



BRIAN L. HEWITT ENGINEERING L.L.C.

November 30, 2014

Lewis County Public Health
Environmental Health Unit
2025 NE Kresky Ave.
Chehalis, Washington 98532
Attn: Mr. Michael Hamling

Re: 14-030; Soil Analysis and Septic Design for Employees at 560 Centralia Alpha rd. Centralia, Wa.

Parcel Number: 021767001001

Clients: Lewis County Animal Shelter – Mr. Doug Carey, Facilities Manager

Dear Mr. Hamling,

The existing septic drainfield has failed. The original system was a delicate system that required a high degree of maintenance to maintain. This facility was not able to provide this type of attention. I have redesigned the system separating the employees from the sanitation of the Animal Shelter cages and material washing. The new system requires much less attention to maintain. This portion of the On Site septic system is for the Employees only.

Attached you will find a design for an Pressure Distribution system meeting Treatment Level E. The septic system has been for employees and visitors (see attached) with a daily demand of 220 gallons per day. The soil was determined to be Type 5, Clay Loam to Silt Loams. The loading rate will be 0.40. Test Holes in the primary area where the Drainfield will be located showed no mottling layer. Maximum depth of the trench is 24" with a minimum depth of 6". The Drainfield has two 60' drainlines 4.0' x 3.0' Gravelless Chambers. I have taken a 40 % reduction of the drainfield for using Gravelless Chambers which is within the allowance according to Washington State R S & G's. I will be adjusting the manual valves to meet the required minimum 5' squirt height.

If you have any questions about my design please feel free to contact me at your convenience.

Sincerely,

Brian L. Hewitt P.E.



Xc: Lewis County Animal Shelter – Mr. Doug Carey, Facilities Manager





BRIAN L. HEWITT ENGINEERING L.L.C.

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BRIAN L. HEWITT ENGINEERING L.L.C.

Site Evaluation Report

July 24, 2014

Job # 14-030

Property Address: 560 Centralia Alpha rd. Chehalis, Washington 98532

Parcel Number: 021767001001

Applicant Name: Lewis County Animal Shelter 560 Centralia Alpha rd. Chehalis, Washington 98532

Septic Design: 220 gallon per day

Acres: 14.49

Site Characteristics

General Topographic Characteristics: Melborne Loam

Drainage Characteristics: Well Drained

Slopes: General: 15-30 %

Proposed Drainfield Location: 28 %

Geology: Type of Bedrock & depth: none

Vegetation: forested, underbrush

Distance to, and type of, nearest surface water: 150 ft.
(If less than 250 ft.)

Distance to nearby wells: 400 ft.

Distance to public Sewers: none

Other Structures on Property: 40 ft. Shop

Engineer's statement regarding type of system required:

Based upon the soil analysis performed July 22, 2014, it is my determination that the primary on-site sewage system is approved for an Treatment Level E, Pressure Distribution drainfield system

The primary Drainfield area will require 550 sq. ft. (of Drainfield) minimum and 1,375 sq. ft. (land area) or 60 ft. by 23 ft.

The reserve area is approved for a Treatment Level A, Pretreatment to Engineered Sand Mound system and will require 550 sq. ft. (of Drainfield) minimum and 3,710 sq. ft. (land area) or 76.5 ft. by 48.5 ft.

Submitted by: Brian L. Hewitt P.E. # 29393

Date: November 30, 2014



5/13/15



BRIAN L. HEWITT ENGINEERING L.L.C.

Soil Evaluation Report

July 24, 2014

Job # 14-030

Property Address: 560 Centralia Alpha rd. Chehalis, Washington 98532

Parcel Number: 021767001001

Applicant Name: Lewis County Animal Shelter 560 Centralia Alpha rd. Chehalis, Washington 98532

Section 27 Township 14N Range 2W Tax Lot #

Subdivision Number Lot of

Soil Information

As mapped by U.S. Soil Conservation Service (S.C.S.): Melborne Loam

Appears to be (if different from S.C.S. Classification):

Soil Profile:

	<u>Depth</u>	<u>Description</u>	<u>Comments</u>
<u>Test Hole #1</u>	0-3"	Clay Loam (cl)	Drk brn, 2/f-m/sbk
	3-24"	Clay Loam (cl)	Brn, 2/c/pr
	24-36"	Silt Loam (sil)	Drk brn, 2/f-m/pr
	36-57"	Silty Clay Loam (sicl)	Rd brn, 2/m-c/pr
	Roots to 57",	No Mottling,	No Water
<u>Test Hole #2</u>	0-24"	Clay Loam (cl)	Brn, 2/m/abk
	24-35"	Silty Clay Loam (sicl)	Dk brn, 2/m/pr
	35-80"	Silty Clay Loam (sicl)	Rd brn, 2/c/pr
	Roots to 80",	No Mottling,	No Water
<u>Test Hole #3</u>	0-12"	Clay Loam (cl)	Drk brn, 2/f-m/abk
	12-16"	Clay Loam (cl)	Mixed, 2/f-m/abk
	16-72"	Clay ©	Rd.brn, massive
	Roots to 16",	Mottling 16",	No Water
<u>Test Hole #4</u>	0-11"	Clay Loam (cl)	Drk brn, 2/f-m/sbk
	11-22"	Clay Loam (cl)	Ylw brn, 2/mc/abk
	22-29"	Clay Loam (cl)	Drk brn, 2/m/abk
	29-48"	Silty Clay Loam (sicl)	Brn, 2/m-c/pr
	48-80"	Clay ©	Rd brn, massive
	Roots to 48",	Moderate Mottling 48",	No Water
<u>Test Hole #5</u>	0-29"	Clay Loam (cl)	Brn, 2/f-m/abk
	29-61"	Clay Loam (cl)	Ylw brn, 2/f-m/abk
	61-69"	Clay ©	Rd brn, massive
	Roots to 61",	Moderate Mottling 61",	No Water





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Cont. Soil Evaluation Report

July 24, 2014

Job # 14-030

Property Address: 560 Centralia Alpha rd. Chehalis, Washington 98532

Parcel Number: 021767001001

Applicant Name: Lewis County Animal Shelter 560 Centralia Alpha rd. Chehalis, Washington 98532

Maximum Seasonal Groundwater Elevation:

Soil Mottling: none in Primary area
(Depth and degree of development)

WAC Soil Classification: Type 5
(1A,1B,2A etc.)

Hydraulic Loading Rate: 0.40 gallons/sq ft/day

Water Table: none
(depth to standing water)

Additional Comments:





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14-030 Design Criteria for Employees

Three Full time Employees x 15 gallons per day	=	45 gpd
Two Part time Employees x 7.5 gallons per day	=	15 gpd
Ten customers x 5 gallons per day	=	50 gpd
Total	=	110 gpd
110 gpd x 2 (safety factor)	=	220 gpd



Re: # 14-030; Lewis County Animal Shelter- Employee design, 560 Centralia Alpha rd. Centralia, Wa.



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14-030 Pressure Distribution Worksheet November 30, 2014

Step 1: Determine the daily wastewater load and select a pretreatment process

- Daily design flow 220 gal. (120 gal/bdrm)(# of bdrms)
- Pretreatment method: Septic Size: 2,646 gal.
- Other pretreatment required? No

Step 2: Size the infiltration area and make a detailed preliminary drawing

- Required infiltration area: 550 sq ft (daily wastewater load / soil load rate)
- Preliminary drawing of layout. (on separate sheet of paper)

Step 3: Specify and layout components of the pressure distribution network

- Transport line: Length: 150 ft
Diameter: 1.25 in
Material: PVC Sch 40
Highest elevation: 10 ft.
- Manifold End Manifold
Length: 8 ft.
Diameter: 1.25 in
Material: PVC Sch 40
Highest elevation: 0 ft.
- Lateral: How many? 2
Length: 56 ft (60' installed)
Diameter: 1.25 in
Material: PVC Sch. 40
Highest elevation: 0 ft.
- Orifice Diameter: 1/8 in.
Spacing: 4 ft.
Orientation: 12:00
How many/lateral: 15
How many total: 30

Step 5: Calculate the total Dynamic Head in the network
(See attached Orenco Pump Selection Program)
Total Dynamic Head: 19.9 ft.

Step 6: Select a pump
(See attached Orenco Pump Selection Program)
GPM: 13.0 Model # PF-3005, 1/2 hp.

Step 7: Calculate dose volume:

- Total number of doses/day selected/required 8
- Dose volume: 30 gal. (Daily design flow / # of doses/day)

Re: # 14-030; Lewis County Animal Shelter- Employee design, 560 Centralia Alpha rd. Centralia, Wa.





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14-030 Pressure Distribution Worksheet cont.

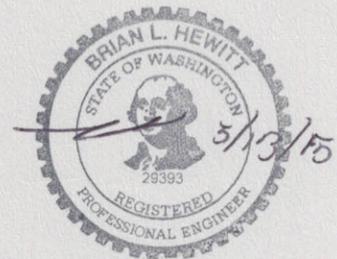
November 30, 2014

Step 8: Set the method of pump operation:
Timer Controlled

Step 9: Design the pump/siphon chamber or surge tank and set pump controls

- Required volume: $220 \times 1.75 = 385$ gal.
Septic Tank 2646 Reserve volume = 963 gal
Dose volume: 30 gal.
Emergency volume available $963 - 45 = 918 > 385$ gal. OK!
- Outlet Filter on septic Tank? Yes Biofilter
- Floats (from top of tank lid down)

<u>Float</u>	<u>Function</u>
20"	High Level Alarm
37"	Pump On- Ok to start for time dosing
42"	Redundant Pump off- Alarm
- Timer-controlled system:
Pump-time: $30/13.0 = 2.3$ min. Pump-off time: 2 hours 58 min.
- Drawdown: $30/15.8 = 1.9$ in. (#gal /dose/# gal /in. in tank)



Re: # 14-030; Lewis County Animal Shelter- Employee design, 560 Centralia Alpha rd. Centralia, Wa.

Pump Selection for a Pressurized System - Single Family Residence Project

14-030 Lewis County Animal Shelter- Employees / 560 Centralia Alpha rd. Centralia, Wa.

Parameters

Discharge Assembly Size	1.25	inches
Transport Length	150	feet
Transport Pipe Class	40	
Transport Line Size	1.25	inches
Distributing Valve Model	None	
Max Elevation Lift	10	feet
Manifold Length	8	feet
Manifold Pipe Class	40	
Manifold Pipe Size	1.25	inches
Number of Laterals per Cell	2	
Lateral Length	56	feet
Lateral Pipe Class	40	
Lateral Pipe Size	1.25	inches
Orifice Size	1/8	inches
Orifice Spacing	4	feet
Residual Head	5	feet
Flow Meter	None	inches
'Add-on' Friction Losses	0	feet

Calculations

Minimum Flow Rate per Orifice	0.43	gpm
Number of Orifices per Zone	30	
Total Flow Rate per Zone	13.0	gpm
Number of Laterals per Zone	2	
% Flow Differential 1st/Last Orifice	1.2	%
Transport Velocity	2.8	fps

Frictional Head Losses

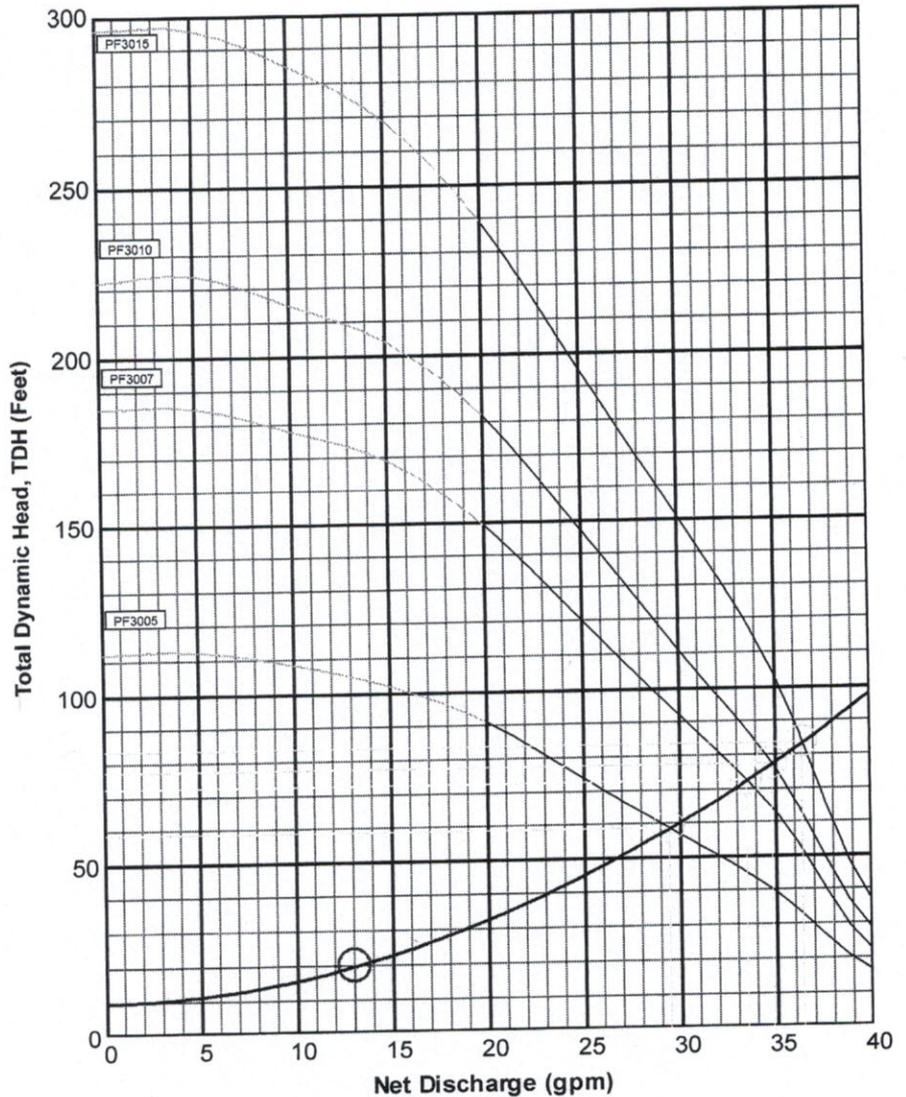
Loss through Discharge	1.2	feet
Loss in Transport	3.6	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.1	feet
Loss in Laterals	0.2	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	0.0	feet

Pipe Volumes

Vol of Transport Line	11.7	gals
Vol of Manifold	0.6	gals
Vol of Laterals per Zone	8.7	gals
Total Volume	20.9	gals

Minimum Pump Requirements

Design Flow Rate	13.0	gpm
Total Dynamic Head	19.9	feet



PumpData

PF3005 High Head Effluent Pump
30 GPM, 1/2HP
115/230V 1Ø 60Hz, 200V 3Ø 60Hz

PF3007 High Head Effluent Pump
30 GPM, 3/4HP
230V 1Ø 60Hz, 200/460V 3Ø 60Hz

PF3010 High Head Effluent Pump
30 GPM, 1HP
230V 1Ø 60Hz, 200/460V 3Ø 60Hz

PF3015 High Head Effluent Pump
30 GPM, 1-1/2HP
230V 1Ø 60Hz, 200/230/460V 3Ø 60Hz

Legend

System Curve	—
Pump Curve	- - -
Pump Optimal Range	—
Operating Point	○
Design Point	⊙



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14-030 Material List- Employees

This list is an attempt for the contractor to get a good idea what is to be purchased. It is no intent to be the complete list of all necessary materials for the project.

Any substitutions must be pre-approved by the Engineer prior to installation.

- Sound Placement Services 12-2633, 2,646 gallon, three chamber, Well sealed- or equal
 - Orenco Biotube® EasyPak™ BEP30TDD
 - Includes Pump, Biotube, 3- floats, MVP control panel, etc.
 - Pump: PF3005 ½ hp- 13.0 GPM @ 19.9' TDH
- External disconnect for control panel wiring
- Electrical- Provide two 20 amp circuits to system, One for Pump 120 v, one for level Switches 120 v
- Piping
 - 1.25" diameter- PVC discharge assembly
 - 1.25" diameter- PVC Schedule 40 Transport
 - 1.25" diameter PVC Schedule 40 lateral piping
 - Misc. fittings
- Valves
 - 1.25" PVC ball valves, 150 lb rating
 - 1.25" diameter PVC check valve
- (3) Fiberglass valve box for laterals- locking lid
- Fiberglass valve box for main manifold- locking lid
- 4" PVC schedule 40 pipe and threaded cap for observation ports and cleanouts
- (30) Graveless Chambers 4.0' x 2.83'
- Top soil- use local from property- clean of debris (not clay!)

Two electrical 120 v circuits with external disconnects must be supplied to the control panel and all wiring is to be run in sealed conduit from the control panel to the splice box or the system will not be approved

Re: # 14-030; Lewis County Animal Shelter- Employee design, 560 Centralia Alpha rd. Centralia, Wa.





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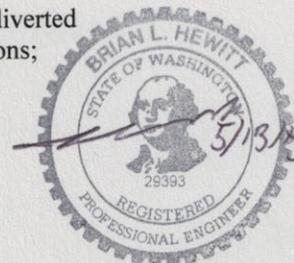
OPERATIONS AND MAINTENANCE

This system was designed to operate at a peak flow of 120 gallons per day and average of 80 gallons per day for each bedroom in the house and at a waste strength typical for a residence. If the average waste flow or waste strength is exceeded, this system WILL FAIL. Please note the following requirements to help lengthen the life of your septic system:

Prevent continuous running of water from going into the septic system. Such as toilets, leaking faucets, Water Softener units, etc. This will quickly make the Drainfield fail or alarms sound.

- All Gravity Fed Septic systems are required by state code to be inspected every 3 years and pumped only when necessary.
- All Pressurized Septic systems are required state code to be inspected every year and pumped only when necessary. This shall be performed by either the home owner or a licensed O & M service provider.
- Pump Vault-type filters must be removed and rinsed with a hose every year.
- If a baffle-type filter is used on the outlet side of the septic tank it must be removed and rinsed with a hose every 6 months.
- Plantings on drainfields should be limited to ground cover or grass. Roots from trees, shrubs, etc can be detrimental and cause pre-mature system failure.
- The area over the drainfield, sand filter, Glendon® pods, Sub-Surface Drips, etc should be inspected for erosion twice a year and repaired as necessary.
- Pump(s), floats, alarms, switches and controls should be inspected yearly and repaired/adjusted as necessary to maintain the dose volumes and times in design.
- Residual pressure at the distal ends of pressure drainfields should be checked yearly and compared to the information recorded in the as-built (if system pressurized). Clean laterals if necessary.
- Toxic substances (i.e. paint, paint thinner, oils pesticides, RV chemicals, and solvents) should NEVER be dumped into sinks or toilets.
- Cooking oils, grease, coffee grounds, cigarettes, paper towels, newspaper, sanitary napkins, diapers and hair should NEVER be dumped into sinks or toilets.
- Garbage disposals shall NOT be used unless specifically designed for. They can cause pre-mature system failure and require additional treatment devices if used.
- Septic tank additives should NOT be used. Some of these products can cause solids to enter the drainfield causing early system failure.
- The septic tank can be pumped clean but should NEVER be washed or disinfected.
- Under NO circumstances should anyone enter a septic tank. Poisonous gases, contaminants and lack of oxygen may be fatal.
- No roads, structures or other physical features should be located over the primary or reserve drainfield areas (see plans for locations).
- Detergent w/ bleach, liquid fabric softener, hair conditioner, antibacterial products and liquid drain cleaner should be avoided whenever possible.
- A washing machine filter can help reduce buildup in the septic tank and contaminants in the drainfield.
- Implement a water conservation plan for your house. Use low flow shower heads, low volume toilets, etc.
- In no case should swimming pools, water softener discharges or other large water flows be diverted into the system or on top of the drainfield. If a container mentions these words on the instructions; Warning, Danger, or Hazardous, These items should not be put into the septic system

Re: # 14-030; Lewis County Animal Shelter- Employee design, 560 Centralia Alpha rd. Centralia, Wa.





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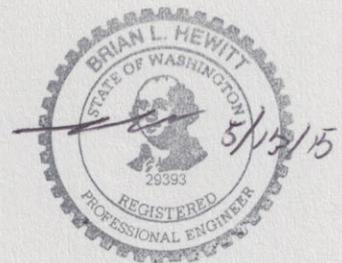
PERFORMANCE MONITORING

Performance monitoring shall be performed every six months or whenever there is a problem. A contract is **Recommended** between the owner and the maintenance provider to ensure proper maintenance is performed.

Criteria used for performance monitoring of systems should include the following:

- System type/age and soil type/conditions
- Mechanical and/or electrical malfunctions (including switches, alarm, valves and dose volumes/frequency) should be checked. Dose volumes and timer setting should be verified to ensure as-built settings are still met.
- Septic tank problems including inadequate pumping or baffling and groundwater intrusion
- Pump tank problems including inadequate servicing and groundwater intrusion
- Ponding or clogging of the system trenches, orifices and filters
- Evidence of improper use or neglect including higher than normal flows or strengths
- Residual pressure at the distal ends of pressurized systems should match the as-built
- Drainfield area should be evaluated for surface effluent, appropriate vegetation, and absence of traffic, structures, impervious surfaces and abnormal settling.
- Monitoring ports should be checked for ponding.

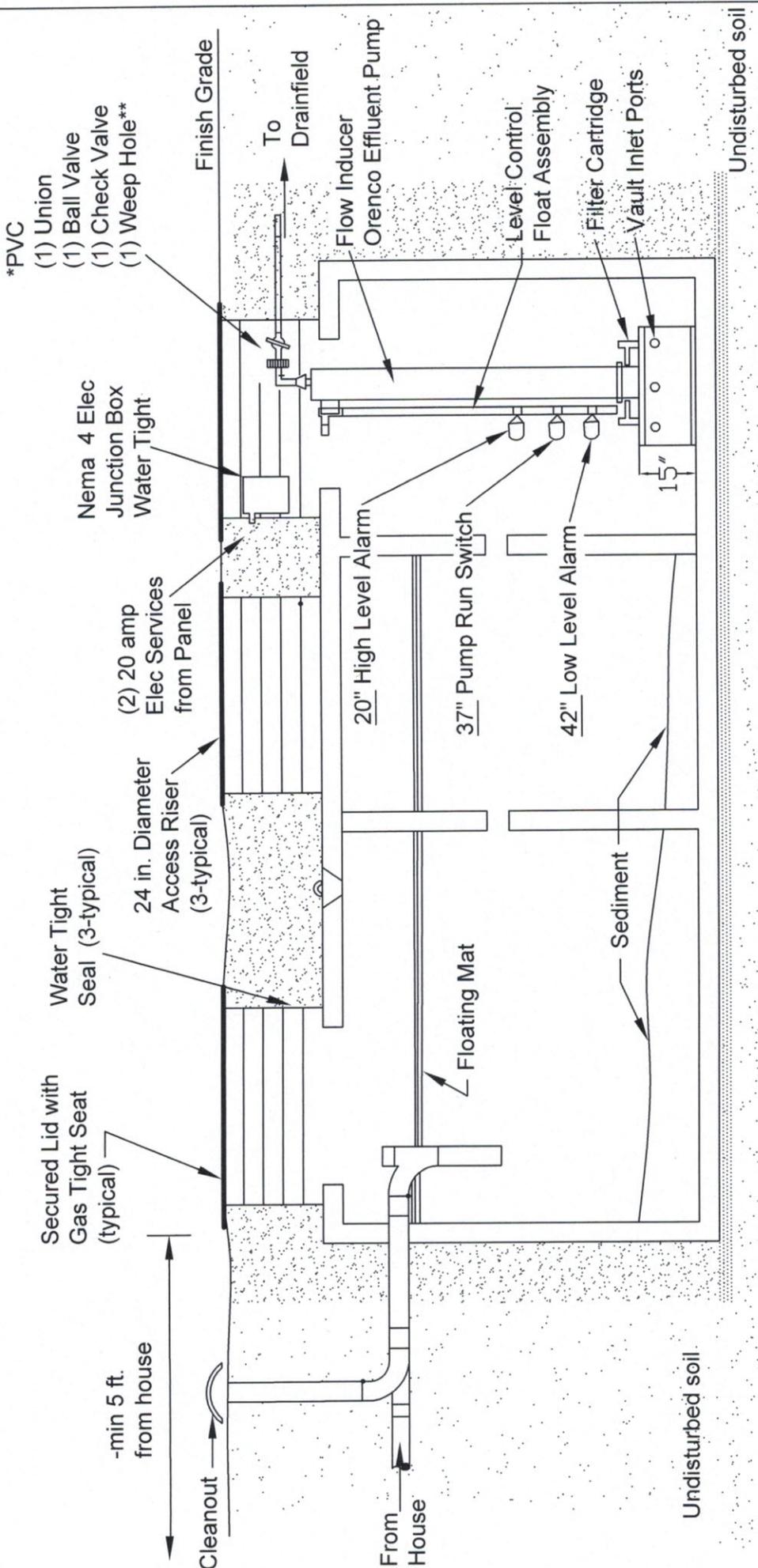
Re: # 14-030; Lewis County Animal Shelter- Employee design, 560 Centralia Alpha rd. Centralia, Wa.



1
M-1

Typical 3-Chamber Septic Tank

Model 12-2633, 2,646 Gallon-Sound Placement or Equal



Lewis County Animal Shelter
560 Centralia Alpha Road
Chaeahlis, Washington 98531

Brian L. Hewitt Engineering L.L.C.
3029 Maple St. Longview, Washington 98632
Cell: 360.751.3751 Fax: 360.425.2255
e-mail: Hewitt.Engineering@comcast.net

Date: 11/21/14 Job #14-030
Scale: NTS Sheet M-1

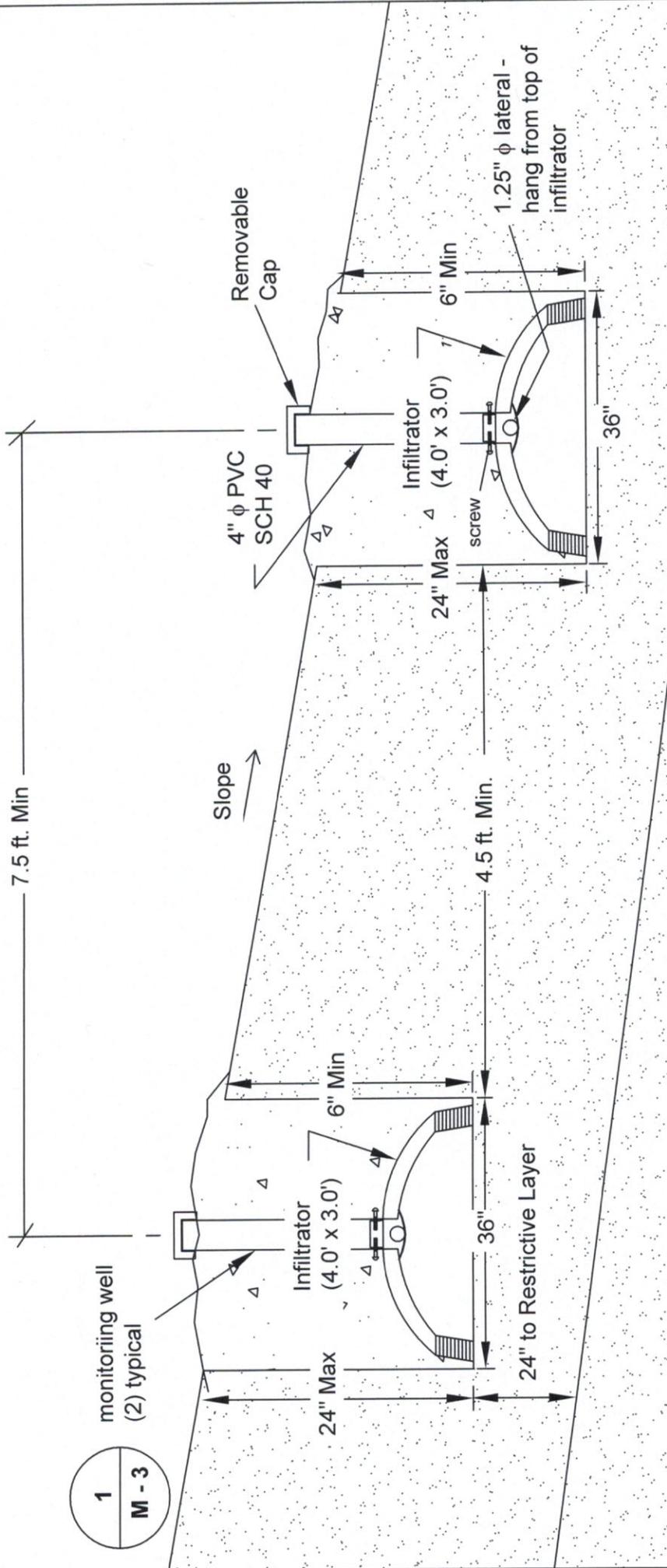
* Valve Units must be installed so the Filter Unit can be removed without moving piping or valves.

** Weep Hole only needed when Sand Filter / Mound / or Drainfield located below top of pump.
If Weep Hole installed, it must be installed on the Horizontal Points down before the check valve.

Infiltrator Drainfield Cross Section w/ Lateral Pipe

(Sloping Site, Full Depth Trench with Capping Fill)

1
M-2



Construction Notes

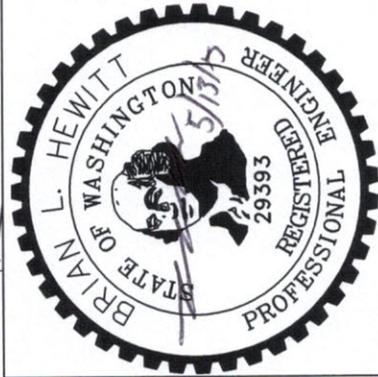
- Backfill:**
- ~ Backfill with soil excavated from trench.
 - ~ 12" capping fill above the top of the Infiltrators

Trenches:

- ~ Trench bottoms must be level and follow slope contours.
- ~ Bottom of each trench must be within +/- 1/2" level over entire length.

Lateral Pipe:

- ~ 1.25" ϕ lateral - hang from top of infiltrator
- ~ 1/8" ϕ orifices - 4' on center, 12:00 position



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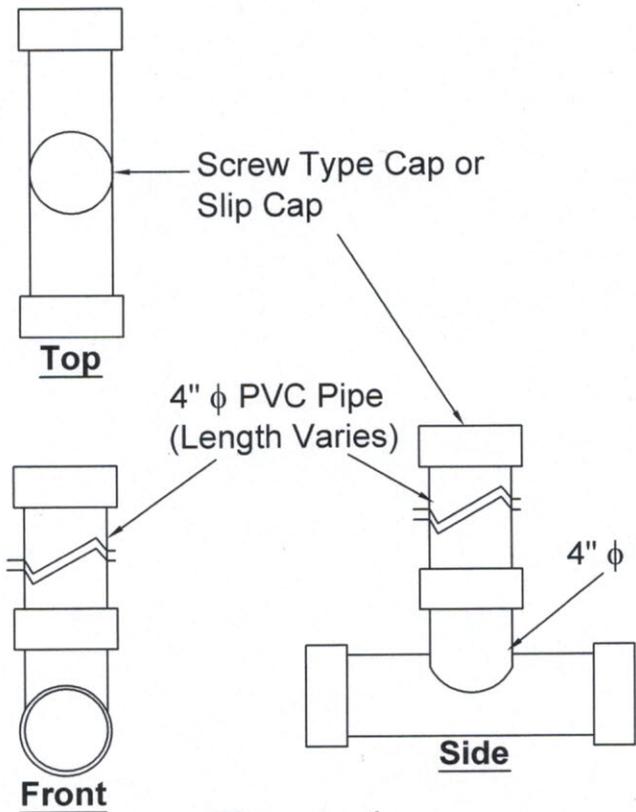
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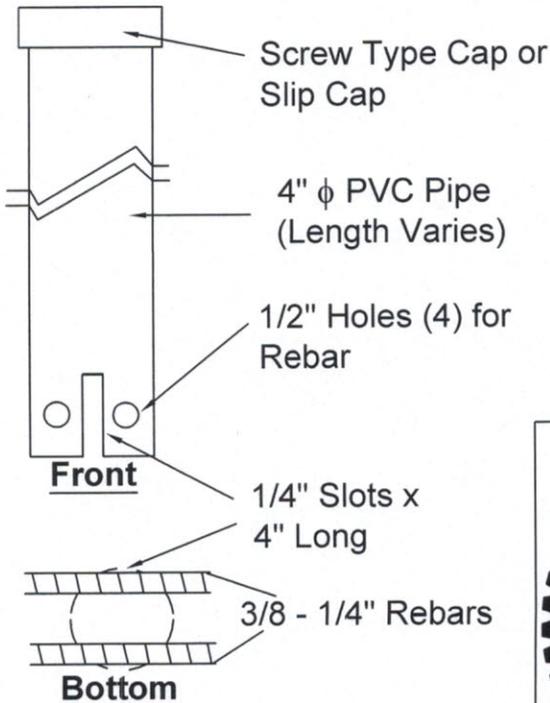
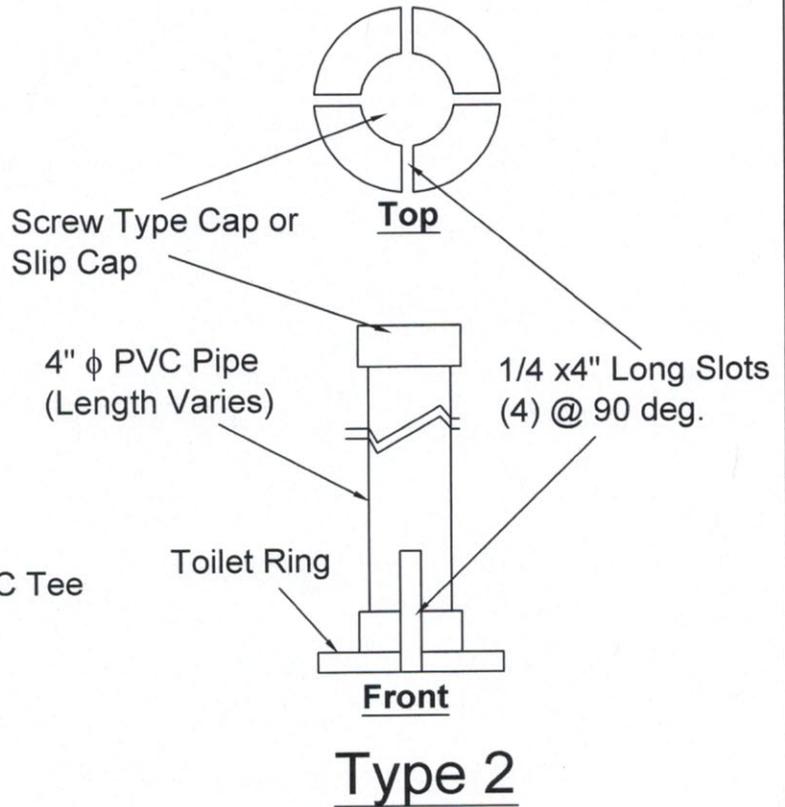
1
M-3

Monitoring Wells

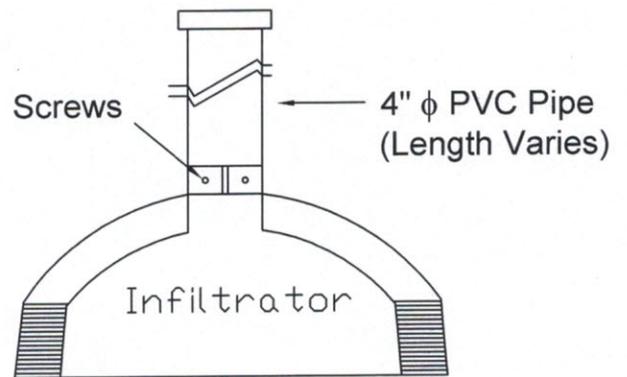
Four Types



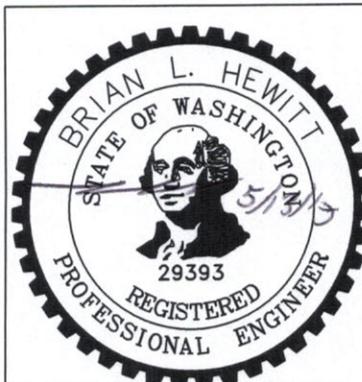
Type 1



Type 3



Type 4



Lewis County Animal Shelter
560 Centralia Alpha Road
Chaehalis, Washington 98531

Brian L. Hewitt Engineering
3029 Maple St.
Longview, Washington 98632
Cell: 360.751.3751 Fax: 360.425.2255
e-mail: Hewitt.Engineering@comcast.net

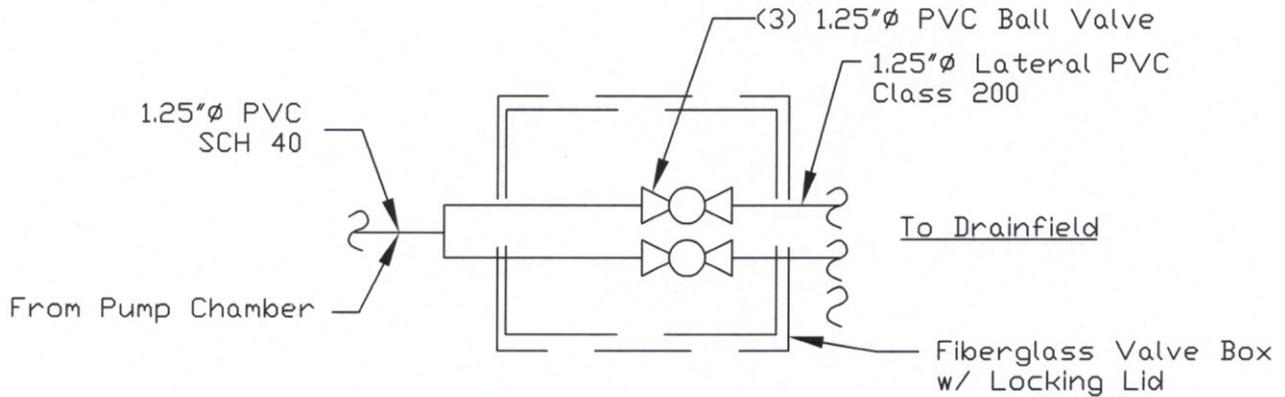
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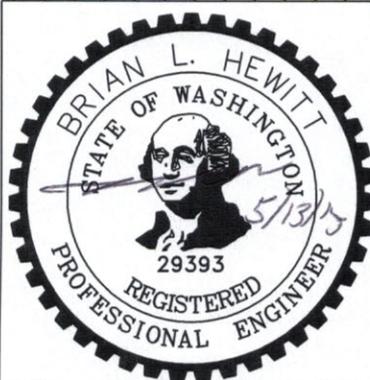
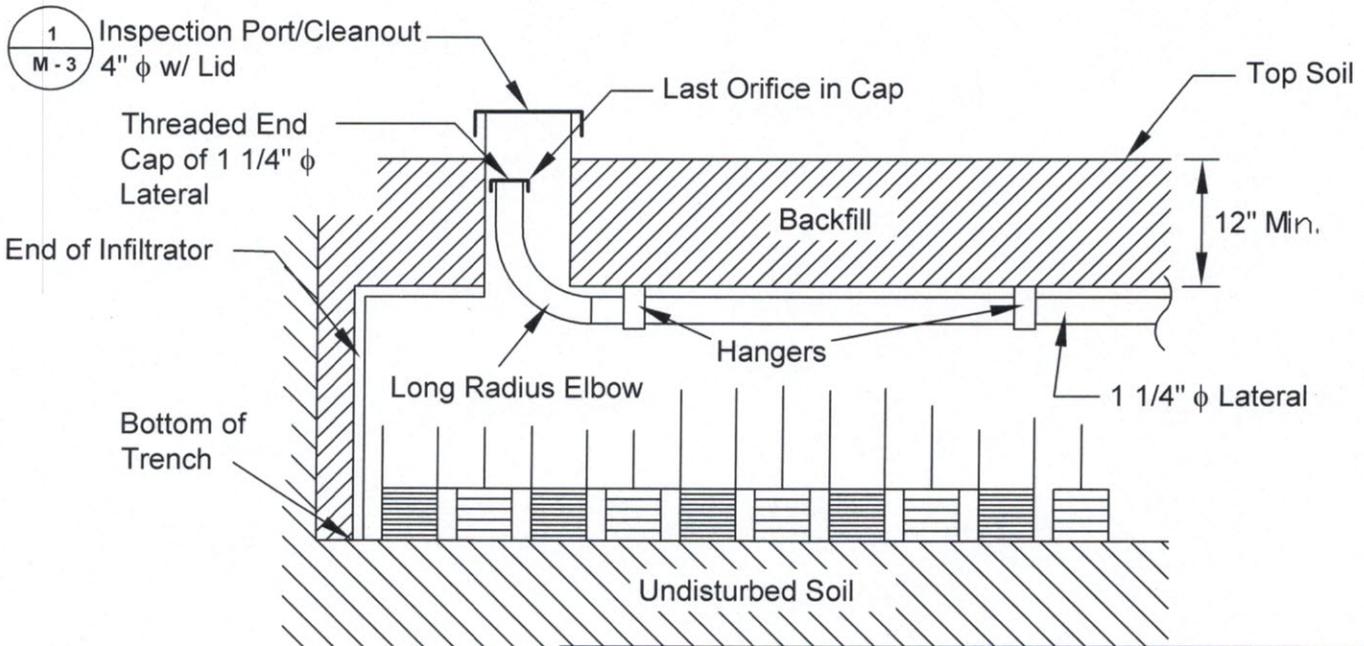
Scale: NTS

Sheet M-3

1 Valve Box
M-4 TYP (1) PLC's NTS



2 Cleanout/Inspection Port Detail
M-4 TYP (2) PLC's NTS



Lewis County Animal Shelter
560 Centralia Alpha Road
Chaehalis, Washington 98531

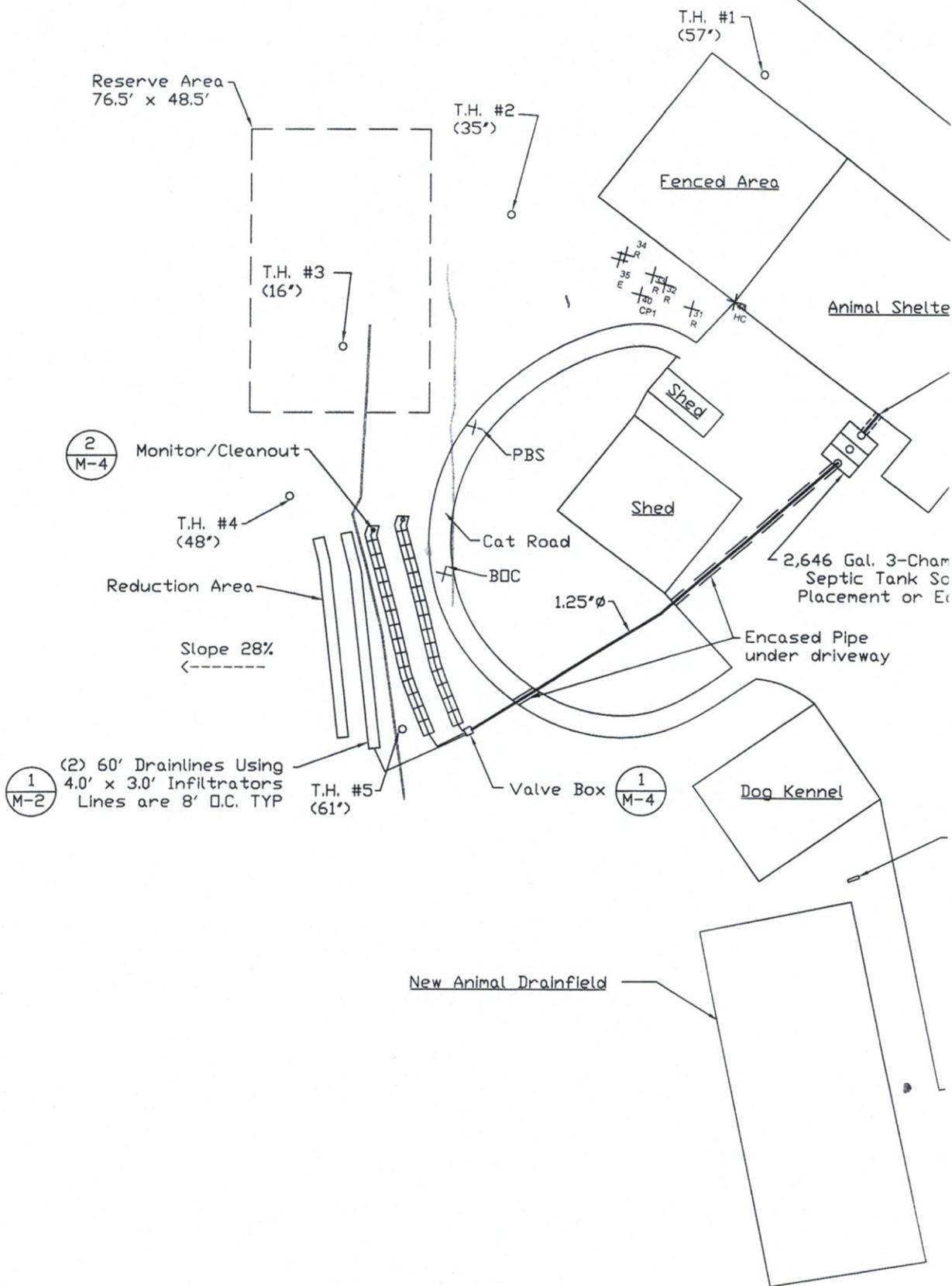
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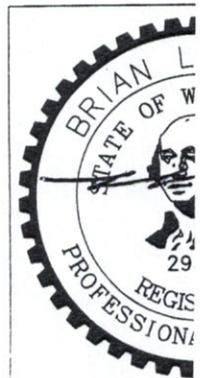
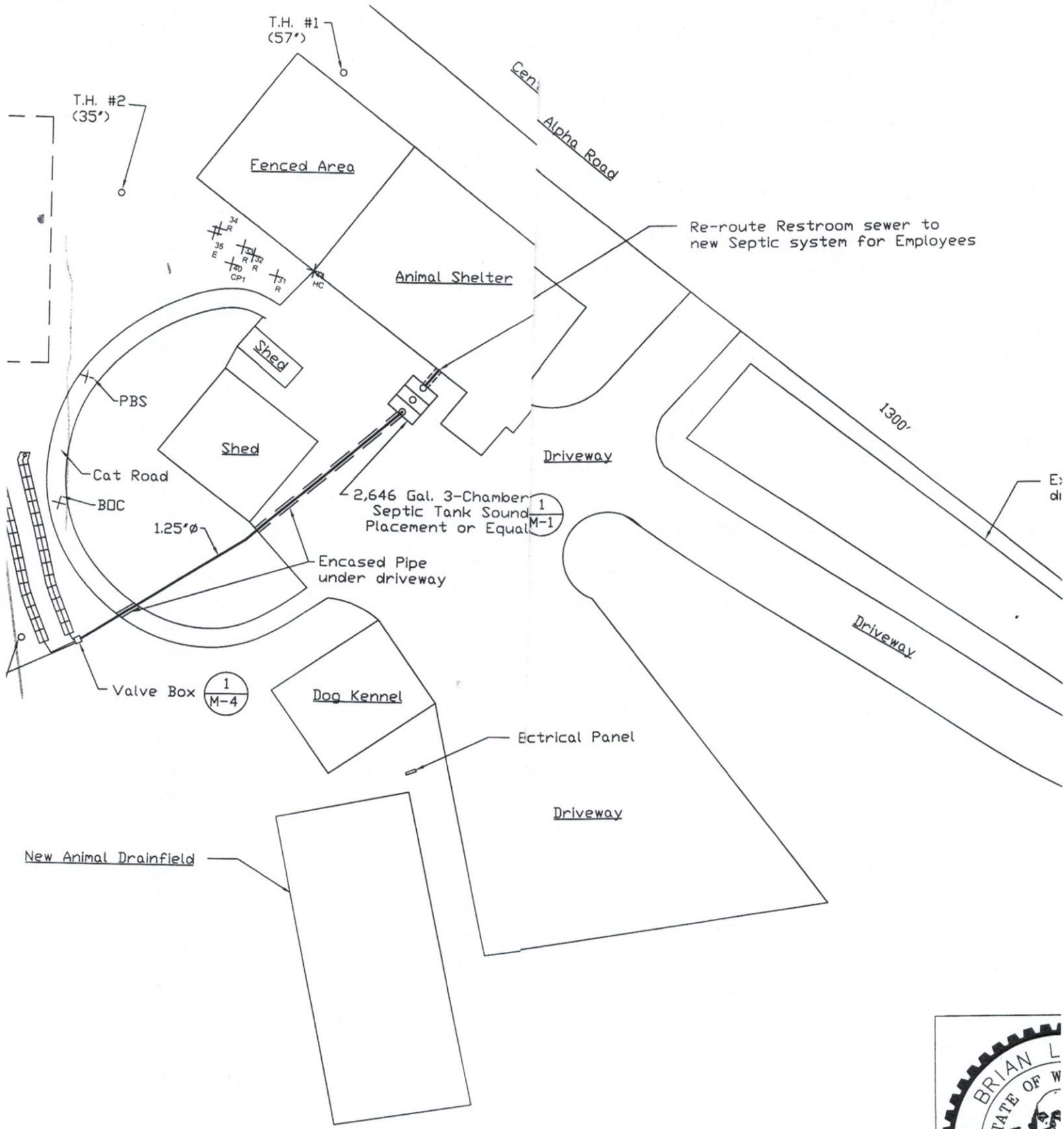
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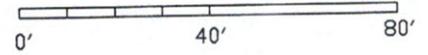
Job# 14-030

Scale: NTS

Sheet: M-4







Alpha Road

Re-route Restroom sewer to new Septic system for Employees

1300'

Driveway

Existing Sub-Surface Drip drainfield to be abandon

1
M-1

Driveway



critical Panel

Driveway

PLOT PLAN

If Drainfield is to be installed other than the months of June-September the installer must contact Brian Hewitt Engineering before work begins for soil moisture content approval.



Lewis County Animal Shelter
560 Centralia Alpha Road
Chehalis, Washington 98531
Brian L. Hewitt Engineering L.L.C.
3029 Maple St.
Longview, Washington 98632
Cell: 360.751.3751 Fax: 360.425.2255
e-mail: Hewitt.Engineering@comcast.net

Date: 11/21/14

Job #14-030

Scale: 1"=40'-0"

Sheet M-5