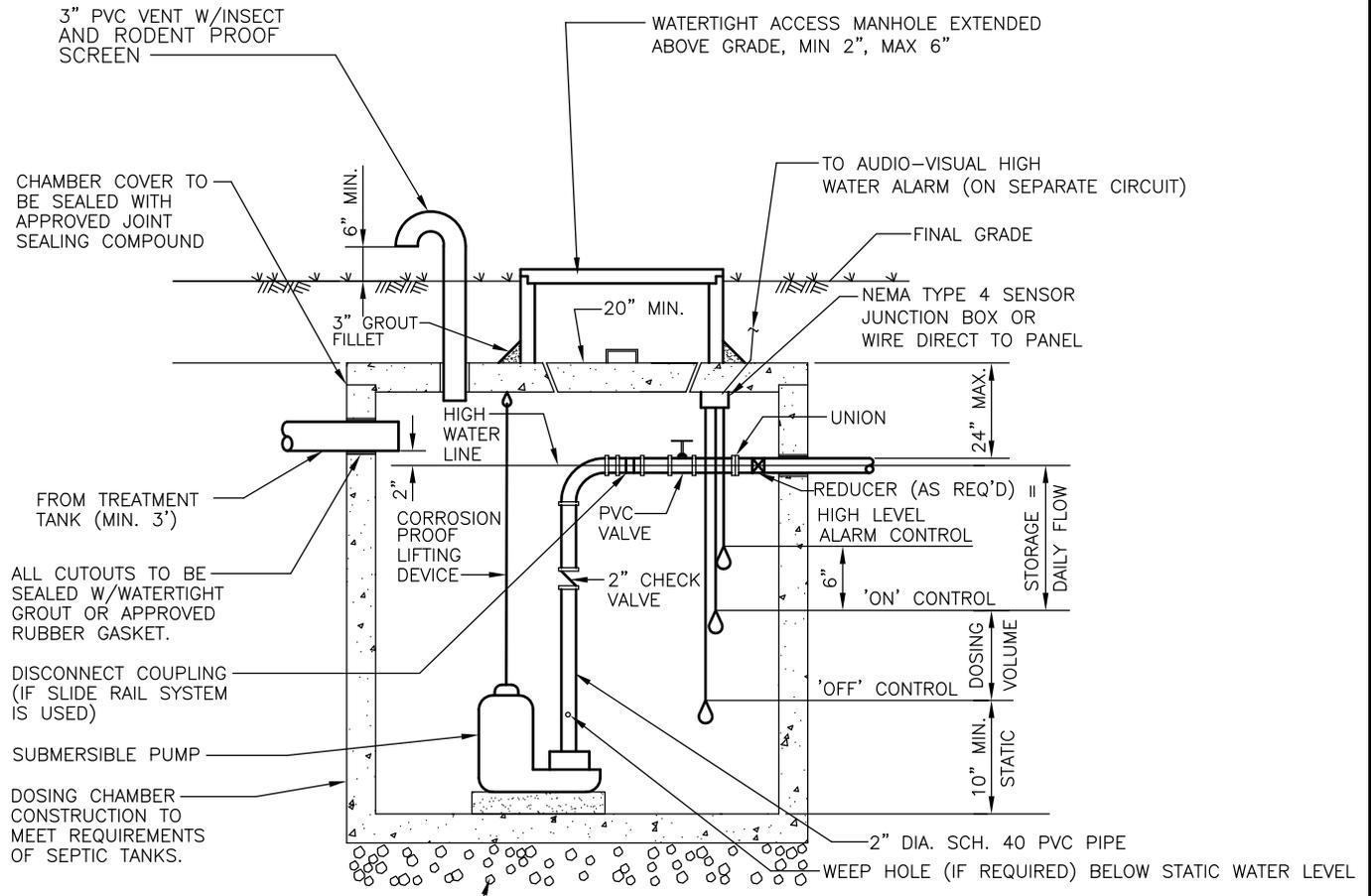


STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

TYPICAL CONCRETE DISTRIBUTION
BOX
(NOT TO SCALE)

ISSUED: JANUARY 1985
REVISED: APRIL 2004

EXHIBIT - H



6" COMPACTED WASHED AGGREGATE BED (WHEN REQUIRED FOR STABILIZATION)

NOTE:
 ADJUST PVC GATE VALVE FOR MINIMUM 2.31' ORIFICE HEAD.
 FLOATS ARE NOT TO BE LOCATED DIRECTLY BELOW INLET.

SECTION

NOTES:

1. MAXIMUM DEPTH FROM GRADE TO INVERT OF DOSING CHAMBER TO BE 9'-0".
2. EXCAVATION LIMITS SHALL EXTEND AT LEAST 2 FEET BEYOND TANK PERIMETER.
3. ALL PIPE TO BE PVC SCHEDULE 40.
4. CHAMBER TO BE SIZED ACCORDING TO REQUIREMENTS OF DOSING VOLUME AND STORAGE.
5. ALL DOSING CHAMBER COMPONENTS SHALL BE FIELD TESTED TO ENSURE ACCURACY, WATER TIGHTNESS, AND PROPER OPERATION OF ALL PUMPS AND ALARM CONTROLS.
6. ALL ELECTRICAL CONNECTIONS SHALL BE WATERPROOF, CORROSION-RESISTANT AND EXPLOSION-PROOF. (IF INSIDE TANK)
7. WHERE POSSIBLE, PUT ALL ELECTRICAL CONNECTIONS OUTSIDE OF THE TANK.
8. RAIN TIGHT (3R) BOXES ARE REQUIRED OUTSIDE OF THE TANK: NOT EXPLOSION PROOF.
9. THE REDUCER, IF USED, CAN BE INSTALLED INSIDE OF THE TANK.

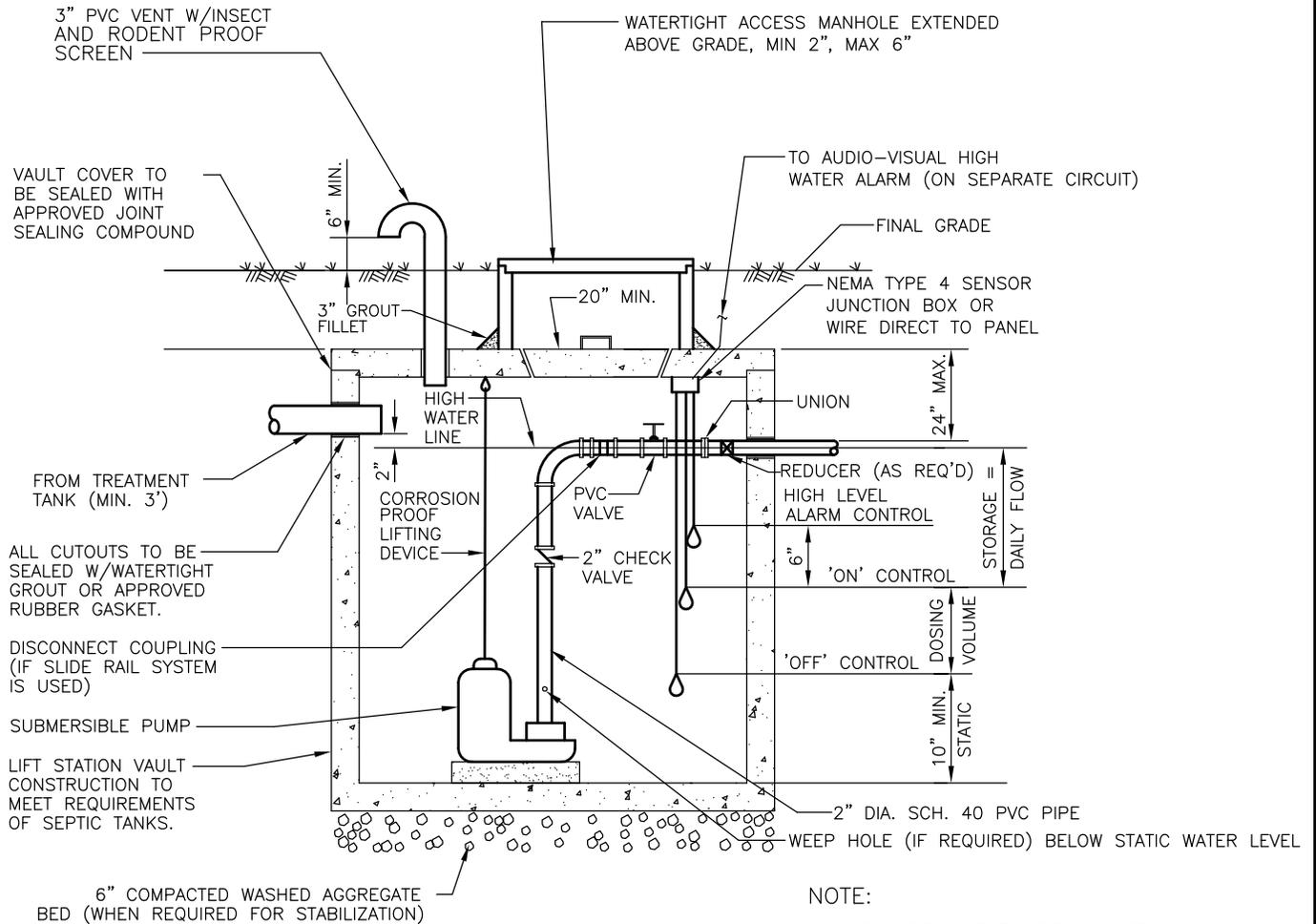


STATE OF DELAWARE
 DEPARTMENT OF NATURAL RESOURCES
 AND ENVIRONMENTAL CONTROL

TYPICAL PUMP DOSING CHAMBER
 (NOT TO SCALE)

ISSUED: JANUARY 1985
 REVISED: JANUARY 2012

EXHIBIT - I
 (Sheet 1 of 2)



SECTION

NOTES:

1. MAXIMUM DEPTH FROM GRADE TO INVERT OF LIFT STATION TO BE 9'-0".
2. EXCAVATION LIMITS SHALL EXTEND AT LEAST 2 FEET BEYOND VAULT PERIMETER.
3. ALL PIPE TO BE PVC SCHEDULE 40.
4. VAULT TO BE SIZED ACCORDING TO REQUIREMENTS OF DOSING VOLUME AND STORAGE.
5. ALL LIFT STATION COMPONENTS SHALL BE FIELD TESTED TO ENSURE ACCURACY, WATER TIGHTNESS, AND PROPER OPERATION OF ALL PUMPS AND ALARM CONTROLS.
6. ALL ELECTRICAL CONNECTIONS SHALL BE WATERPROOF, CORROSION-RESISTANT AND EXPLOSION-PROOF. (IF INSIDE VAULT)
7. WHERE POSSIBLE, PUT ALL ELECTRICAL CONNECTIONS OUTSIDE OF THE VAULT.
8. RAIN TIGHT (3R) BOXES ARE REQUIRED OUTSIDE OF THE VAULT: NOT EXPLOSION PROOF.
9. THE REDUCER, IF USED, CAN BE INSTALLED INSIDE OF THE VAULT.

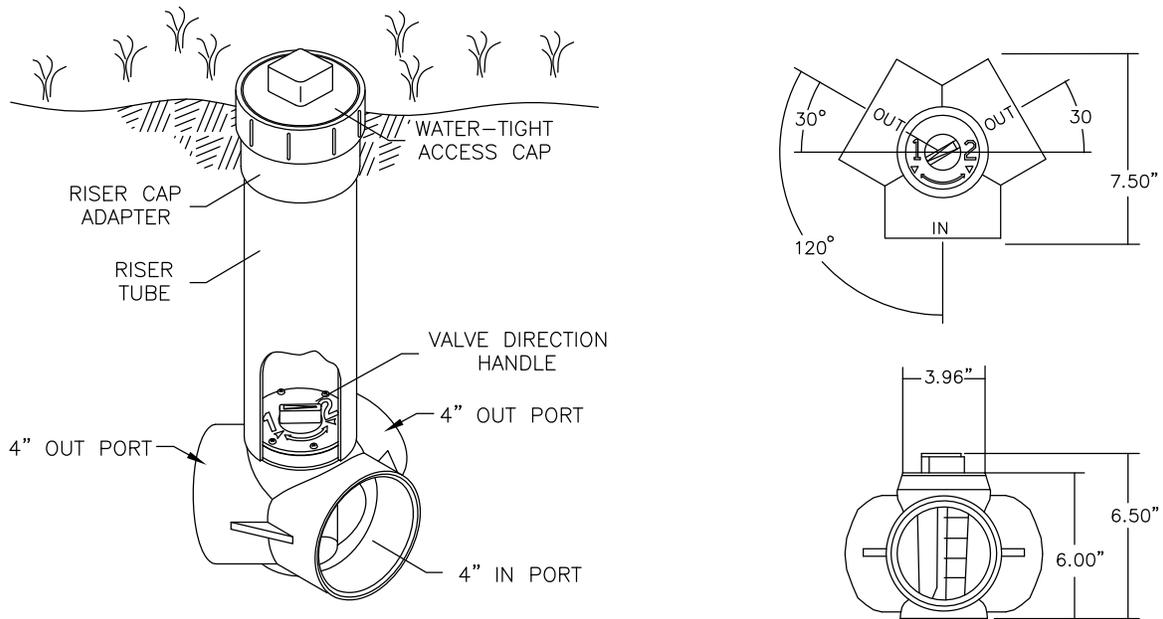


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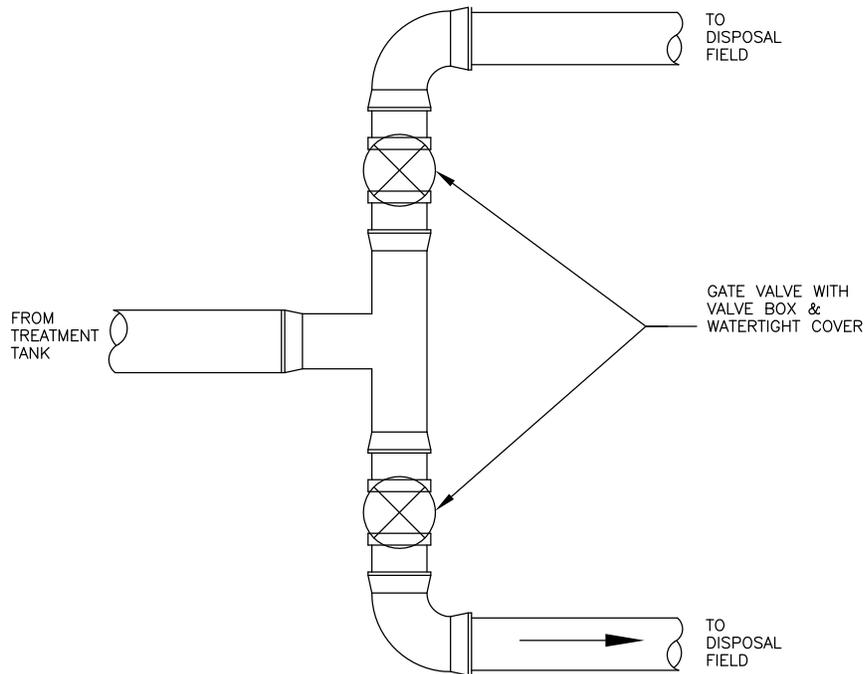
TYPICAL LIFT STATION VAULT
(NOT TO SCALE)

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - I
(Sheet 2 of 2)



BULL RUN VALVE- (TYPICAL)
(FOR GRAVITY FLOW ONLY)



DIVERSION VALVES- (TYPICAL)
(FOR GRAVITY OR PRESSURE SYSTEM)

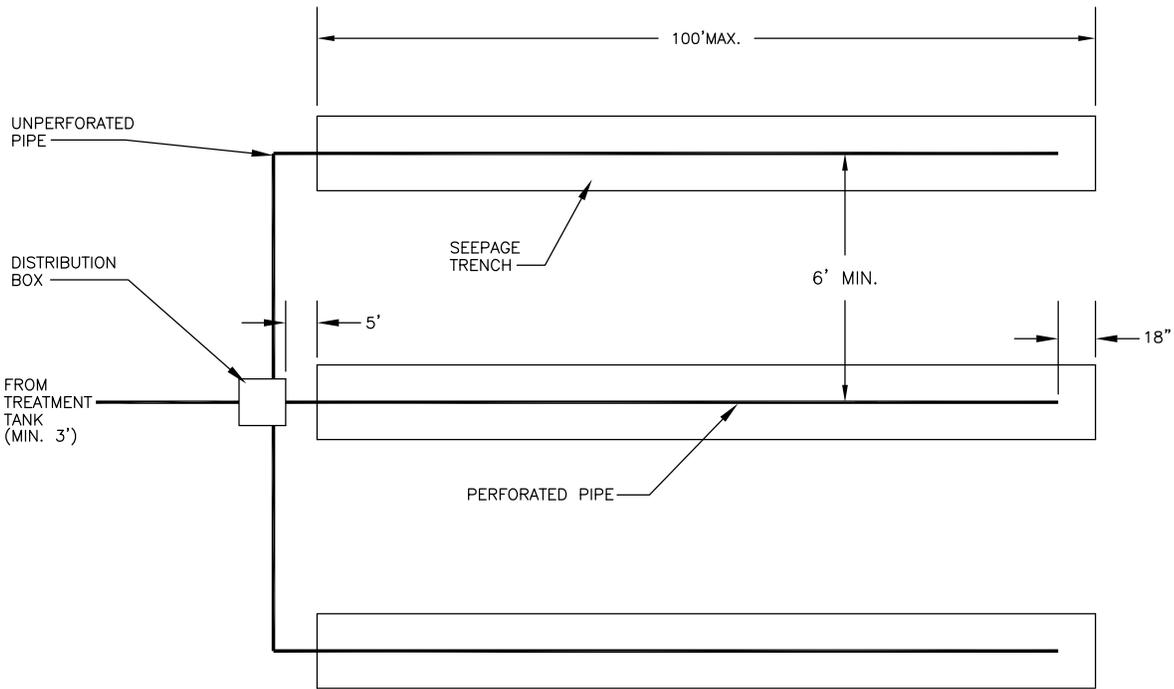


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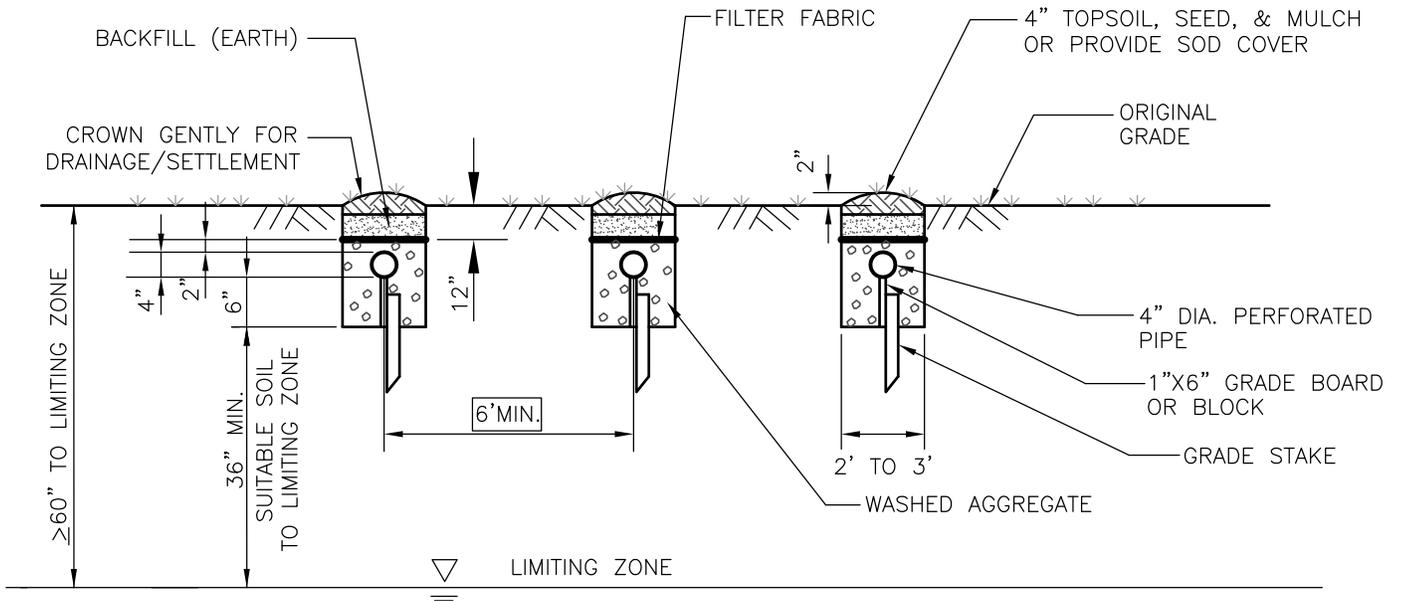
**DIVERSION EQUIPMENT FOR
DUAL FIELDS
(NOT TO SCALE)**

ISSUED: JANUARY 1985
REVISED: APRIL 2004

EXHIBIT - J



PLAN



SECTION



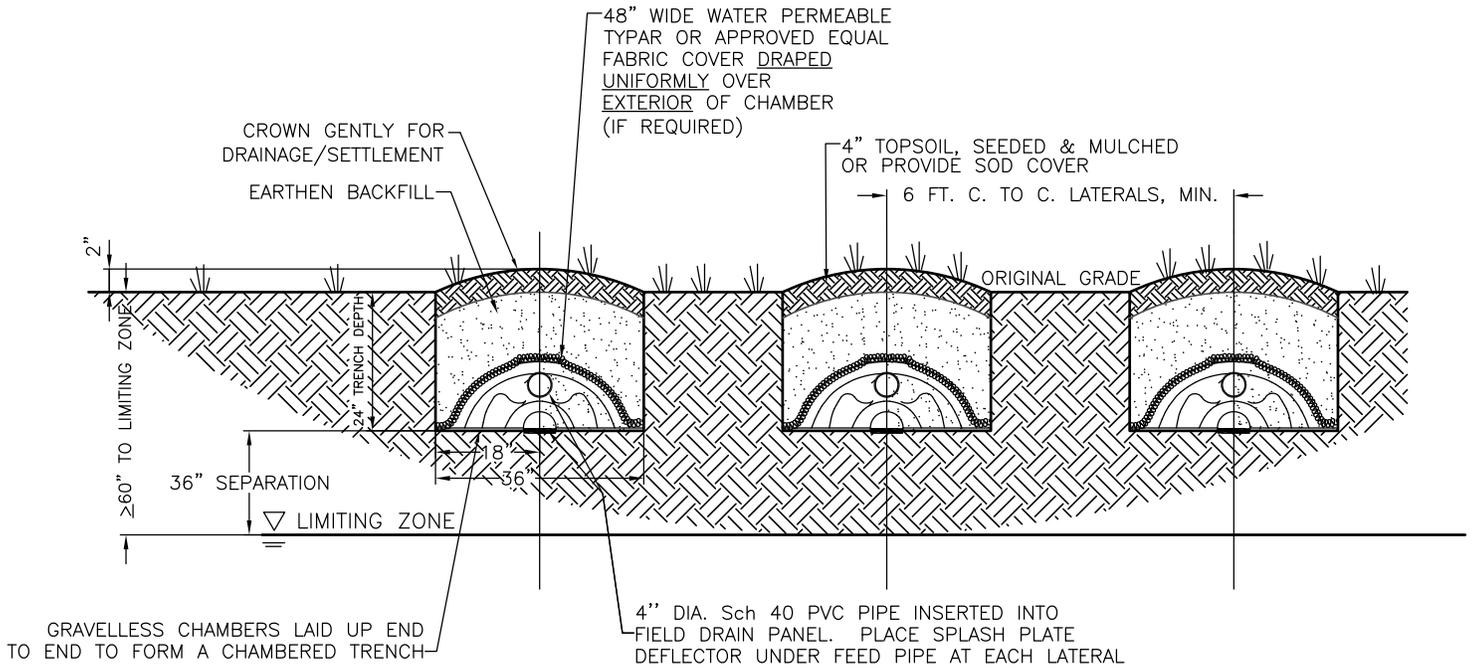
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

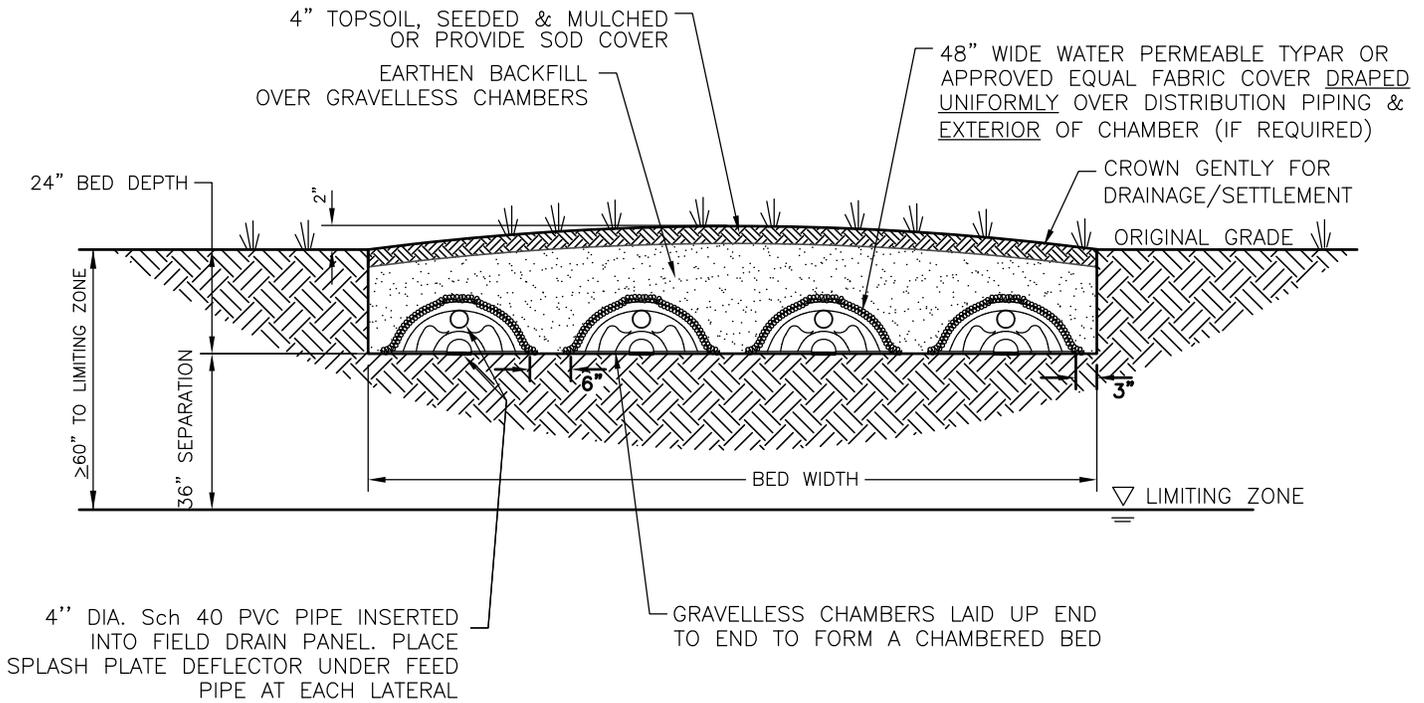
TYPICAL AGGREGATE TRENCH DESIGN FULL DEPTH GRAVITY (NOT TO SCALE)

ISSUED: JANUARY 1985
 REVISED: JANUARY 2012

EXHIBIT - K
 (Sheet 1 of 2)



FULL DEPTH TRENCH SECTION



FULL DEPTH BED SECTION



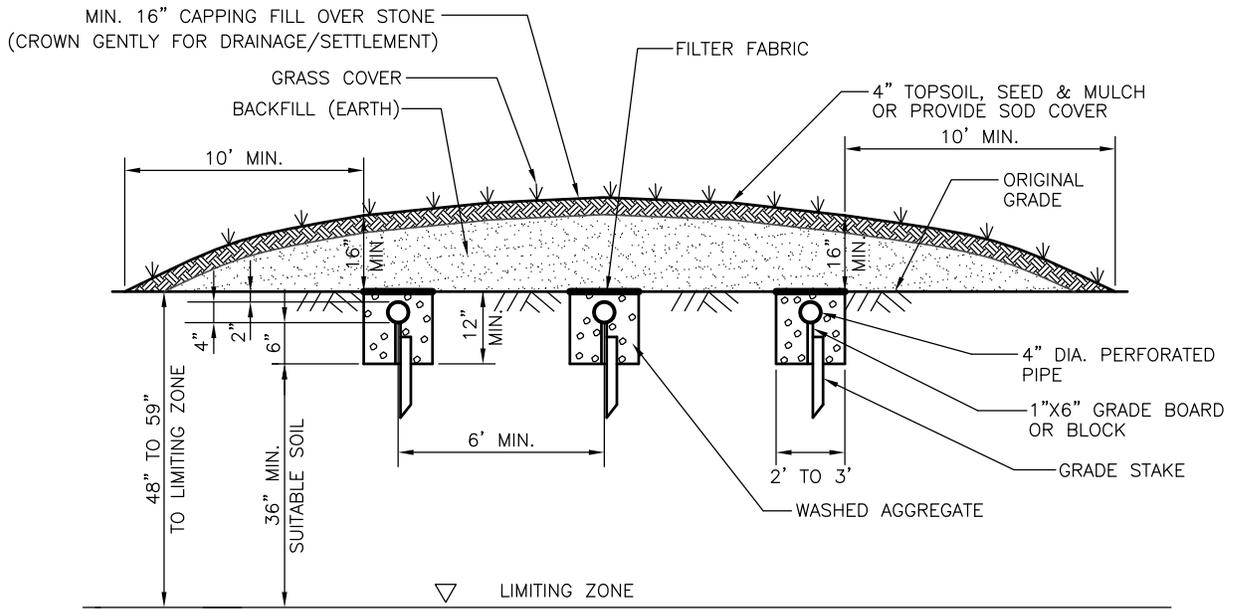
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

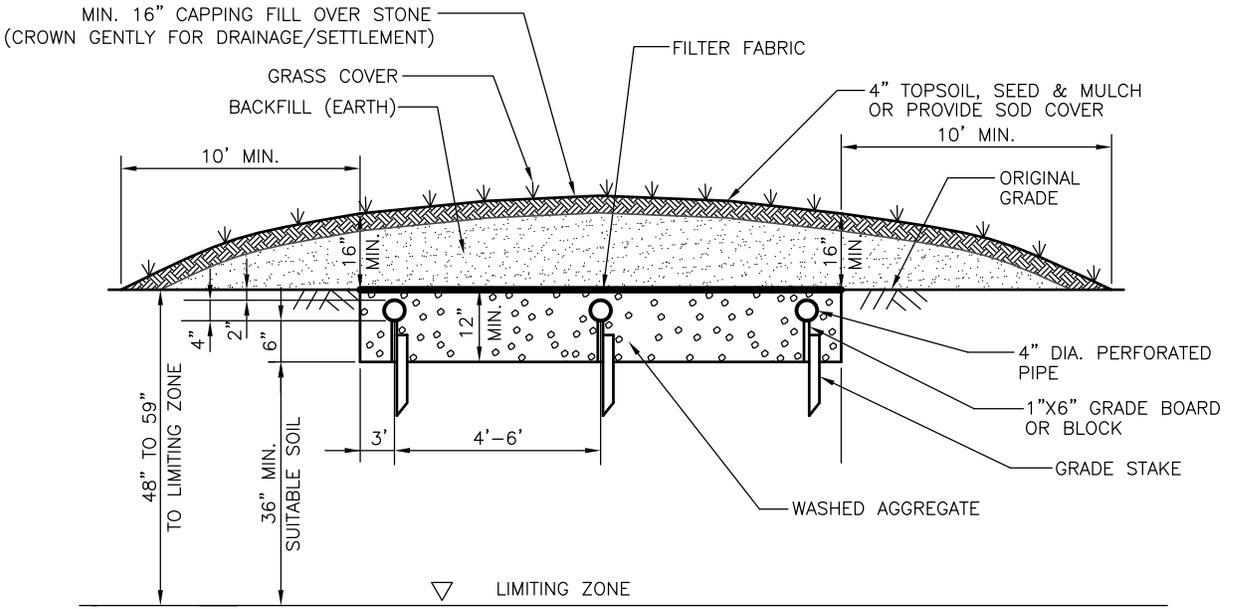
**TYPICAL AGGREGATE-FREE
TRENCH/BED DESIGN
FULL DEPTH GRAVITY
(NOT TO SCALE)**

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - L



CAPPING FILL TRENCH SECTION



CAPPING FILL BED SECTION

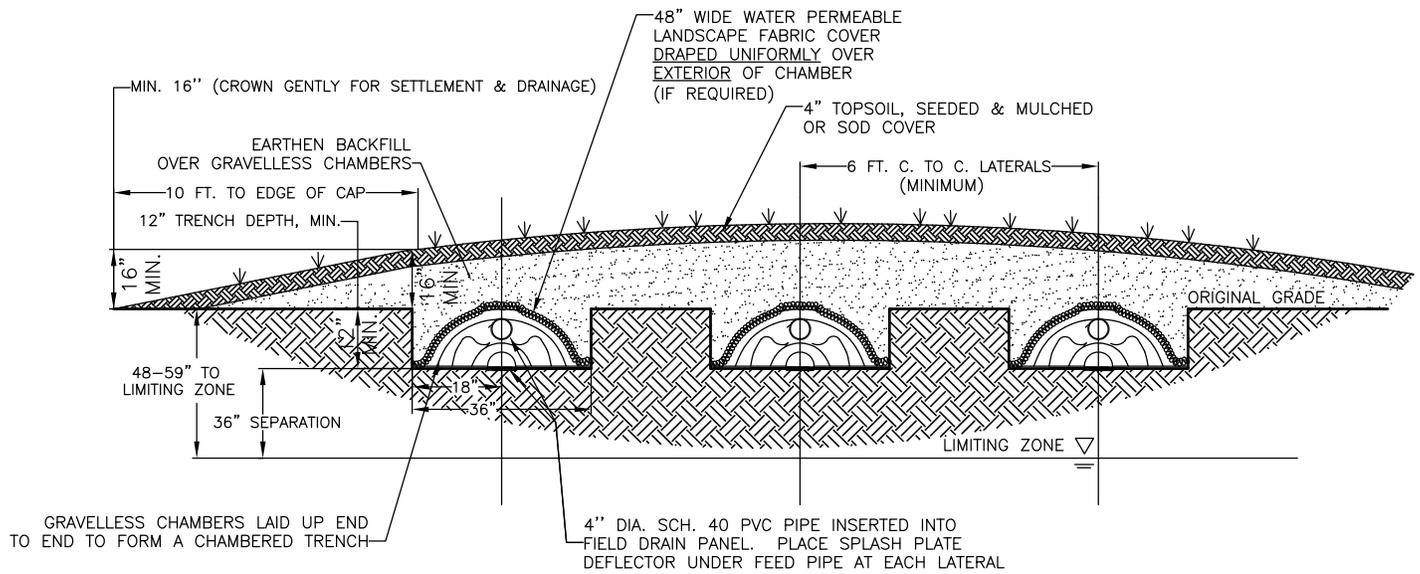


STATE OF DELAWARE
 DEPARTMENT OF NATURAL RESOURCES
 AND ENVIRONMENTAL CONTROL

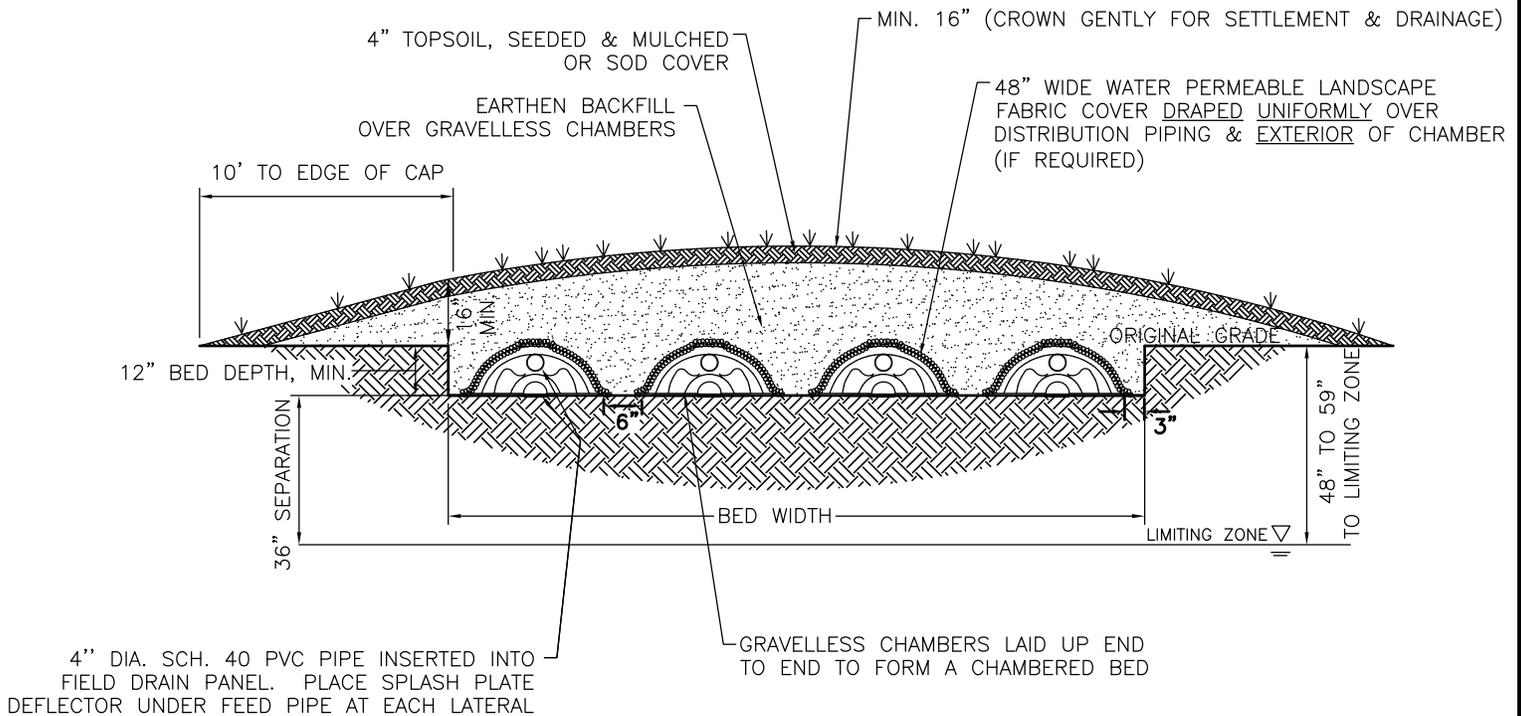
**TYPICAL AGGREGATE TRENCH/BED
 DESIGN- CAPPING FILL GRAVITY**
 (NOT TO SCALE)

ISSUED: JANUARY 1985
 REVISED: JANUARY 2012

EXHIBIT - M



CAPPING FILL TRENCH SECTION



CAPPING FILL BED SECTION



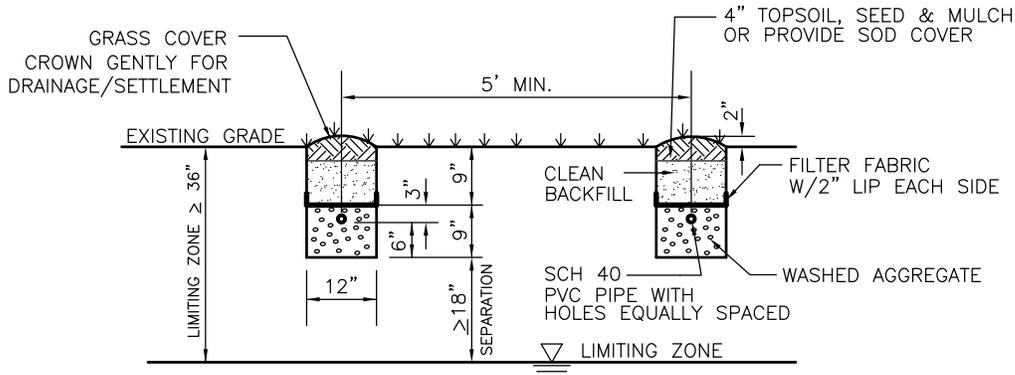
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

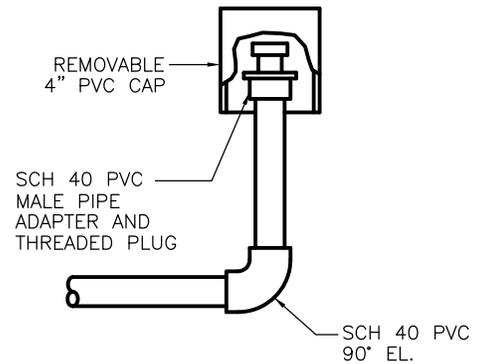
**TYPICAL AGGREGATE-FREE
TRENCH/BED DESIGN
CAPPING FILL GRAVITY
(NOT TO SCALE)**

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

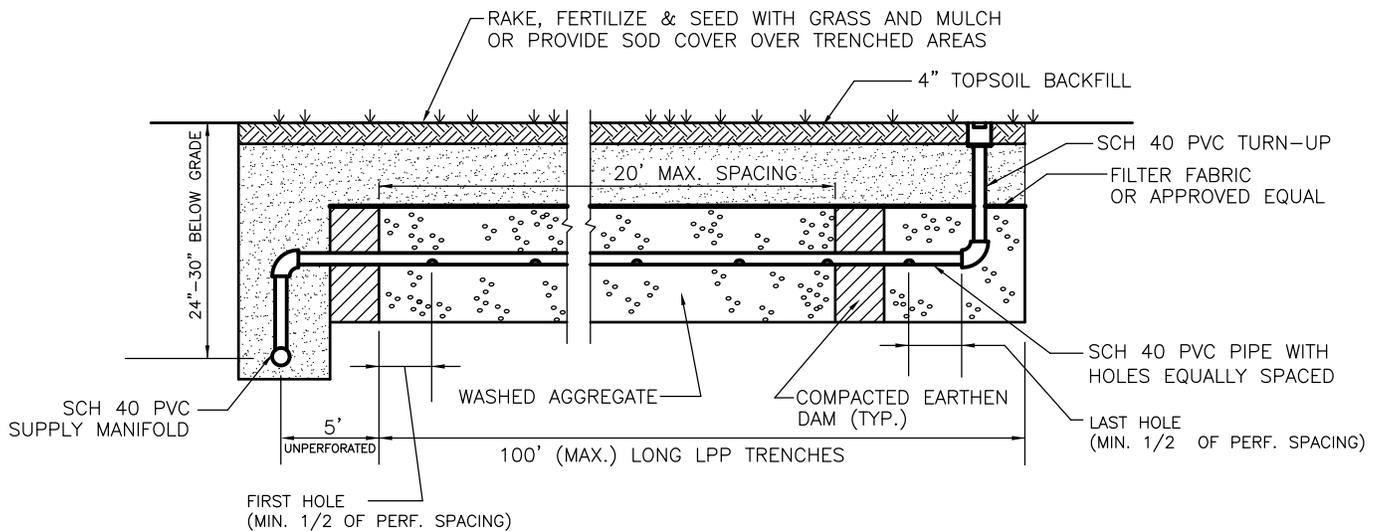
EXHIBIT - N



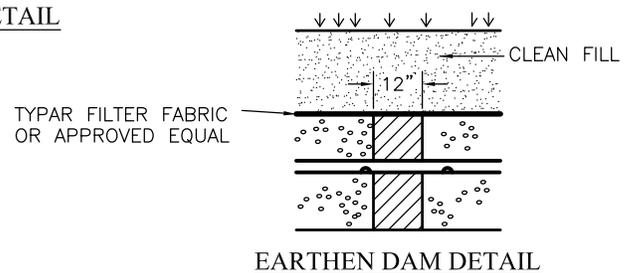
TRENCH CROSS SECTION



TURN-UP DETAIL



LPP TRENCH SECTION DETAIL



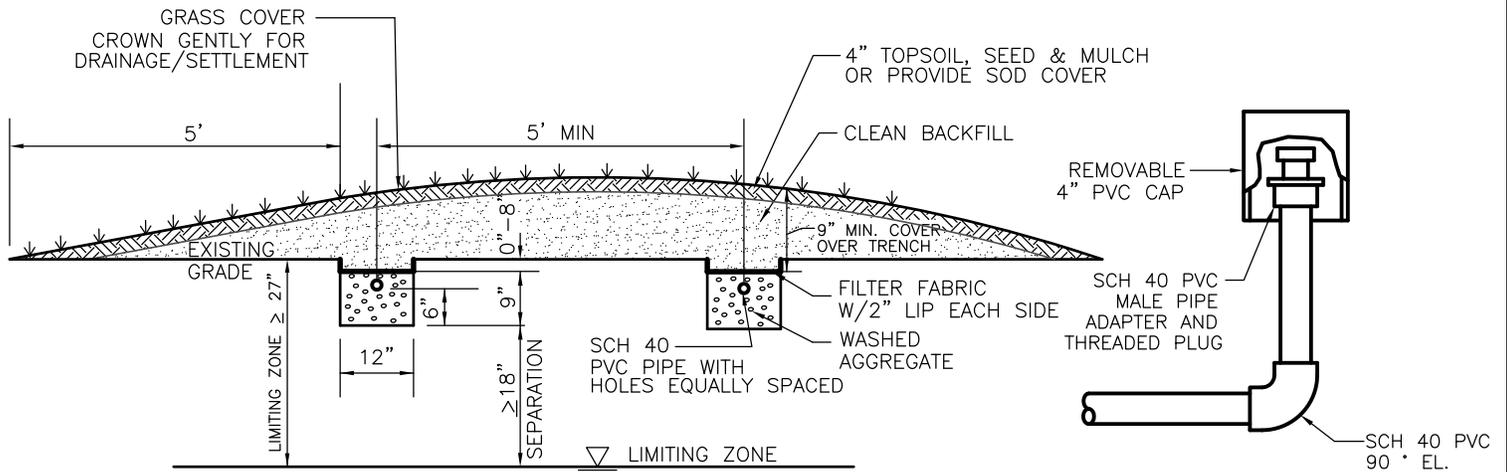
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

**TYPICAL FULL DEPTH
LOW PRESSURE PIPE DESIGN
(NOT TO SCALE)**

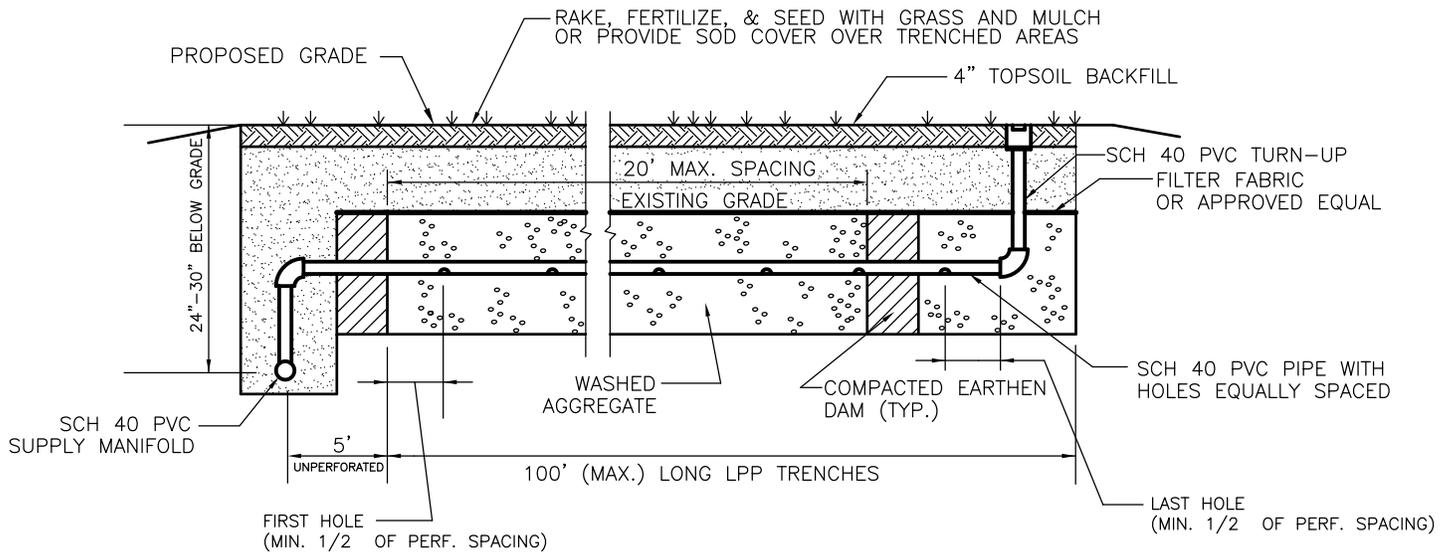
ISSUED: JANUARY 1985
REVISED: JANUARY 2012

**EXHIBIT - O
(Sheet 1 of 3)**



TRENCH CROSS SECTION

TURN-UP DETAIL



LPP W/CAP TRENCH SECTION DETAIL



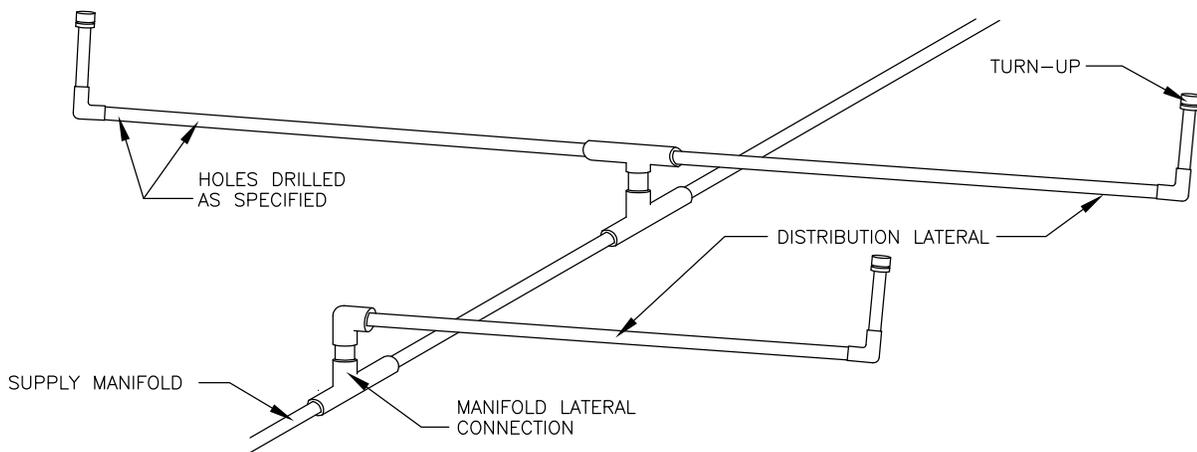
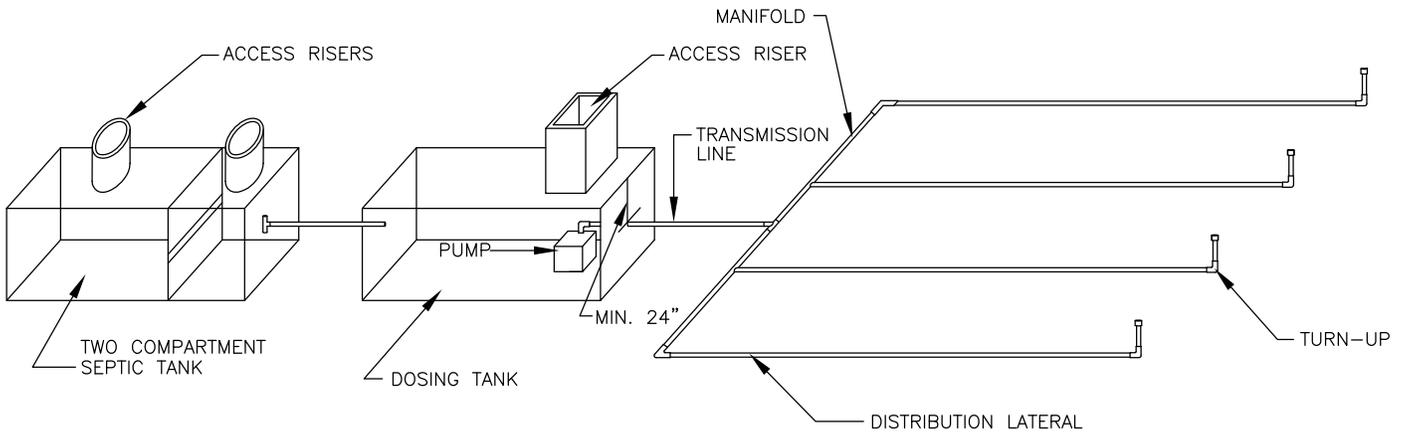
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

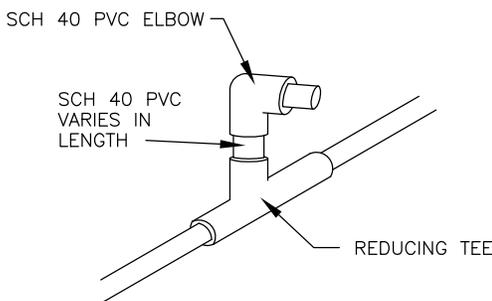
**TYPICAL CAPPING FILL
LOW PRESSURE PIPE DESIGN
(NOT TO SCALE)**

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

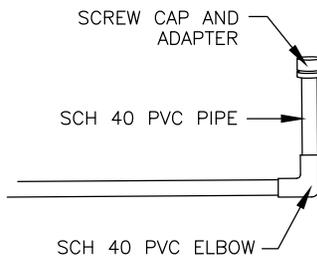
**EXHIBIT - O
(Sheet 2 of 3)**



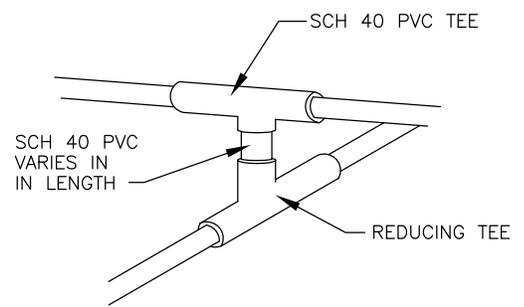
DISTRIBUTION SYSTEM



SIDE MANIFOLD LATERAL CONNECTION



TURN-UP



CENTER MANIFOLD LATERAL CONNECTION



**LOW PRESSURE PIPE DESIGN
PERCOLATION RATES & MAXIMUM HOLE SPACING DISTANCES**

MPI	FACTOR	MAX. SPC'G
20	3.70	60
25	4.20	60
30	4.80	72
35	5.50	72
40	5.58	72
45	5.87	72
50	6.16	72
55	6.45	72
60	6.65	72
65	7.35	96
70	8.05	96
75	8.75	96
80	9.45	96
85	10.15	96
90	10.99	96
95	11.76	96
100	12.74	96
105	13.86	96
110	15.26	96
115	16.52	96
120	17.50	96



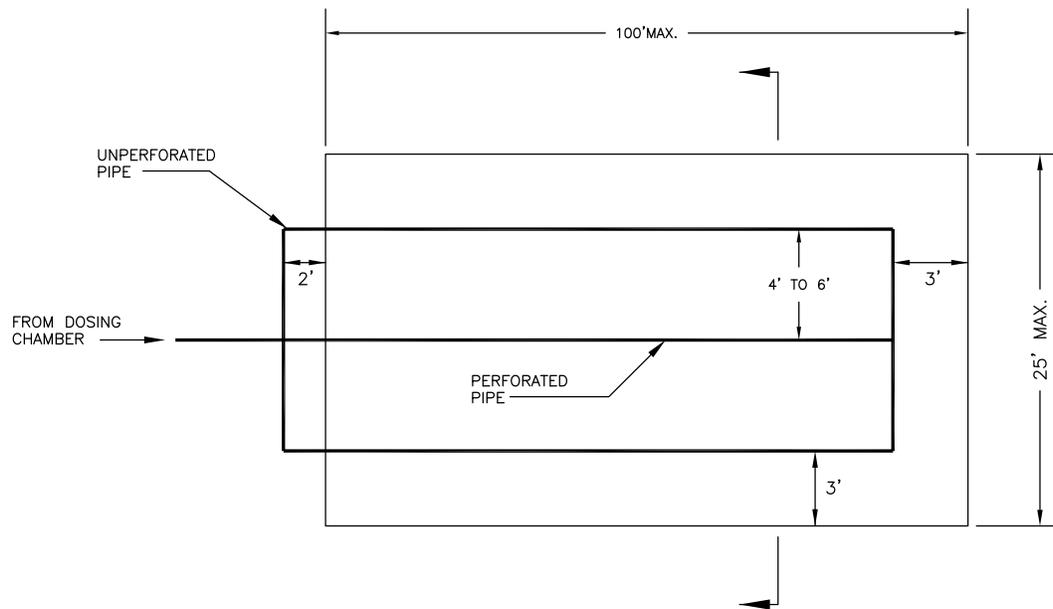
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

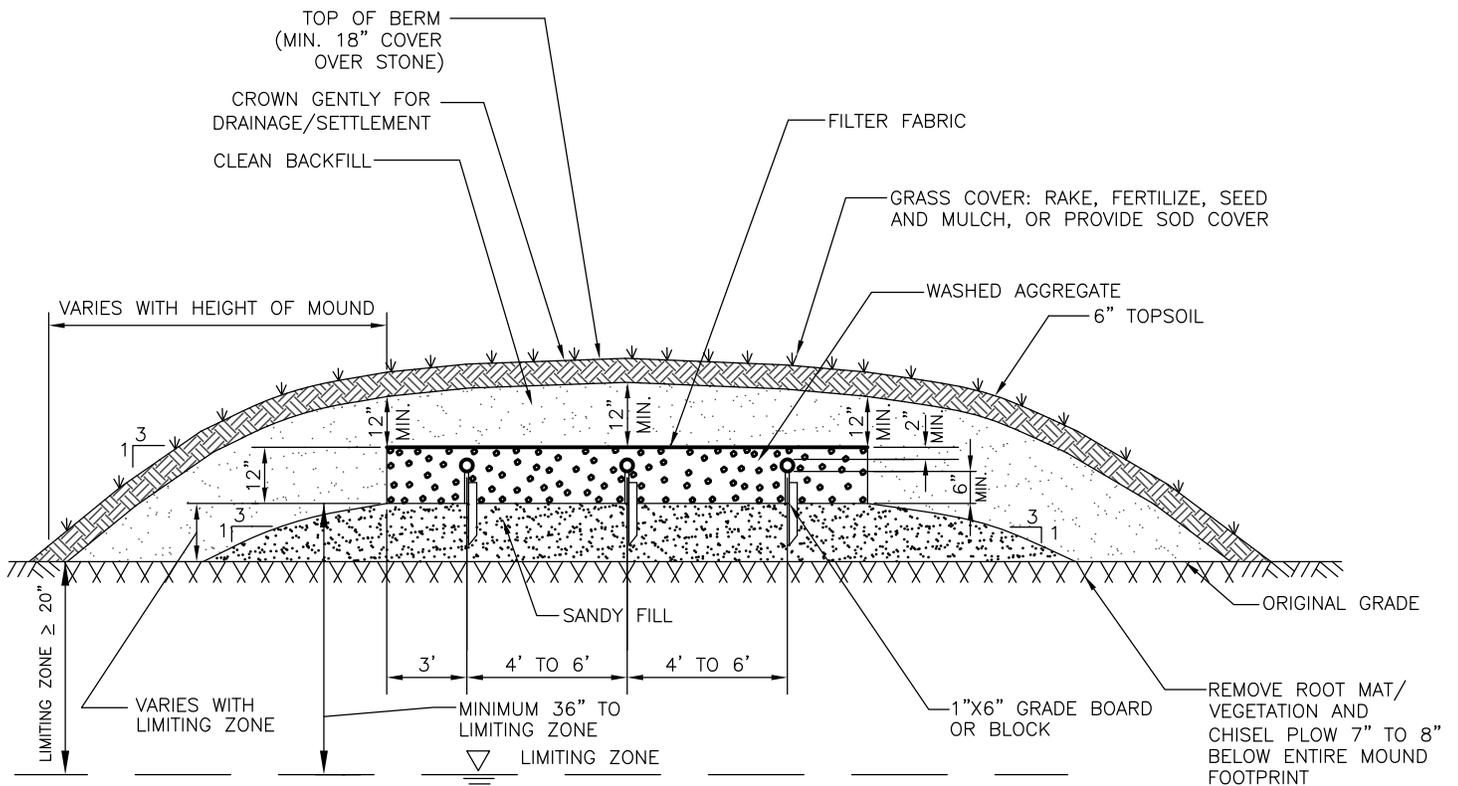
**LOW PRESSURE PIPE DESIGN
PERCOLATION RATES
AND
MAXIMUM HOLE SPACING DISTANCES**

ISSUED: JANUARY 1985
REVISED: APRIL 2004

EXHIBIT - P



PLAN



SECTION

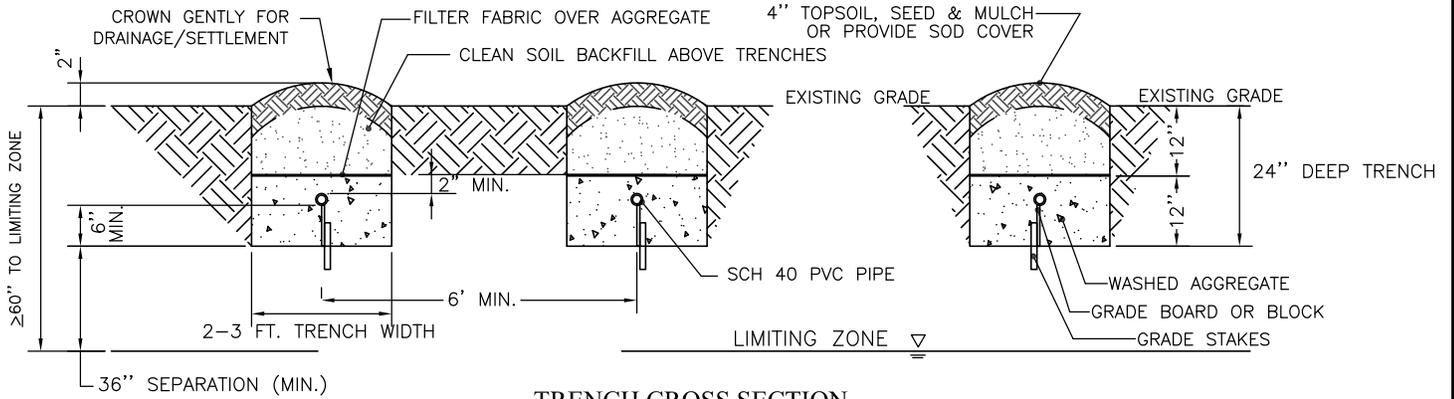


STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

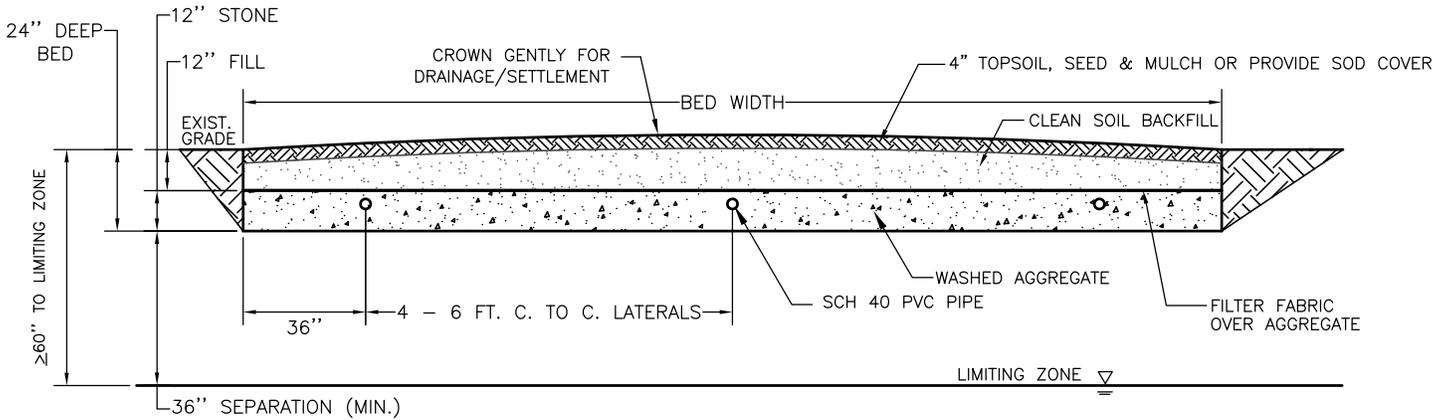
TYPICAL
ELEVATED SAND MOUND
DESIGN

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - Q
(Sheet 1 of 2)



TRENCH CROSS SECTION



BED CROSS SECTION

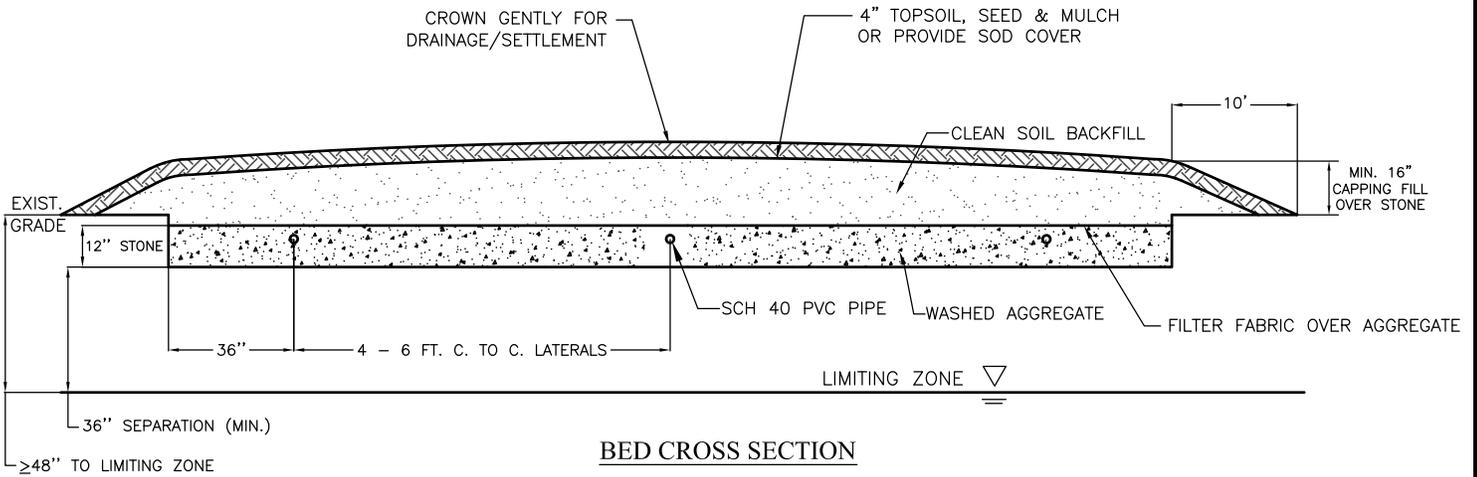
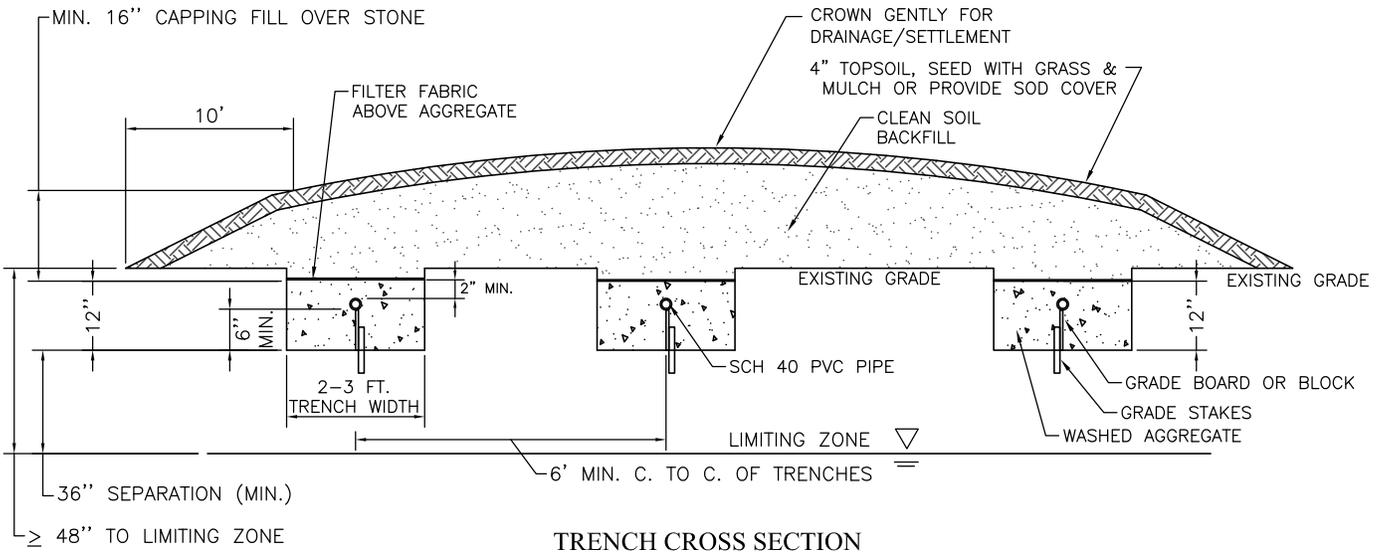


STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

**TYPICAL PRESSURE-DOSED
TRENCH/BED DESIGNS
FULL DEPTH**

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - R

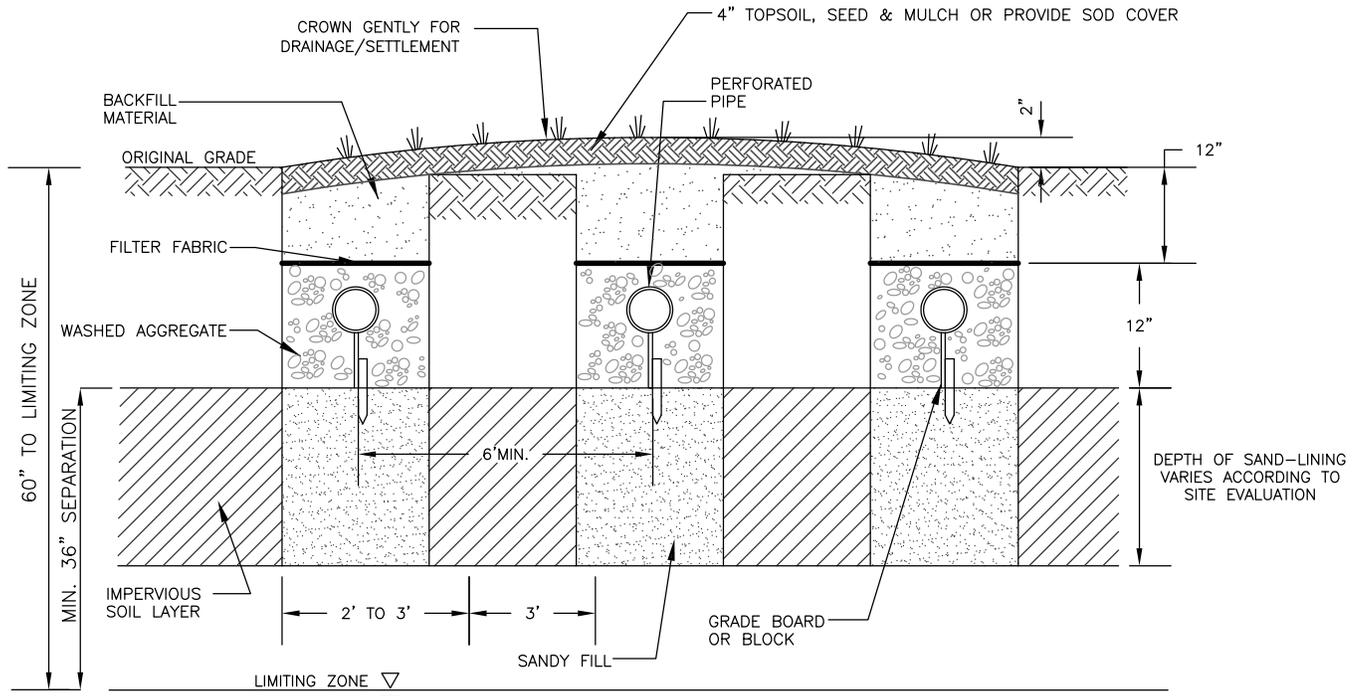


STATE OF DELAWARE
 DEPARTMENT OF NATURAL RESOURCES
 AND ENVIRONMENTAL CONTROL

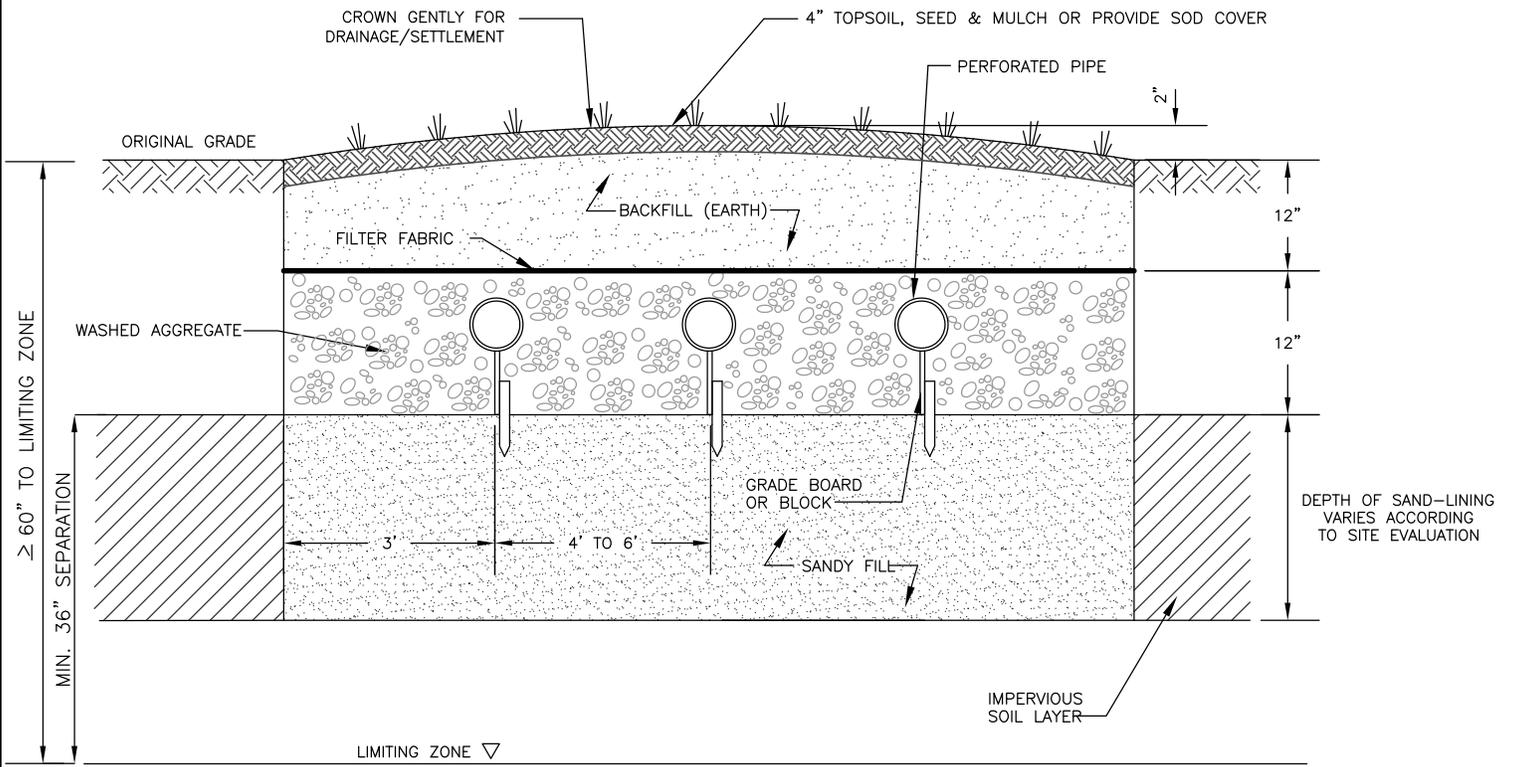
**TYPICAL PRESSURE DOSED
 TRENCH/BED DESIGN
 CAPPING FILL**

ISSUED: JANUARY 1985
 REVISED: JANUARY 2012

EXHIBIT - S



TRENCH SECTION



BED SECTION



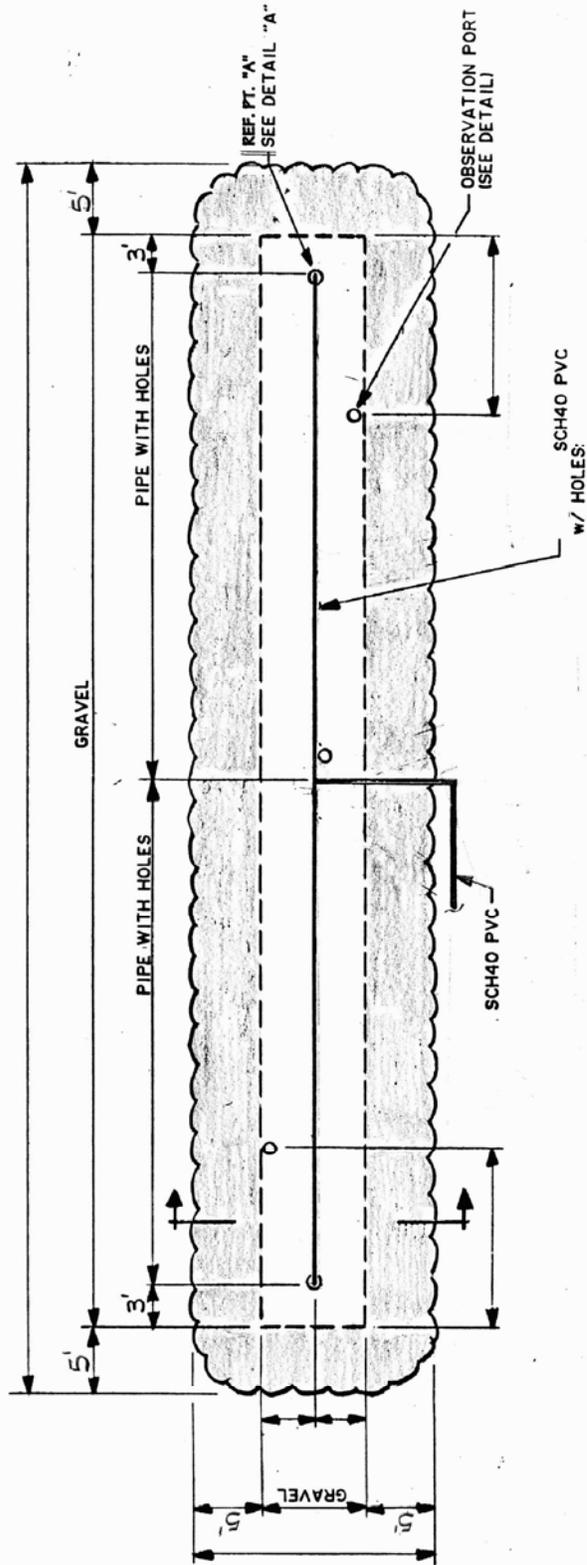
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

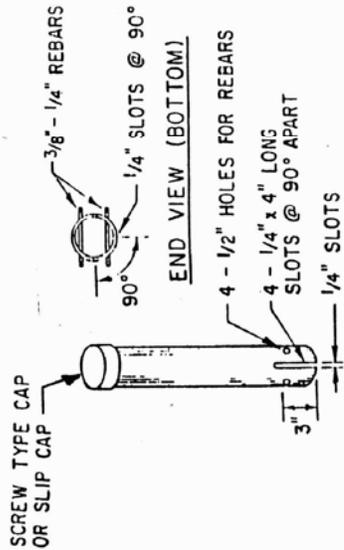
TYPICAL SAND-LINED
TRENCH/BED DESIGNS
FULL DEPTH

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - T



PLAN VIEW



DETAIL (TYPICAL 3 PORTS)



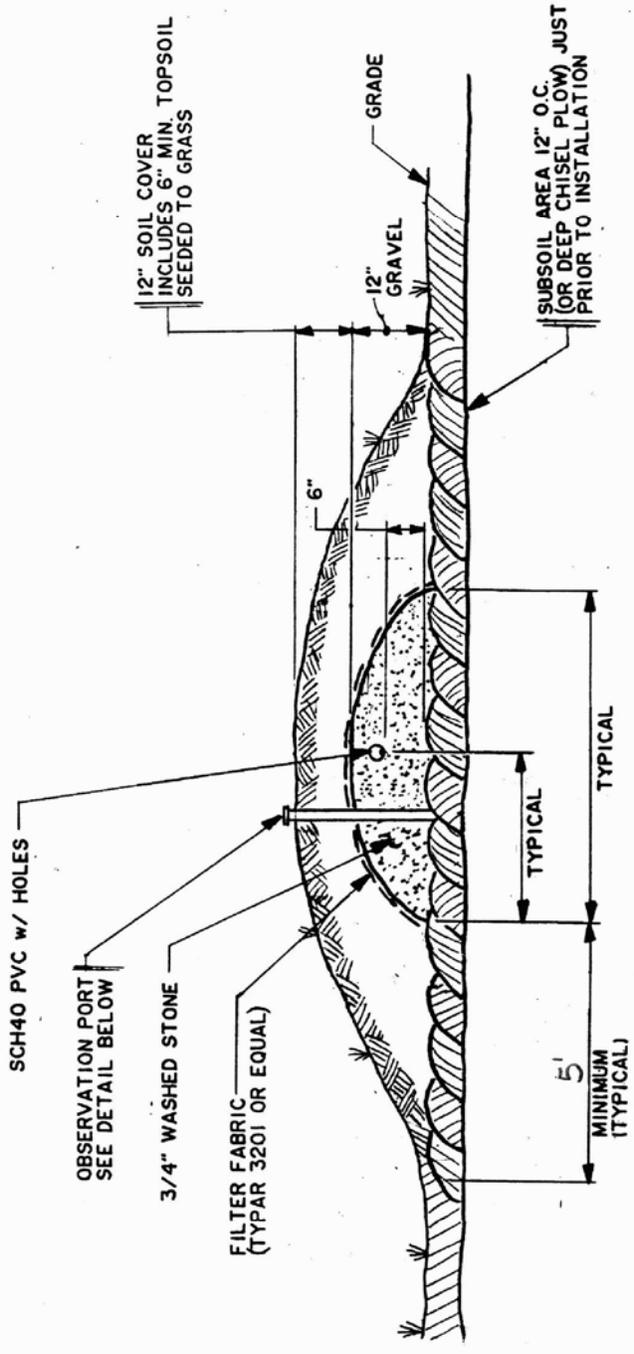
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

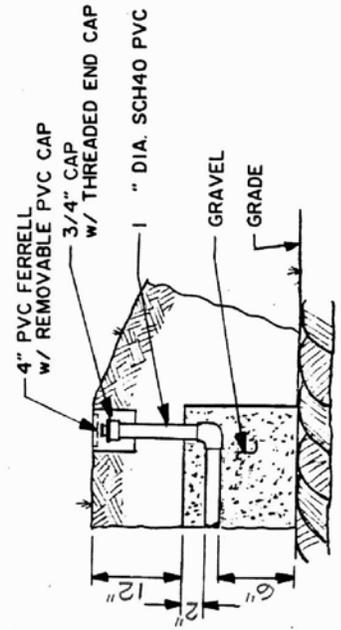
TYPICAL
WISCONSIN AT-GRADE
DISPOSAL SYSTEM DESIGN
(NOT TO SCALE)

ISSUED: JANUARY 2012
REVISED: _____

EXHIBIT - U
(Sheet 1 of 2)



SECTION



DETAIL "A"



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

TYPICAL
WISCONSIN AT-GRADE
DISPOSAL SYSTEM DESIGN
(NOT TO SCALE)

ISSUED: JANUARY 2012
REVISED: _____

EXHIBIT - U
(Sheet 2 of 2)

Long Term Acceptance Rate (LTAR) Calculation

Permeability Rate (MPI)	K (ft/min)	LTAR (gpd/ft ²)
20	0.0042	0.525
25	0.0033	0.501
30	0.0028	0.483
35	0.0024	0.469
40	0.0021	0.458
45	0.0019	0.448
50	0.0017	0.440
55	0.0015	0.433
60	0.0014	0.427
65	0.0013	0.421
70	0.0012	0.416
75	0.0011	0.412

Incremental Loading Rate (ILR) Calculation

<u>Texture</u>	<u>Structure</u>			
	Moderate to Strong	Weak	Massive	Single Grain
Sand or coarser	NR	NR	NR	NR
Loamy Sand	NR	0.50	NR	0.45
L. fine sand-fine sand	NR	0.35	0.20	0.30
Sandy Loam	0.40	0.30	0.10	NR
Fine SL-L-Silt Loam	0.30	0.20	0.00	NR
Sandy Clay Loam	0.25	0.15	0.00	NR
Clay Loam-Silty CL	0.20	0.10	0.00	NR
Sandy Clay-Silty C-C	0.05	0.01	0.00	NR

NR = Not Recommended

0.00 for any cemented class or any consistency stronger than firm



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

WISCONSIN AT-GRADE
DESIGN LOADING RATES

ISSUED: JANUARY 2012

REVISED: _____

EXHIBIT - V

On-Site Wastewater Treatment and Disposal System Siting Information

SYSTEM TYPE	DEPTH TO THE LIMITING ZONE (LZ)	SEPARATION REQUIREMENTS			TRENCH DEPTH
		SMALL SYSTEM	LARGE SYSTEM ¹	POINT OF COMPLIANCE	
Denial	0 – <11 inches	N/A	N/A	N/A	N/A
Alternative Technologies	11 – 18 inches	*	*	*	*
Micro-Irrigation (Drip)	≥18 inches	18 inches	18 inches	Tubing	0 – 6 inches
Peat Biofilters	≥12 inches	12 inches	12 inches	Aggregate	N/A
Elevated Sand Mound	20 – 26 inches	36 inches	36 inches	Aggregate/Chamber	N/A
Wisconsin At-Grade	24 – 26 inches	24 inches	24 inches	Land Surface	N/A
Low Pressure Pipe (CF)	27 – 35 inches	18 inches	18 inches	Aggregate/Chamber	Varies, min. 9 inches
Low Pressure Pipe (FD)	36 – 47 inches	18 inches	18 inches	Aggregate/Chamber	18 inches
Gravity Capping Fill	48 – 59 inches	36 inches	N/A	Aggregate/Chamber	Varies, min. 12 inches
Pressure-Dosed (CF)	48 – 59 inches	36 inches	36 inches	Aggregate/Chamber	Varies, min. 12 inches
Full Depth Gravity	≥60 inches	36 inches	N/A	Aggregate/Chamber	24 inches
Pressure-Dosed (FD)	≥60 inches	36 inches	36 inches	Aggregate/Chamber	24 inches
Rapid Infiltration Basin (RIB)	≥48 inches	N/A	24 inches	Basin Bottom	N/A
Spray Irrigation	>24 inches	N/A	24 inches	Beneath Root Zone	N/A

¹ Large system separation requirements must be maintained from the mounded seasonal high water table to the point of compliance.

*Depends on the method of disposal.

In replacement situations with limiting zones < 20" an ESM may be assigned by a Class D soil scientist and may require advanced treatment. In this instance, converting a residential use to a commercial use the maximum allowable daily flow is 500 gpd.



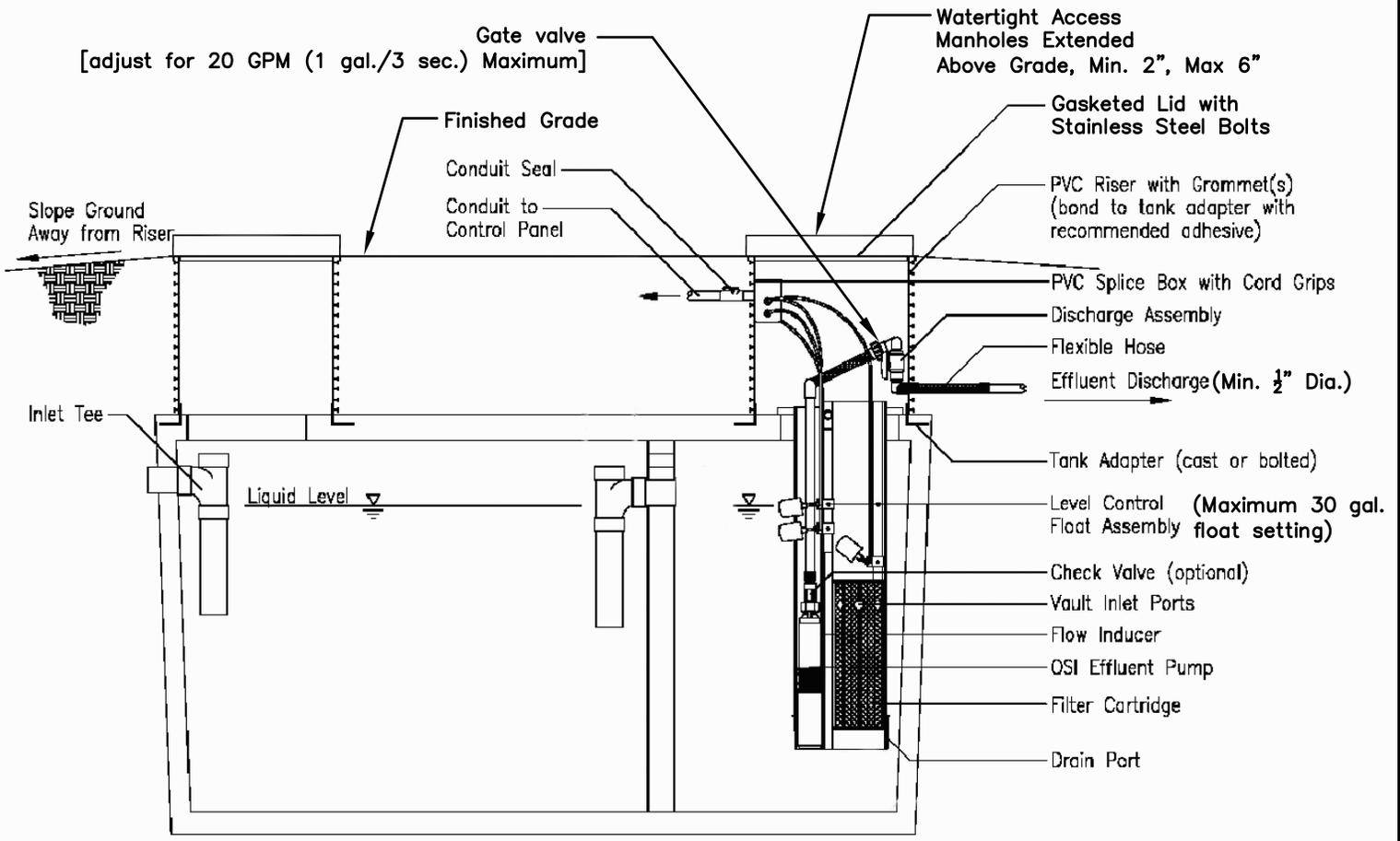
STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

SYSTEM INFORMATION QUICK REFERENCE GUIDE

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - W



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

SEPTIC TANK LIFT STATION
(NOT TO SCALE)

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - X

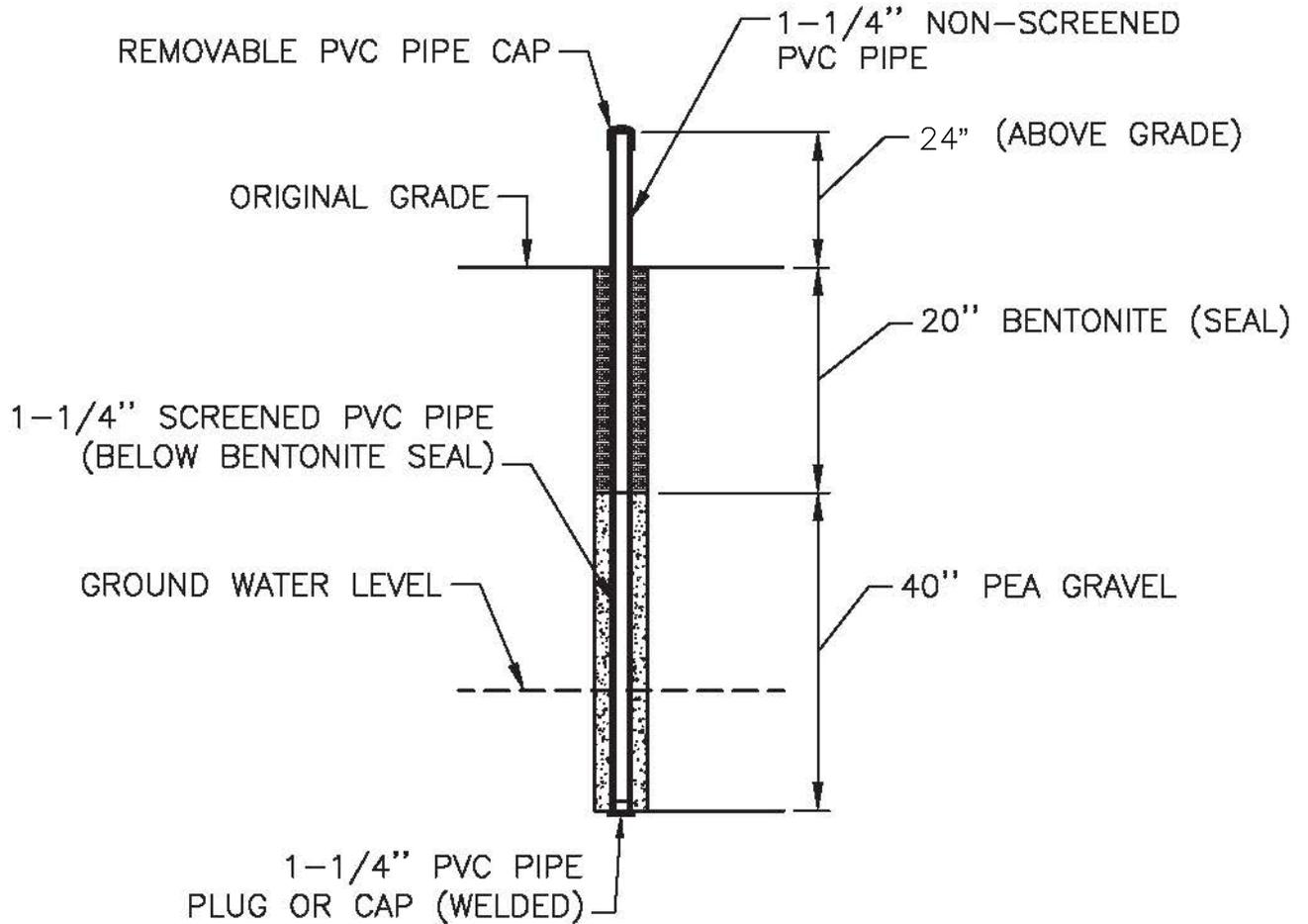
PERCOLATION RATES
BASED UPON USDA SOIL TEXTURES

USDA TEXTURE	DNREC ASSIGNED PERMEABILITY RATE (MPI)*
Sands	5
Loamy Sand	10
Sandy Loam	20
Sandy Clay Loam	30
Loam	30
Silt Loam	50
Silt	50
Clay Loam	75
Silty Clay Loam	75
Sandy Clay	120
Silty Clay	120
Clay	120

* Other soil properties such as high bulk density, structure, total porosity, and size and continuity of the pores may significantly affect these permeability rates. Textures of loamy coarse sand and coarse sandy loam may have permeability rates faster than assigned, while loamy very fine sand, loamy fine sand, very fine sandy loam and fine sandy loam may have permeability rates slower than assigned.

Permeability Class	Permeability Rate (mpi)
Very Slow	> 120
Slow	50 – 120
Moderate	25 – 49
Moderately Rapid	10 – 25
Rapid	6 – 10
Very Rapid	< 6





STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

**OBSERVATION WELL
CONSTRUCTION DIAGRAM
(NOT TO SCALE)**

ISSUED: JANUARY 1985

REVISED: APRIL 2004

EXHIBIT - Z



ON-SITE WASTEWATER SYSTEM ABANDONMENT REPORT



(Please Type or Print Legibly)

TAX MAP #: _____

DNREC LICENSEE NAME: _____ DNREC LICENSE #: _____ PHONE #: _____

OTHER GOVERNMENTAL APPOINTEE
LICENSE NAME: _____ LICENSE #: _____ PHONE #: _____

ABANDONMENT DATE: _____

THIS FORM MUST BE SUBMITTED WITHIN 10 DAYS OF COMPLETION

REASON FOR ABANDONMENT: **Connection to Central Sewer** **New System Installed**
 Other (Explain) _____

IF NEW SYSTEM INSTALLED - PERMIT #: _____

ABANDONED SYSTEM PERMIT #: _____

WAS ABANDONED SYSTEM A:
(Check all that apply)

<input type="checkbox"/> Cesspool	# Cesspools _____
<input type="checkbox"/> Seepage Pit	# Seepage Pits _____
<input type="checkbox"/> Concrete Tank	# Concrete Tanks _____
<input type="checkbox"/> Steel Tank	# Steel Tanks _____

TYPE OF ABANDONMENT:
(Check all that apply)

<input type="checkbox"/> Crushed and Filled	<input type="checkbox"/> Removed and Filled
<input type="checkbox"/> Removed and New Tank Installed in Same Location	

Date

Licensee Signature



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

SYSTEM ABANDONMENT REPORT

ISSUED: JANUARY 1985
REVISED: JANUARY 2012

EXHIBIT - A A

Peat System Design Loading Rates

Soil Type	Permeability Rate (mpi)	Hydraulic Loading Rate (gpd/ft ²)	
		Trench	Bed
S	5	2.033	1.597
LS	10	1.437	1.129
	15	1.174	.922
SL	20	1.016	.799
	25	.909	.714
SCL, L	30	.803	.652
	35	.768	.604
	40	.719	.565
	45	.678	.532
Si, SiL	50	.643	.505
	55	.613	.482
	60	.587	.461
	65	.564	.443
	70	.543	.427
	75	.525	.412
CL, SiCL	80	.508	.399
	85	.493	.387
	90	.479	.376
	95	.466	.366
	100	.455	.357
	105	.444	.349
	110	.433	.341
	115	.424	.333
SC, SiC, C	120	.415	.326

Notes:

1. For commercial and/or large systems, please contact the GWDS and the manufacturers for additional siting criteria.



Micro-Irrigation "Drip" Design Loading Rates

Soil Type	Permeability Rate (mpi)	Hydraulic Loading Rate (gpd/ft ²)	Drip – Line Spacing	Emitter Spacing
S	5	.303	Typically 24"	Typically 24"
LS	10	.278		
	15	.253		
SL	20	.228		
	25	.211		
SCL, L	30	.203		
	35	.196		
	40	.189		
	45	.180		
Si, SiL	50	.173		
	55	.162		
	60	.154		
	65	.146		
	70	.139		
CL, SiCL	75	.133		
	80	.127		
	85	.122		
	90	.117		
	95	.116		
	100	.105		
	105	.096		
	110	.088		
	115	.080		
SC, SiC, C	120	.073		

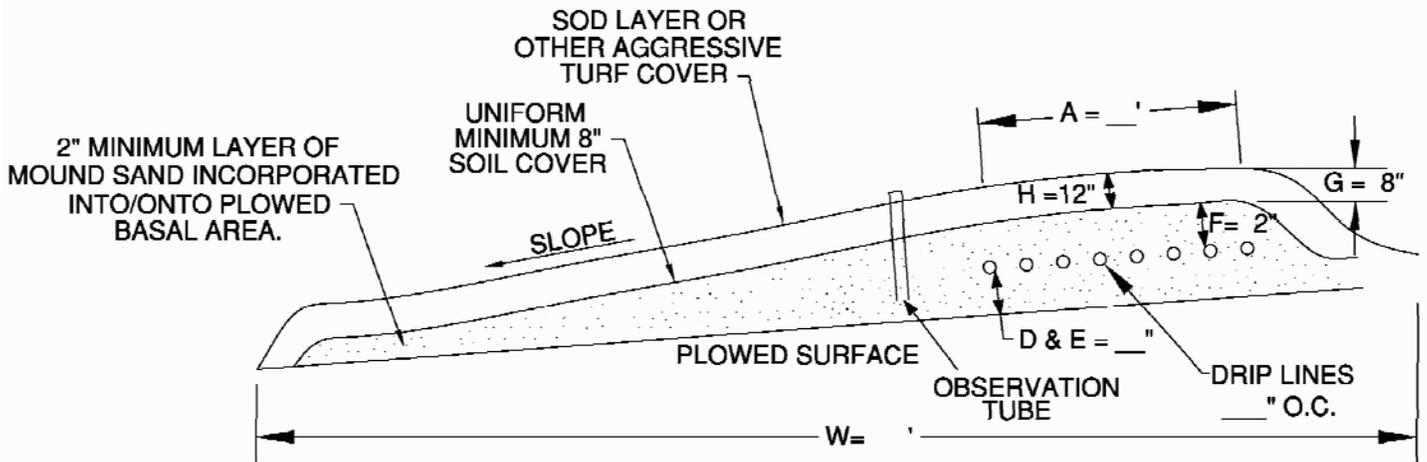
Notes:

1. Primary effluent systems require automation of filter and field flushing.
2. Spacing of drip-line and emitters may also be a function of soil textures and landscaping requirements. Please contact manufacturer for recommendations and limitations.
3. For commercial and/or large systems, please contact the GWDS and the manufacturers for additional siting criteria.



MICRO-MOUND CROSS-SECTION

NTS



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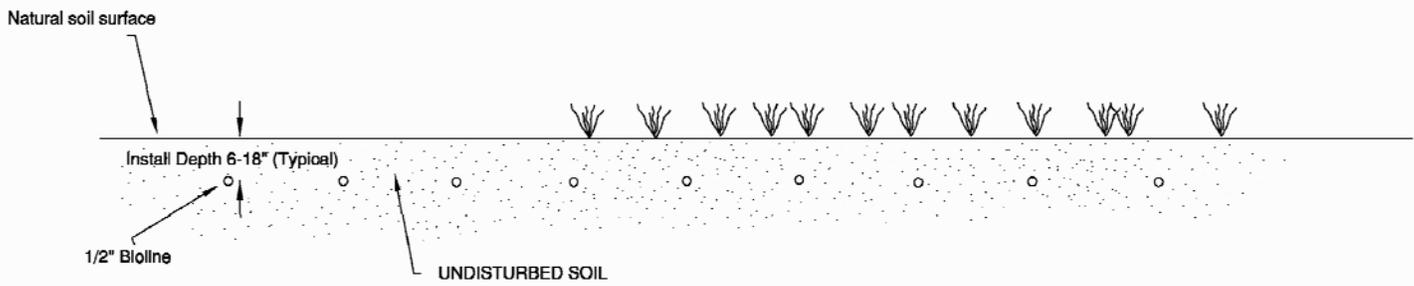
MICRO-IRRIGATION "DRIP"
DIPSERSAL INSTALLATION METHODS
MICROMOUND/DRIP
CROSS SECTION

ISSUED: JANUARY 2012

REVISED: _____

EXHIBIT - D D
(Sheet 1 of 3)

SUBSURFACE DRIP TUBING INSTALLATION
(INSTALL VIA VIBRATORY PLOW OR TRENCHER)



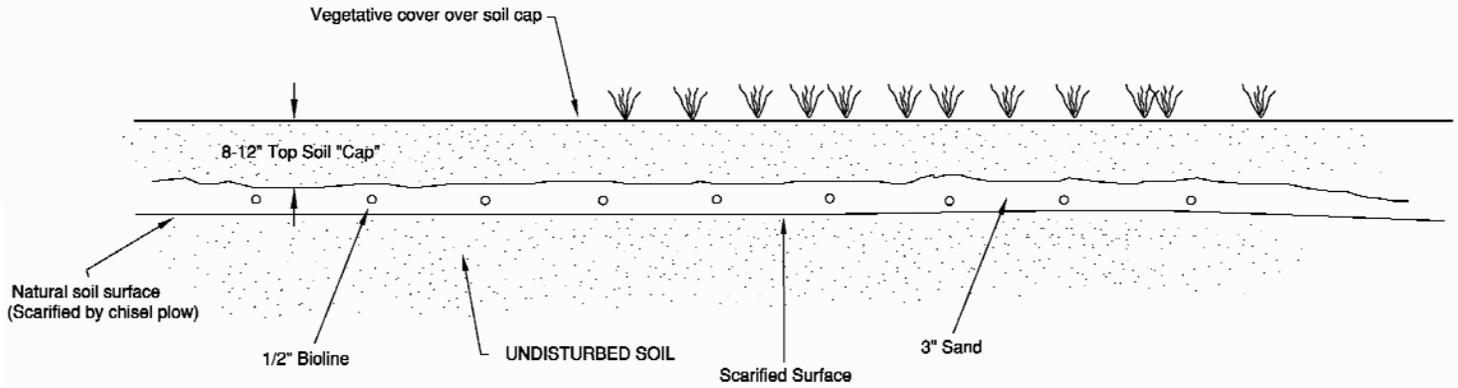
STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

**MICRO-IRRIGATION "DRIP"
DIPSERSAL INSTALLATION METHODS
SUBSURFACE DRIP
CROSS SECTION**

ISSUED: JANUARY 2012
REVISED: _____

EXHIBIT - D D
(Sheet 2 of 3)

AT-GRADE DRIP TUBING INSTALLATION
 (INSTALL BY HAND IN SAND FILL OVER SCARIFIED SURFACE)



STATE OF DELAWARE
 DEPARTMENT OF NATURAL RESOURCES
 AND ENVIRONMENTAL CONTROL

MICRO-IRRIGATION "DRIP"
 DIPERSAL INSTALLATION METHODS
 AT-GRADE DRIP
 CROSS SECTION

ISSUED: JANUARY 2012
 REVISED: _____

EXHIBIT - D D
 (Sheet 3 of 3)

Department of Natural Resources and Environmental Control
Ground Water Discharges Section
Product Approval Checklist

Any persons seeking approval of an innovative and alternative on-site wastewater treatment unit and/or disposal system, product or component shall make an application in writing to the Ground Water Discharges Section of the Department of Natural Resources and Environmental Control in accordance with the Regulations Governing the Design, Installation, and Operation of On-Site Wastewater Treatment and Disposal Systems, and the checklist below. Please submit one copy of all requested material as applicable to the Ground Water Discharges Section, 89 Kings Highway, Dover, DE 19901 (phone 302-739-9948).

1. Application Information Required for all Systems or Protocols
 - a. Name, address, phone number, fax number and email address for manufacturer, owner and agent.
 - b. Executive summary describing the system, stating the type of approval sought, model numbers, and treatment levels as applicable
 - c. System proposed is fully described with the following information:
 - i. Construction drawings provided detailing all system components;
 - ii. Specifications describing all materials to be used, methods of construction, means for assuring the quality and integrity of the finished product, and installation procedures;
 - iii. Materials specified for use in construction are equal or superior in physical properties and chemical durability
 - iv. Any special conditions for use, installation, operation; and monitoring and maintenance that should be conditions of any approval document.
 - d. Provide summary of pertinent literature, published research, and previous experience and performance with the system.
 - e. Provide other state approvals.
 - f. Provide results of any available testing, research or monitoring of pilot systems or full scale operational systems conducted by a third party independent research or testing organization. These independent studies must have adequate research from highly controlled, third party studies with rigorous research protocols or well documented long term use studies of proven wastewater technologies.
 - g. Operation, Maintenance and Monitoring procedures for system.
 - h. Notification given of any proprietary information, system, component, or device.
 - i. Local distributor information and contact information.

The Applicant hereby certifies that, to the best of his/her knowledge and beliefs, a complete factual representation of the information requested above has been provided:

Applicant

Date



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

INNOVATIVE/ALTERNATIVE
PRODUCT APPROVAL CHECKLIST

ISSUED: JANUARY 2012

REVISED: _____

EXHIBIT - E E

Lot Clearing/Disturbed Site Inspection Report

Date of Report: _____ **Tax Map #:** _____

Date of Field Inspection: _____ **Septic Permit #:** _____

Location of Site: _____

• **Observation Method:** Boring(s) Test Pit(s) Probe

• **Inspected Area:** Initial Replacement

• **Selected Observable Features Indicative of Soil Compaction (upper 24 inches only):**

Auger Resistance ^[1]: Yes No N/A Min & Max. Depth Observed _____

Platy Soil Structure ^[2]: Yes No N/A Min & Max. Depth Observed _____

Redoximorphic Concentrations ^[3]: Yes No N/A Min. Depth Observed _____

Visible Ruts From Equipment: Yes No N/A Max. Depth Observed _____

Presence of Fill or Stockpiling: Yes No N/A Max. Depth Observed _____

Evidence of Surface Ponding: Yes No N/A Comments _____

Moisture Content Suitable for Installation: Yes No Comments _____

Stumps Visible: Yes No N/A

Drainfield Area Flagged, Roped, or Barricaded ^[4]: Yes No N/A

Soil Horizons Mixed (> 9 inches from surface) ^[5]: Yes No N/A

• **Summary of Inspection:** (Circle one or both)

? The area reserved for the initial/replacement disposal system, as of the date of inspection, does not appear to have been adversely affected by tree clearing.

? The area reserved for the initial/replacement disposal system, as of the date of inspection, does appear to have been adversely affected by tree clearing.

Inspectors Comments: _____

Signed: _____ **License #:** _____

^[1] Auger boring resistance is a subjective observation and may be affected by soil moisture state.

^[2] Platy structure can be a result of soil compression/compaction.

^[3] Redoximorphic (Iron Oxide) concentrations can form quickly in response to compaction as a result of slowed water movement thru the soil.

^[4] Marking the proposed drainfield to help prevent equipment encroachment and possible compaction is a recommended practice.

^[5] Extensively mixed soils may prevent the system from functioning hydraulically or from a treatment perspective.



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

LOT CLEARING/DISTURBED
SITE INSPECTION REPORT

ISSUED: JANUARY 2012

REVISED: _____

EXHIBIT - F F

[Http://www.fieldcrops.org](http://www.fieldcrops.org)

[Http://www.umd.edu/mce/](http://www.umd.edu/mce/)

[Http://ag.udel.edu/extension/agnr/agronomy.htm](http://ag.udel.edu/extension/agnr/agronomy.htm)

[Http://mawaterquality.org/](http://mawaterquality.org/)

[Http://www.agguide.agronomy.psu.edu](http://www.agguide.agronomy.psu.edu)

[Http://pubs.ext.vt.edu/](http://pubs.ext.vt.edu/)

[Http://rutgers.edu](http://rutgers.edu)

[Http://ipni.net/ipniweb/pnt.nsf](http://ipni.net/ipniweb/pnt.nsf)

[Http://nanc.ipni.net/articles/nanc0005-en](http://nanc.ipni.net/articles/nanc0005-en)



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

**CROP NUTRIENT UPTAKE
WEBSITES**

ISSUED: JANUARY 2012
REVISED: _____

EXHIBIT - G G

Cumulative metal loading limit for spray irrigation systems

<u>Metal</u>	<u>Soil Cation Exchange Capacity (meq/100g)¹</u>		
	<u>0-5</u>	<u>5-15</u>	<u>>15</u>
	- - - Cumulative Limit - lb/ac (Kg/ha) - - -		
Pb	500 (560)	1000 (1120)	2000 (2240)
Zn	250 (280)	500 (560)	1000 (1120)
Cu	125 (140)	250 (280)	500 (560)
Ni	125 (140)	250 (280)	500 (560)
Cd	4.4 (5)	8.9 (10)	17.8 (20)

¹ Annual Cd application rate not to exceed 0.44 lb/ac (0.5 Kg/ha)

NOTE: Soil must be maintained at pH 6.5 or above whenever food chain crops are grown unless plant nutrient needs and soil chemistry preclude such values without excessive lime addition, based not on cost but on unrealistic tonnage of lime/acre. In such cases, lime additions suitable to the vegetation used are to be applied in conjunction with annual metal monitoring of the vegetation.



MONTHLY AVERAGE DAYLIGHT HOURS IN UNITS OF 12 HOURS AS A
 FUNCTION OF LATITUDE FOR THORNTHWAITE POTENTIAL
 EVAPOTRANSPIRATION

Month	<u>Duration on 15th Day of Month</u>
	39° N Latitude*
January	0.81
February	0.8
March	0.99
April	1.10
May	1.19
June	1.24
July	1.22
August	1.15
September	1.04
October	0.93
November	0.84
December	0.79

*Values for 39° N latitude may be used for all latitudes in Delaware



STATE OF DELAWARE
 DEPARTMENT OF NATURAL RESOURCES
 AND ENVIRONMENTAL CONTROL

MONTHLY AVERAGE DAYLIGHT HOURS
 FOR THORNTHWAITE POTENTIAL
 EVAPOTRANSPIRATION

ISSUED: JANUARY 2012
 REVISED: _____

EXHIBIT - I I

**CLIMATOLOGICAL NORMAL TEMPERATURES (Ta) AND THORNTHWAITE POTENTIAL EVAPOTRANSPIRATION
FOR THE U.S. WEATHER SERVICE STATIONS IN DELAWARE**

Station	January		February		March		April		May		June		July		August		September		October		November		December		Annual	
	Ta	PET	Ta	PET	Ta	PET	Ta	PET	Ta	PET	Ta	PET	Ta	PET	Ta	PET	Ta	PET	Ta	PET	Ta	PET	Ta	PET	Total PET	
	°F	in	°F	in	°F	in	°F	in	°F	in	°F	in	°F	in	°F	in	°F	in	°F	in	°F	in	°F	in	in	
Northern Region																										
Newark University Farm	31.7	0	33.7	0.1	42.1	0.6	52.8	1.8	62.7	3.3	71.2	4.8	75.7	5.4	74.5	4.9	67.9	3.5	56.3	1.9	45.8	0.8	35.6	0.1	27.2	
Wilmington WSO AP	31.2	0	33.2	0	41.8	0.6	52.4	1.8	62.2	3.2	71.2	4.8	76.0	5.5	74.8	5.0	67.9	3.5	56.2	1.9	45.6	0.8	35.5	0.1	27.1	
Wilmington Porter Resvr	30.8	0	32.6	0	41.0	0.6	51.8	1.7	61.6	3.2	70.4	4.7	74.9	5.3	73.7	4.8	66.9	3.4	55.7	1.9	45.2	0.8	35.1	0.1	26.5	
Middletown	31.3	0	34.4	0.1	42.6	0.6	53.2	1.8	63.0	3.3	72.1	4.9	76.0	5.5	74.8	4.9	68.8	3.6	56.9	1.9	46.8	0.8	37.2	0.2	27.7	
Southern Region																										
Bridgeville 4 NW	34.3	0.1	36.0	0.1	43.8	0.7	54.2	1.9	63.7	3.4	72.0	4.8	76.2	5.5	74.7	4.9	68.4	3.6	57.4	1.9	47.5	0.9	38.1	0.2	28.0	
Dover	34.3	0.1	36.3	0.1	44.2	0.7	54.7	1.9	64.2	3.4	72.7	4.9	77.0	5.6	75.7	5.1	73.0	4.2	58.6	2.0	48.2	0.9	38.5	0.2	29.0	
Georgetown 5 SW	34.2	0.1	35.8	0.1	43.5	0.7	53.6	1.8	63.1	3.3	71.5	4.8	76.1	5.5	74.9	4.9	68.4	3.6	57.0	1.9	47.2	0.9	37.8	0.2	27.7	
Lewes	34.6	0.1	36.1	0.2	43.3	0.7	53.1	1.8	62.1	3.2	70.7	4.6	75.2	5.3	74.3	4.8	68.4	3.6	57.5	2.0	48.0	0.9	38.5	0.3	27.5	
Milford 4 SE	34.3	0.1	35.8	0.1	44.3	0.7	54.4	1.9	63.9	3.4	72.0	4.8	76.5	5.5	75.2	5.0	68.8	3.6	57.7	2.0	47.6	0.9	37.9	0.2	28.2	

NOTE: See Definitions Section for definition of Ta and PET



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

**CLIMATOLOGICAL NORMAL
TEMPERATURES (Ta)
AND
THORNTHWAITE POTENTIAL
EVAPOTRANSPIRATION**

ISSUED: JANUARY 2012
REVISED: _____

EXHIBIT - J J

CLIMATOLOGICAL NORMAL PRECIPITATION (P) AND 5-YEAR RETURN PERIOD MONTHLY PRECIPITATION DATA (P5) FOR THE LONG-TERM U.S. WEATHER SERVICE STATIONS IN DELAWARE

Station	January		February		March		April		May		June		July		August		September		October		November		December	
	P	P ₅	P	P ₅	P	P ₅	P	P ₅	P	P ₅	P	P ₅	P	P ₅	P	P ₅	P	P ₅	P	P ₅	P	P ₅	P	P ₅
----- inches -----																								
Northern Region																								
Newark University Farm	2.6	4.4	2.8	4.0	3.4	4.9	3.6	5.0	3.7	5.2	3.9	5.4	4.4	6.4	4.1	6.4	3.8	5.5	3.3	4.7	3.1	4.5	3.6	5.4
Wilmington WSO AP	2.9	4.3	3.1	4.7	3.7	5.1	3.4	4.8	3.6	5.1	3.6	5.0	4.0	5.7	3.6	5.7	3.7	5.6	2.9	4.1	3.2	4.9	3.5	5.2
Wilmington Porter Resvr	3.2	4.7	3.2	4.5	4.0	5.5	4.0	5.6	3.9	5.7	4.2	5.8	4.2	6.3	4.1	6.3	4.0	6.0	3.4	4.7	3.7	5.7	3.8	5.8
Middletown	2.8	4.1	2.9	4.1	3.5	4.9	3.5	4.8	3.4	5.0	3.6	5.3	3.7	5.3	3.4	5.1	3.6	5.5	3.3	4.8	3.2	4.6	3.3	4.9
Southern Region																								
Bridgeville 4 NW	3.4	4.7	3.3	4.5	3.8	5.2	3.3	4.5	3.6	5.2	3.7	5.2	4.1	6.4	4.7	8.0	3.7	5.3	3.3	5.1	3.1	4.5	3.6	5.4
Dover	3.1	4.6	3.0	4.3	3.7	5.3	3.4	4.9	3.6	5.2	3.7	5.2	4.4	7.0	4.5	7.4	4.5	6.8	3.4	5.0	3.3	4.9	3.5	5.2
Georgetown 5 SW	3.3	4.7	3.2	4.4	4.1	5.6	3.2	4.5	3.4	5.0	3.6	5.1	3.9	6.3	5.3	8.2	3.6	5.2	3.5	5.4	3.1	4.6	3.6	5.2
Lewes	3.4	4.8	3.4	4.7	4.2	5.7	3.6	5.1	3.7	5.4	3.7	5.2	4.2	6.3	5.3	8.2	3.3	4.8	3.4	5.0	3.4	4.9	3.8	5.4
Milford 4 SE	3.3	4.7	3.3	4.6	4.0	5.5	3.4	4.8	3.7	5.2	3.7	5.1	4.1	6.6	4.4	7.1	3.9	5.5	3.4	5.1	3.6	4.8	3.7	5.4

NOTE: P = Climatological normal precipitation
P₅ = 5-year return period precipitation



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

**CLIMATOLOGICAL NORMAL
PRECIPITATION (P)
AND
5 YEAR RETURN MONTHLY
PRECIPITATION (P5)**

ISSUED: JANUARY 2012

REVISED: _____

EXHIBIT - K K

Minimum Treatment Requirements for Large Systems *

Parameter	Slow Rate Land Treatment		Overland Flow	Rapid Infiltration Basins	< 20,000 gpd capacity ¹	> 20,000 gpd capacity
	Limited Access	Unlimited Access				
Biochemical Oxygen Demand	30 mg/l	10 mg/l	50mg/l	30 mg/l	#	30 mg/l
Total Suspended Solids (TSS)	30 mg/l	10 mg/l	50 mg/l	30 mg/l	#	30 mg/l
Fecal Coliform	200 Col/100ml	20 Col/100ml	200 Col/100ml	200 Col/100ml	NA	200 Col/100ml
Total Nitrogen	NA^{\$}	NA^{\$}	NA	5 mg/l	NA	5 mg/l
Turbidity	NA	5 TU	NA	NA	NA	NA

* These limits may be superseded by a Pollution Control Strategy for specific watersheds

¹ For subsurface disposal systems only not applicable for RIB's or Spray Irrigation

Site specific constraints will dictate the specific levels

\$ 5 mg/L in percolate only



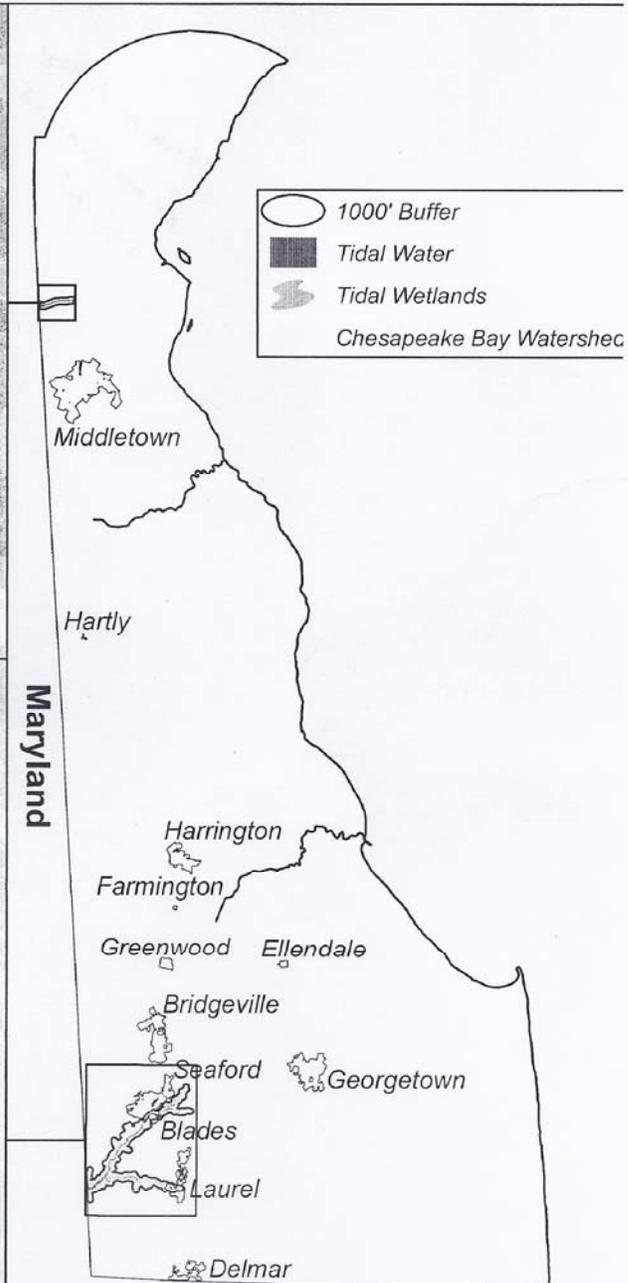
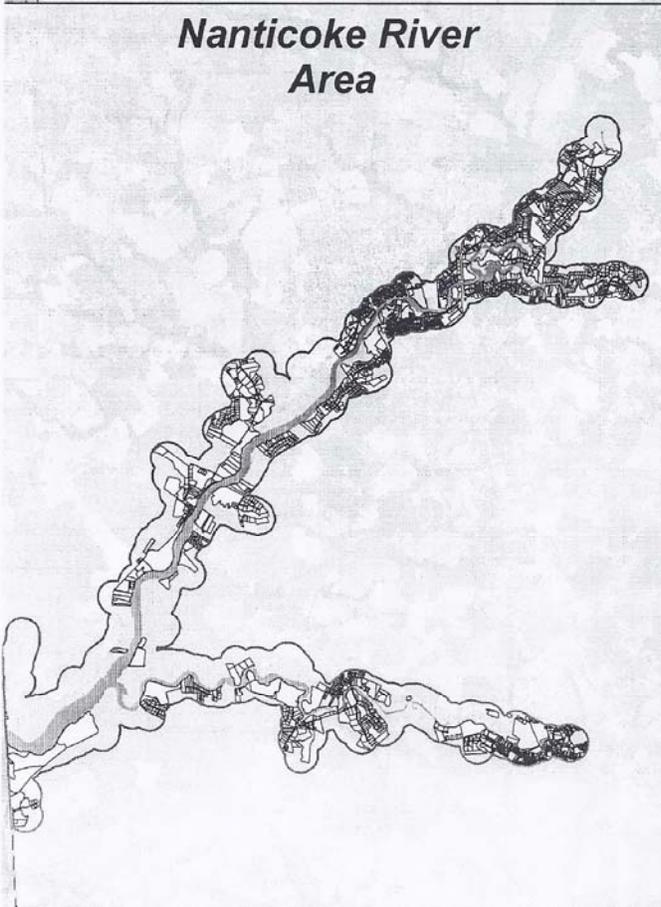
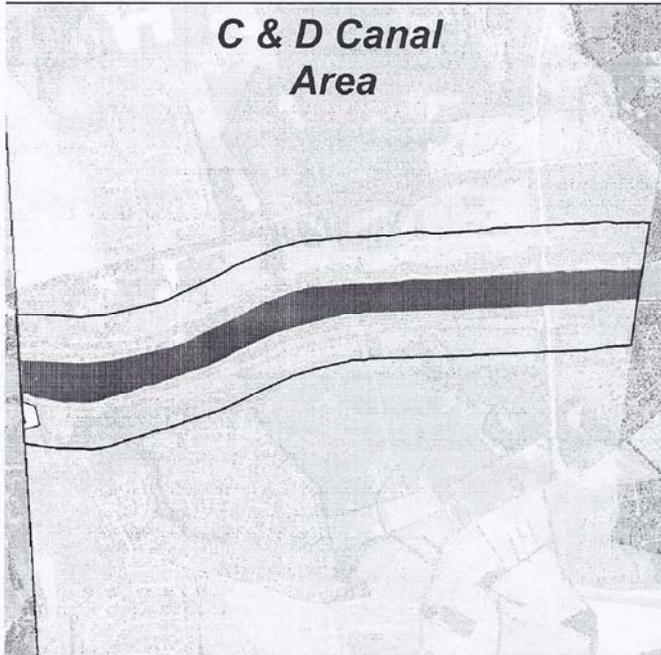
**Large On-Site Wastewater Treatment and Disposal System (LOWTDS)
Performance Standards**

1. Requirements for LOWTDS having flows $\geq 2,500$ gpd but $< 20,000$ gpd:
 - a. All new systems shall meet a Performance Standard Nitrogen level 2 (PSN2).
 - b. All replacement systems within 1000 feet of the Chesapeake Bay tidal waters (as displayed by Exhibit NN) shall meet a Performance Standard Nitrogen level 3 (PSN3).
 - c. When the operation permit expires for an existing system within 1000 feet of the Chesapeake Bay tidal waters (as displayed on Exhibit NN), the system must meet a Performance Standard Nitrogen level 3 (PSN3). If the system must be redesigned, the owner or operator of the system will have up to 60 months from the permit expiration date to bring the system into compliance with the new standard.

2. Requirements for LOWTDS having flows $\geq 20,000$ gpd:
 - a. All new systems shall meet Performance Standard Nitrogen level 1 (PSN1) and Performance Standard Phosphorus level 1(PSP1).
 - b. All replacement systems within 1000 feet of the Chesapeake Bay tidal waters (as displayed on Exhibit NN) shall meet Performance Standard Nitrogen level 2 (PSN2).
 - c. When the operation permit expires for an existing system, the Department will require the system to meet Performance Standard Nitrogen level 2 (PSN2). If the system must be redesigned to meet PSN2, the owner or operator of the system will have up to 60 months from the permit expiration date to bring the system into compliance with the new standard. **NOTE: Systems permitted at a higher performance standard will remain at that higher performance standard.**
 - d. When the operation permit expires for an existing system, and the system location is identified as having high potential for phosphorus mobility, the system must comply with the Performance Standard Phosphorous level 1 (PSP1). If the system must be redesigned to meet PSP1, the owner or operator of the system will have up to 60 months from the permit expiration date to bring the system into compliance with the new standard.



Delaware Parcels Completely Within 1,000 Feet of Chesapeake Bay Tidal Areas



Parcel Features

- Has On-Site Septic
- Has Sewer Access
- Has No Septic/ Sewer Access



STATE OF DELAWARE

DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

DELAWARE PARCELS COMPLETELY
WITHIN 1,000 FEET OF
CHESAPEAKE BAY TIDAL AREAS

ISSUED: JANUARY 2012

REVISED: _____

EXHIBIT - NN