



Name: _____

Date: _____

Designer Exam No. _____
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Designer Examination

This is an open-book, take-home examination that is divided into two parts:

Part 1 is comprised of questions with answers that are generally found in the Ordinance and Manual. The purpose of these questions is to assure those taking the exam have a basic familiarity with the Butte County's new On-Site Wastewater Ordinance and On-Site Wastewater Manual.

Part 2 is a request for submission of two complete designs that incorporate pressure distribution. The purpose of this is to assure Certified Designers can demonstrate designer expertise.

Part One

1. What is the difference between the Ordinance and the Manual?
2. What are the four parts of the Manual?
3. What is the difference between "vertical separation" and "total effective (or useable) soil?" (Ordinance definitions)
4. What is the importance of vertical separation?
5. Why are drainfields now required to be shallow?
6. Give three conditions in the soil that would make it be considered a "restrictive layer." (Ordinance definitions)
7. A 2-acre parcel has an approved site evaluation for a 4-bedroom residence. There is 48 inches of effective soil that is known to be a silt loam. The parcel does not have a slope.

Determine: # sq. ft. of drainfield needed (Manual Pt 3)

Determine: Minimum vertical separation required for a gravity system (Ordinance)



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Determine: Maximum trench depth

8. Why is sidewall area not considered in the Ordinance and Manual for reducing the length of a standard gravity system?
9. Why is serial distribution no longer used to distribute effluent on a sloping site?
10. When is a certified designer required to design a system? (Ordinance and Manual Pt. 3)
11. Where are the requirements found for 5+ acre parcels that only require 18 inches of vertical separation?
12. What can my customer do if we disagree with the way staff is interpreting the Ordinance or if we have an alternative proposal that is not found in the Manual? (Ordinance)
13. Where can I find setback requirements for septic tanks and drainfields?
14. Where can I find what type of pipe to use in a wastewater system?
15. What type of pipe should I use: (Manual Pt. 2)
 - a) From septic tank to d-box
 - b) For first 5 ft out of the d-box
 - c) For the drainfield laterals
16. Where in the Manual can I read how to test a septic tank for water tightness once it is installed?
17. Where in the Ordinance can I find a list of corrections I can make to a wastewater system after notifying the health department but without having to obtain a repair permit?



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18. List 3 examples where notification, but not permitting, is required.
 - a)
 - b)
 - c)

19. Where are observation ports required for a standard gravity system? (Manual Pt. 2 and 3)

20. What is the maximum length of a drainfield lateral and how much slope is allowed? (Manual Pt. 3)

21. As a designer for discharge of treated sewage effluent, your concern for vertical separation as defined in the Butte County On-site Wastewater Ordinance will be _____.
 - a) separation between existing groundwater and a limiting layer of insufficient soil or rock.
 - b) separation between the seasonal water table and permanent water table.
 - c) separation between the bottom of the dispersal component of the wastewater system and the water table or insufficient soil or rock.
 - d) separation between the bottom of the system distribution laterals and the bottom of the sand filter.
 - e) none of the above

22. A containment vessel for sand filters may include excavated pit unsupported Polyvinyl Chloride lined filters, filters constructed below ground with water-tight concrete walls, and floors, and above ground concrete tanks designed by a professional engineer.
True____ False____

23. The hydraulic design of a pressurized distribution system must include a minimum of _____ feet of head at the furthest orifice from the piping manifold.

24. You are faced with designing a small treatment and disposal system for five homes in an outlying area. Currently, one three bedroom home is occupied, one single bedroom cottage is occupied, and three two bedroom homes are unoccupied with the potential of future occupation. Which design flow should best be used in the design of the system? _____



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- a) 520 gpd
 - b) 600 gpd
 - c) 720 gpd
 - d) 800 gpd
 - e) 1,320 gpd
25. In July in Butte County, you have reviewed a potential sewage disposal site. The site has two definitely different characteristics. Portion 'A' is lush and green with blackberry plants growing on it. Portion 'B' has dried long grasses with a few trees on it. Which site portion would you first investigate and why? How would you investigate each portion? Should you need to?
26. In April, in Butte County, you are called to a site with one existing home on a large farm. The 20-year old septic disposal system has apparently failed as there is surfacing effluent in the leachfield area. Since the farmer has a backhoe, you have him dig you a hole adjacent to the existing leachfield and find clay-loam soils, and encounter groundwater at eleven feet below the surface. You explain to the owner ____.
- a) that this is a repair situation and that he should apply to the Health Department for a leachfield replacement.
 - b) that this repair situation calls for the installation of a treatment system with standard leachlines.
 - c) that this repair situation calls for the installation of a treatment system with shallow leachlines.
 - d) that he should continue to operate the current system until summer arrives when construction work will be less troublesome.
27. In Summer, you are called to a site that has a parcel ten acres in size in north Butte County. The owner wants to split his parcel into twenty one-half acre parcels. This area has been known for very good soils, but potentially high groundwater. You tell the owner that once he has verified zoning and General Plan issues with the County Planning Department, that he should _____.
- a) place twenty groundwater monitoring wells immediately and begin monitoring groundwater levels, and that in the following spring, he should be able to make application.



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- b) dig several test holes on the site, have a qualified person review the holes, and should the soils be adequate, make application for his subdivision with almost assured approval.
 - c) explain to the owner that he is faced with a long process that involves meetings with the Health Department, evaluation of his soils, monitoring of groundwater depths through an average winter and potentially design of an engineered treatment and disposal system.
 - d) tell the owner that he should he should sell the land because he is sitting on a potential gold mine.
28. Which item is not required to be installed in a soil covered intermittent sand filter?
- a) Underdrain.
 - b) Good clay soil cover for protection of filter.
 - c) Geotextile filter fabric for protection of filter media.
 - d) Monitoring port.
 - e) None of the above.
29. During a site soils evaluation, which of the following items must be noted? _____
- a) Soil types.
 - b) Depths of effective soils.
 - c) Moisture contents of soils.
 - d) Perched water table depths and indications of previous water table inundations.
 - e) Slope of surface ground.
 - f) All of the above.
30. When choosing a system to be designed, discussion and evaluation of cost concerns for installation and maintenance should always be considered.
- True _____ False _____



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Part Two

In order to complete Part 2 of the examination, submit **either** of the following:

- a) Two (2) complete designs you have done in the past utilizing pressure distribution and supplemental treatment. The designs need to include hydraulic calculations and pump curves. The designs should contain the information included on the checklist for the Pressure Distribution and Supplemental Treatment Design Form (DS) and the summary information on the first page of the design form should be completed for the design.

or

- b) Submit a design for a supplemental treatment system and pressurized distribution or subsurface drip dispersal system for Design Problem One and for Design Problem Two. The designs should contain the information included on the checklist for the Pressure Distribution and Supplemental Treatment Design Form (DS) and the summary information on the first page of the design form should be completed for the design. Additional drawings and specifications may be added complete each design.

Design Problem A

Refer to the site drawing on Page 4 of the design form identified as Design Problem A.

The property has had 5 test holes indicating that the soil is a silt loam with a restrictive layer at 23 inches. There is 3 inches of mottling present above the restrictive layer, indicating the presence of a seasonal, perched watertable.

Design a system for a 4-bedroom residence utilizing supplemental treatment and sizing the dispersal field based on the soil texture.

Design Problem B

Refer to the site drawing on Page 4 of the design form identified as Design Problem B.

The property has had 7 test holes indicating the soil is a silty clay loam with a restrictive layer at 28 inches. There is 8 inches of mottling present above the restrictive layer, indicating the presence of a seasonal, perched watertable.

Design a system for a 3-bedroom residence utilizing supplemental treatment, sizing the dispersal field based on soil texture, and incorporating a curtain drain.

Design forms can be downloaded from Environmental Health's On-Site Wastewater website located at:

<http://www.buttecounty.net/ph/environmentalhealth>



Design Problem A

See Site Plan Pg 4

Staff Use Only

Date Received: _____

Staff: _____

PRESSURE DISTRIBUTION AND SUPPLEMENTAL TREATMENT DESIGN FORM

Form DS

A design will be reviewed when this form and design drawings are submitted with an On-Site Wastewater System Construction Permit application and fees are paid.

Parcel Identification

APN #: _____

Traklt #: _____

Applicant Name _____

Designer Name _____

Parcel Address _____

Designer Mailing Address _____

City _____ State _____ Zip _____

City _____ State _____ Zip _____

Subdivision Name/Division/Block/Lot _____

Designer Telephone Number _____

Design Parameters

Treatment Type

Vertical Separation (inches) _____

- Closed Bottom Sandfilter
- Open Bottom Sandfilter
- Mound
- ATU

Make/Model _____

Textile Filter _____

Make/Model _____

Disinfect Unit _____

Make/Model _____

Dispersal Type

- Gravity
- Trench
- Drain Rock
- Subsurface Drip
- Pressure
- Bed
- Gravelles Chamber

Dispersal System Parameters

Number of Bedrooms _____

Daily Flow _____ gpd

Septic Tank Capacity (gal) _____ gal.

Receiving Soil Type (A-E) _____

Receiving Soil Ap. Rt _____ gpd/ft²

Designed Vertical Separation _____

Drainfield Square Footage _____

Percent Reduction Taken _____

Trench width _____ inches

Total lineal trench length _____ ft.

Trench depth _____ inches

Depth of fill over drainfield _____ inches

Slope in drainfield area _____ %

Pump Specifications

Difference in Elevation Between Pump Shutoff and Uppermost Orifice: _____ ft

Uppermost Orifice is: Higher Lower than Pump Shutoff

Capacity @ Total Pressure Head: _____ gpm

Calculated Total Pressure Head: _____ ft
(Attach Pump Curve)

Dosing and Pump Chamber

Number of Doses/Day _____

Dose Quantity _____ gal

Chamber Capacity _____ gal

Pump Controls: Timer (or) Elapse Time Meter
(circle if required)

If Timer: Pump On _____ Pump Off _____

Check the following components if they drain between doses:

- Laterals
- Manifold
- Transport

Updated: September 9, 2010

This section completed by Certified Designer

Pressure Distribution and Supplemental Treatment System Design

Design Drawing Checklist

TrakIt #: _____

Pressure Distribution System Parameters

Laterals

Schedule/Class _____
Length (feet) _____
Diameter (inches) _____
Number _____
Separation (feet) _____

Orifices

Total Number of Orifices _____
Diameter (inches) _____
Spacing (inches) _____

Manifold

Schedule/Class _____
Length (feet) _____
Preferred Manifold Configuration Used? Yes No

Transport Pipe

Schedule/Class _____
Length (feet) _____
Diameter (inches) _____

Designer Certification

The undersigned has submitted this design based observed site conditions and has designed the system as shown on this design form and the drawings attached thereto.

Designer Date

The undersigned has reviewed this design on behalf of Butte County Public Health Department and determined it to be in compliance with state and local on-site regulations and ordinances.

Environmental Health Specialist Date

Caution: This design approval is only valid when all the following conditions are met:

- ✓ The design is stamped "Approved" by Butte County Public Health Department
- ✓ The Construction Permit has not expired.
- ✓ The system is installed by a Certified Installer or homeowner authorized by the Butte County Public Health Department
- ✓ Drainfield site conditions have not been altered to adversely affect conditions of design approval

This section completed by Certified Designer

This section completed by EH

Required Drawings

Scaled Plot Plan

- Test hole locations
- Property lines
- Existing and proposed wells within 100 ft of property lines
- Critical distance measurements to cuts, banks, and surface water
- Location and orientation of curtain drain and all absorption components
- Location and dimension of primary system and reserve area
- Buildings
- Direction of slope indicator
- Waterlines
- Roads/easements/driveways/parking
- Critical resource lands (if applicable)
- North arrow and scale of drawing shown on scale bar

Mound Systems Only

Additional layout information for mound system:

- Overall fill dimensions
- Up-slope, downslope, and endslope fill width

Additional cross-section information for mound system:

- Settled cap depth at center and edge of bed
- Sidewall slope
- Up-slope and downslope bed elevation

Scaled Layout Sketch

- Drainfield orientation and layout
- Trench/bed dimensions and critical distances within layout
- D-Box/"T"/"L" locations
- Septic tank/pump chamber location
- Observation port location
- Clean-out location
- Manifold placement
- Orifice placement
- Lateral placement, with distances to edge of bed
- Audible/visual alarm referenced
- Scale of drawing shown on scale bar

Cross-Section Sketch

Referenced depth from original grade:

- Septic tank lid and drainfield cover depth

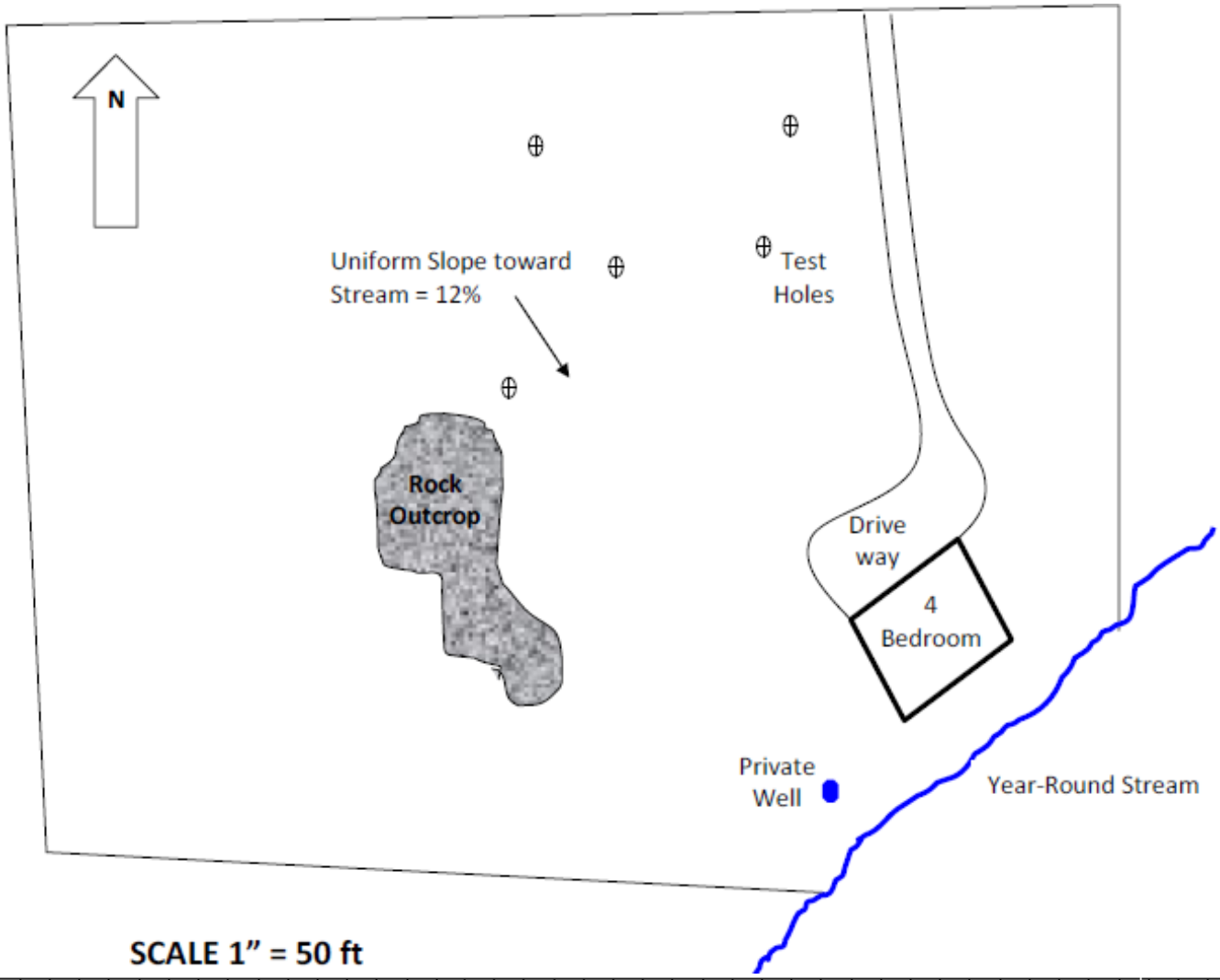
Reference depth from original grade and restrictive strata:

- Laterals, trench/bed top and bottom
- Curtain drain collector
- Sand augmentation

Other cross-section detail:

- Observation ports and clean-outs

Design Problem A



Owner Name: _____ Scale 1" = _____

Address / Phone: _____

Site Location: _____

Contact Name: _____ Phone: _____



Design Problem B

See Site Plan Pg 4

Staff Use Only

Date Received: _____

Staff: _____

PRESSURE DISTRIBUTION AND SUPPLEMENTAL TREATMENT DESIGN FORM

Form DS

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APN #: _____

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Applicant Name _____

Designer Name _____

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City _____ State _____ Zip _____

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Vertical Separation (inches) _____

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Make/Model _____

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Percent Reduction Taken _____

Trench width _____ inches

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Trench depth _____ inches

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This section completed by Certified Designer

Updated: September 9, 2010

TrakIt #: _____

This section completed by Certified Designer

Pressure Distribution System Parameters

Laterals

Schedule/Class _____
Length (feet) _____
Diameter (inches) _____
Number _____
Separation (feet) _____

Orifices

Total Number of Orifices _____
Diameter (inches) _____
Spacing (inches) _____

Manifold

Schedule/Class _____
Length (feet) _____
Preferred Manifold Configuration Used? Yes No

Transport Pipe

Schedule/Class _____
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Diameter (inches) _____

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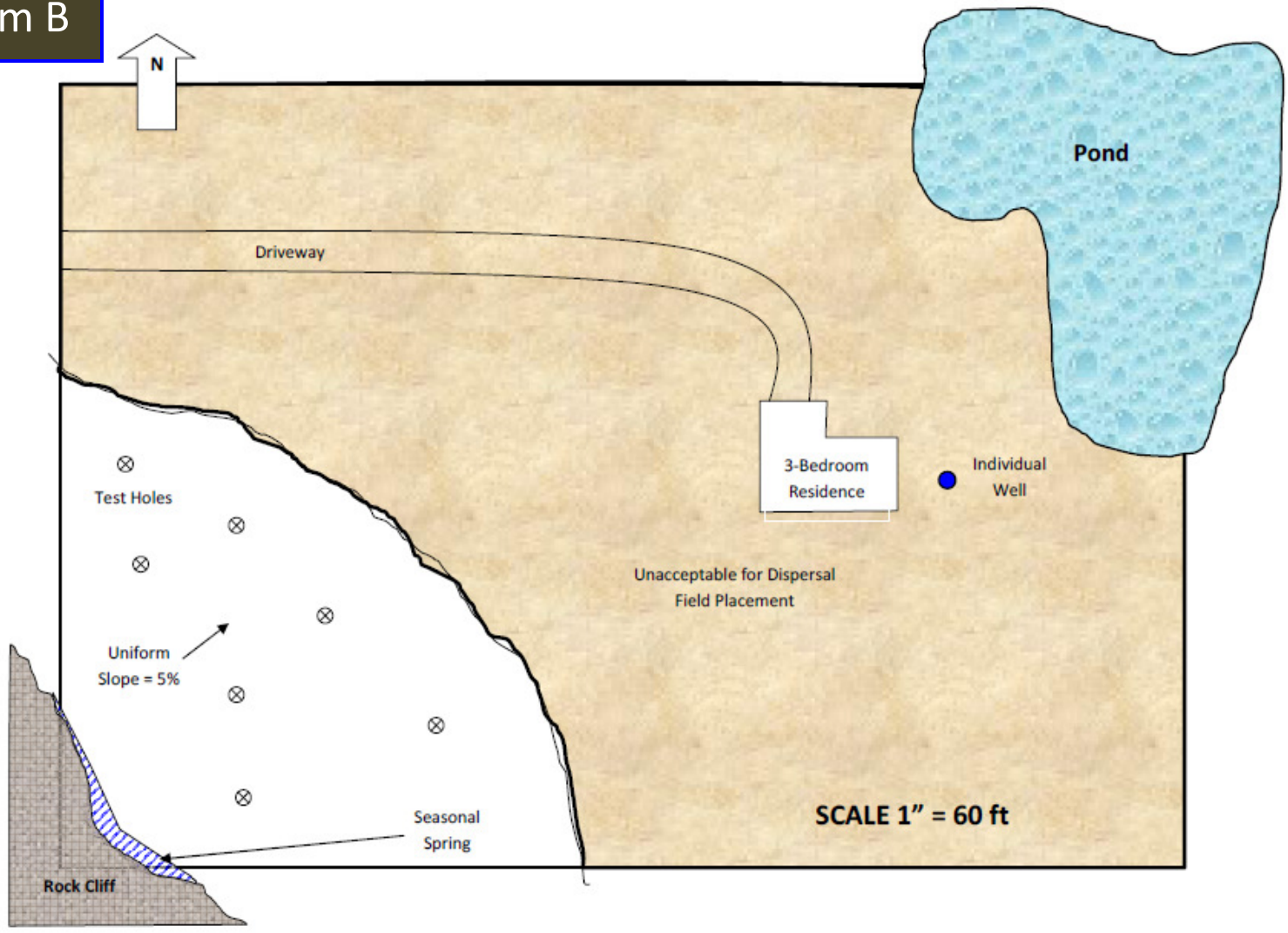
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- Sand augmentation

Other cross-section detail:

- Observation ports and clean-outs

Design Problem B



Owner Name: _____ Scale 1" = _____

Address / Phone: _____

Site Location: _____

Contact Name: _____ Phone: _____