
Conceptual Drainage Report for:

Steve Ferrill – Auto Parts Recycle Center – File Number:

October 3, 2005

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COA PERMIT CENTER



EXPIRES: 01/01/06

Prepared by:
Cascade Surveying & Eng., Inc

Project Summary

Erosion Control Risk Assessment

Upstream & Downstream Analysis

Stormwater Quantity Control & Water Quality BMP's

Appendix

- SITE PLAN/BASIN MAP
- SOIL LOGS
- DRAINAGE CALCULATIONS
- MAINTENANCE REQUIREMENTS
- CPS OIL WATER SEPARATOR
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Project Summary

PROPERTY DESCRIPTION

The site of proposed development is located in the SE ¼ of Section 22, Township 31 N, Range 5 E, W.M. The area of development is approximately 10.0-acres in size and is located north of 172ND Street NE and East of 59th Avenue NE (See Vicinity Map below).



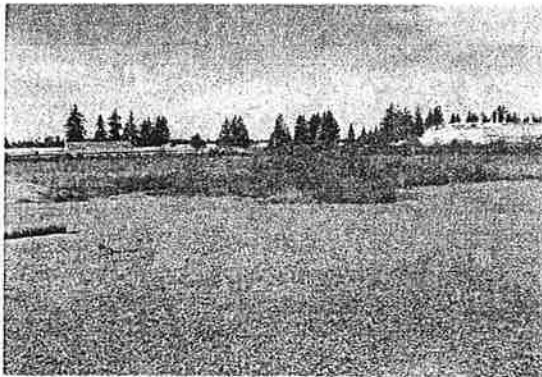
Figure 1: Vicinity Map. Not to scale.

EXISTING CONDITIONS

The proposed area of development is a vacant lot, approximately 10 acres in size, east of the Arlington Airport. The site is bounded by commercial properties to the north, east, and west, a lumberyard to the southeast and an undeveloped property to the southwest. Access to the subject property is provided by a private roadway within a 60-ft access and utilities easement along the east side of Parcel 4-019. The roadway is paved from 172nd St NE to a point where it changes over to gravel roughly 160-ft south of the property.

The site is relatively flat. Site vegetation consists of wild grasses and weeds. The northern and eastern portions of the site also have scattered shrubs such as Scotch Broom and clumps of Black Cottonwood. An area covered with large stockpiles of cedar chips adjacent to an old concrete loading dock is located in the south-central area of the site. A large blackberry thicket is located just north of the cedar chips pile near the center of the site. Onsite drainage consists of infiltration to groundwater.

The following pictures were taken from the old concrete loading dock located on the south-central edge of the site.



Looking North West



Looking North East



Looking South West



Looking South East

According to the Snohomish County SCS, the soils consist of Lynnwood soils, hydrologic group A. On June 24, 2005, twelve test pits were dug to depths ranging from 6.0 to 13.8 feet by Nelson Geotechnical Associates, Inc. (NGA). On June 29, 2005 NGA

drilled two borings to a depth of 24.0 feet and installed two groundwater monitoring wells on the property. The approximate location of the test pits and monitoring wells are shown on the Site Plan/Basin Map (Appendix 1). The test pit logs are shown in Appendix 2. NGA's findings are presented in their report titled "Geotechnical Engineering Evaluation – Auto Parts Recycle Center – Arlington, Washington". A summary of the test pit findings follows:

TEST PITS 1-11:

Surface to 1.3 feet Topsoil
1.3 to 2.2 feet Weathered Outwash
2.2 down Unweathered Outwash

Test Pits 1 through 11 were terminated in the outwash deposit.

Slight ground water seepage was encountered in Test Pits 8 & 11 at depths of 13.8 & 8.2 feet respectively

TEST PIT 12:

Surface to 1.7 feet Sawdust and Wood Chips
1.7 to 3.4 feet Fill (Silt)
3.4 down Unweathered Outwash

Test Pit 12 was terminated in the outwash deposit.

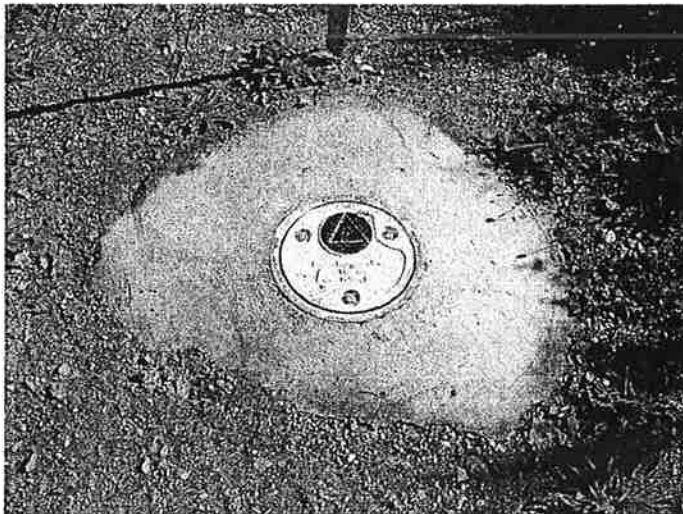
Slight ground water seepage was encountered at a depth of 12.0 feet

TEST BORINGS:

Surface to 3 feet Topsoil
3 to 20 feet Outwash deposit

Test Borings were terminated in the outwash deposit.

Slight ground water seepage encountered at 9.0 and 11.0 feet respectively



Monitoring Well located in south-east portion of site.

DEVELOPED CONDITIONS

The proposal for this project is to construct 2 single-story masonry buildings, storage and parts yards and asphalt parking and driving surfaces. The site will be accessed via the existing driveway from 172nd Street NE. See the Site Plan/Basin Map (Appendix 1).

Site conditions are ideal for infiltration; therefore, infiltration is proposed for stormwater quantity control. The sites infiltration will be handled with five separate systems that are shown in figure 2 and described below. Water quality treatment will be provided in areas 1, 3 and 4 by infiltrating the collected storm water through an import layer of loamy sand.

Area 5 is to remain undeveloped. Rainfall in this area will infiltrate into the ground as it does today.

Runoff generated by area 2 will first pass through a CPS oil-water separator before passing through a Stormwater Management, Inc. storm filter vault.

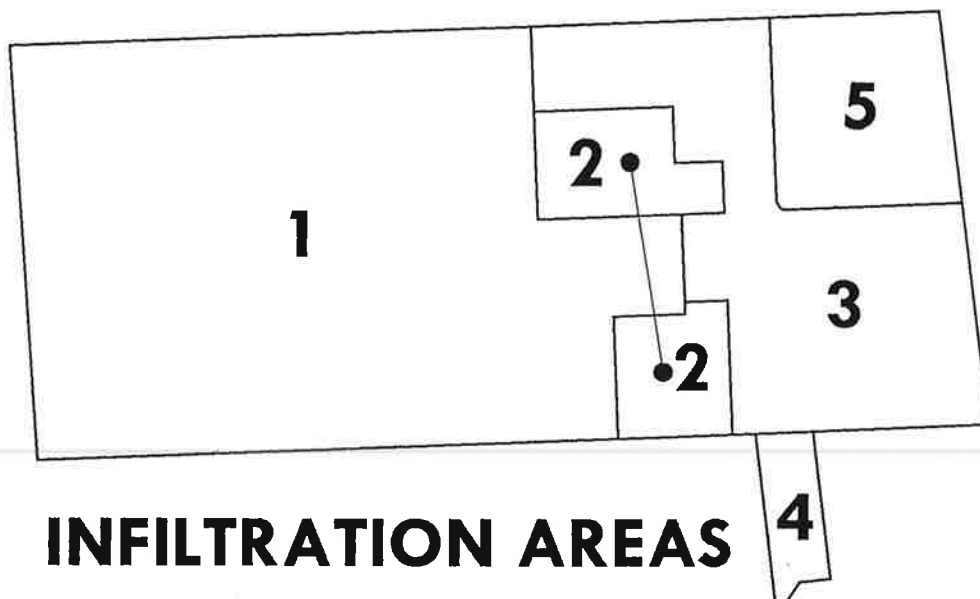


Figure 2: Infiltration Areas Map. Not of scale.

1 - PART CARS STOREAGE AREAS:

Area 1 consists of the western half of the site where foreign and domestic parts cars, will be stored. Area 1 is divided into 9 sub basins. Each sub basin is nearly identical and will handle storm water as follows. Each basin will flow into a water quality pond lined with 18-inches of loamy sand. The water quality ponds at the surface are only sized to completely infiltrate the 6-month 24-hr storm volume. Catch basins located at one end of

each pond will act as overflow spillways for the ponds. The rims of each structure will be set slightly above the 6-month peak stage in the ponds. Larger storm volumes will spill into the top of the catch basin and route the water to an infiltration trench directly below the pond.

2 – AUTO RECEIVING AND FLUIDS REMOVAL AREAS:

Runoff generated by the Fluid Removal and Prep Yard will be collected and directed to the Auto Receiving Yard. At this point this water will combine with the runoff collected in the Auto Receiving Yard at a flow splitting device. Storm events as large as the 6-month 24-hr storm will pass through a CPS Oil-water separator, so that oils can be removed, followed by a Stormwater Management Storm Filter and then an infiltration trench. The peak flows of larger storm events will bypass the CPS oil-water separator and flow directly into the Stormwater Management Storm Filter and then into the infiltration trench.

3 – BUILDINGS, CUSTOMER PARKING AND CRUSH YARD:

The buildings, customer parking and Crush Yard will drain into a flow splitting catch basin where the 6-month 24-hr storm volume will flow into a water quality trench lined with a minimum 18 inches of loamy sand for stormwater treatment during the infiltration process. Any additional run-off from the surfaces will overflow from the water quality trench and flow directly into the infiltration trench. Roof downspouts and footing drains will be piped directly to the infiltration trench

4 – ENTRANCE ROAD:

Along the west side of the entrance road will be a trapezoidal flat-bottom infiltration pond. The pond is sized to accommodate the roads runoff which will infiltrate through an imported loamy sand layer a minimum of 18-inches thick for all storm events.

5 - FUTURE DEVELOPMENT AREA:

Area 5 will be maintained as a grassy area consisting of the sites drainfield and reserve area. Any rainfall on this area will naturally infiltrate into the ground.

Risk Assessment Analysis And Erosion Control

The site is flat and on stable soils with good permeability; therefore, the potential for significant erosion/siltation impact onsite is low.

Erosion Sedimentation Control Notes

Although the risk of erosion is low, erosion control should be taken seriously. The following list is an example of typical erosion control notes.

- (a) Erosion On-and Off-Site. During and after construction, all persons engaging in developing activities shall prevent or minimize erosion and sedimentation on-site and shall protect properties and water courses downstream from the site from erosion due to increases, in the volume, velocity and peak flow rate of storm water runoff from the site:
- (b) Transport of Sediment onto Adjacent Properties. The applicant shall prevent the transport of sediment onto adjacent properties.
- (c) Transport of Sediment onto Paved Surfaces. The applicant shall apply BMP's from the City of Arlington Construction Standards or as approved by the City, to prevent or minimize the transport of sediment onto paved surfaces during construction. If sediment is transported onto a paved surface the contractor is to clean the paved surface at the end of each day.
- (d) Stabilizing Exposed soil. The applicant shall stabilize denuded areas and soil stockpiles as follows:
 - (i) From October 1 to April 30, no soil may remain exposed for more than 2 days. From May 1 to September 30, no soil may remain exposed for more than 7 days. On portions of the site where active grading is in progress, the City may extend the deadline for soil stabilization upon determining that the likelihood of erosion impacts is low. Reasons for this determination may include, but are not limited to the following, the type and amount of soil exposed, site topography, or the potential for discharge to critical areas and lakes. Upon finding a risk of erosion, the applicant shall immediately apply soil stabilization, regardless of any previously established deadline, and the City may require immediate stabilization at any time for this purpose. The applicant shall keep materials, equipment, and other resources on site at all times, in adequate quantities to immediately stabilize all soil.
 - (ii) Denuded areas shall be covered with mulch, sod, plastic, or other BMP's described in City of Arlington Construction Standard G-4 or as approved by the City.
 - (iii) Soil stockpiles shall be stabilized or protected with sediment retention BMPs within 24 hours of formation to prevent soil loss; and
 - (iv) Grading and construction shall be timed and conducted in stages to minimize soil exposure.

- (e) Removal of Temporary Erosion and Sedimentation Control Measures. The applicant may remove all temporary erosion and sedimentation control BMPs within 30 days after final site stabilization or after they are no longer necessary.
- (f) Permanent Vegetative Cover. Before construction acceptance by the City, the applicant shall establish a permanent vegetative ground cover to control soil erosion and to survive severe weather conditions on all areas of land disturbance not otherwise permanently stabilized by impervious surfaces or other means.
- (g) Maintenance and Repair of Erosion and Sedimentation Control Measures. The applicant shall maintain and repair as necessary all temporary and permanent erosion and sedimentation control BMPs to assure their continued performance through construction acceptance and the potential for on site erosion has passed.
- (h) Field Marking. Before performing any grading or clearing, the applicant shall mark, in the filed, the limits of all proposed clearing and grading, critical areas and their buffers, trees to be retained, and drainage courses.
- (i) Protecting Storm Sewer Inlets. The applicant shall protect storm sewer inlets receiving storm water runoff during construction so that water will not enter the inlet without first being filtered or otherwise treated to minimize the amount of sediment entering the inlet.
- (j) Sediment Retention. The applicant shall route storm water runoff from disturbed areas of the site through sediment ponds, traps or other sediment retention BMPs prior to discharge from the site. The BMPs shall be installed as the first step in grading, and shall be in operation before any other site disturbance occurs. The applicant shall stabilize temporary earth structures within the time period specified in subparagraph (d)(i). If site conditions warrant, the City may require additional sediment controls, including but not limited to, preserving a vegetated buffer strip around the lower perimeter of the site.
- (k) Temporary Sediment Ponds and Traps shall be constructed per City of Arlington Construction Standard (G-5). Periodic removal of trapped sediments shall be performed as necessary, however trapped sediment may also be permanently stabilized onsite.
- (l) The applicant shall design and construct temporary and permanent BMPs adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream reaches.
- (m) The installation of underground utility lines shall be subject to the following additional requirements.
 - (i) Between October 1 and March 31, no more than 500 feet of continuous trench may remain open at one time unless check dams to reduce flow velocities and prevent erosion are installed.
 - (ii) Excavated material shall be placed on the uphill side of trenches, unless inconsistent with safety or site constraints.
- (n) Water from a de-watering device shall discharge into a sediment-retention BMP.

The applicant shall implement fully the erosion and sedimentation control plan at each stage of site development.

Upstream & Downstream Analysis

UPSTREAM ANALYSIS

Because the surrounding area is relatively flat and has good infiltrating soils, no stormwater runoff drains onto the project site from the upstream.

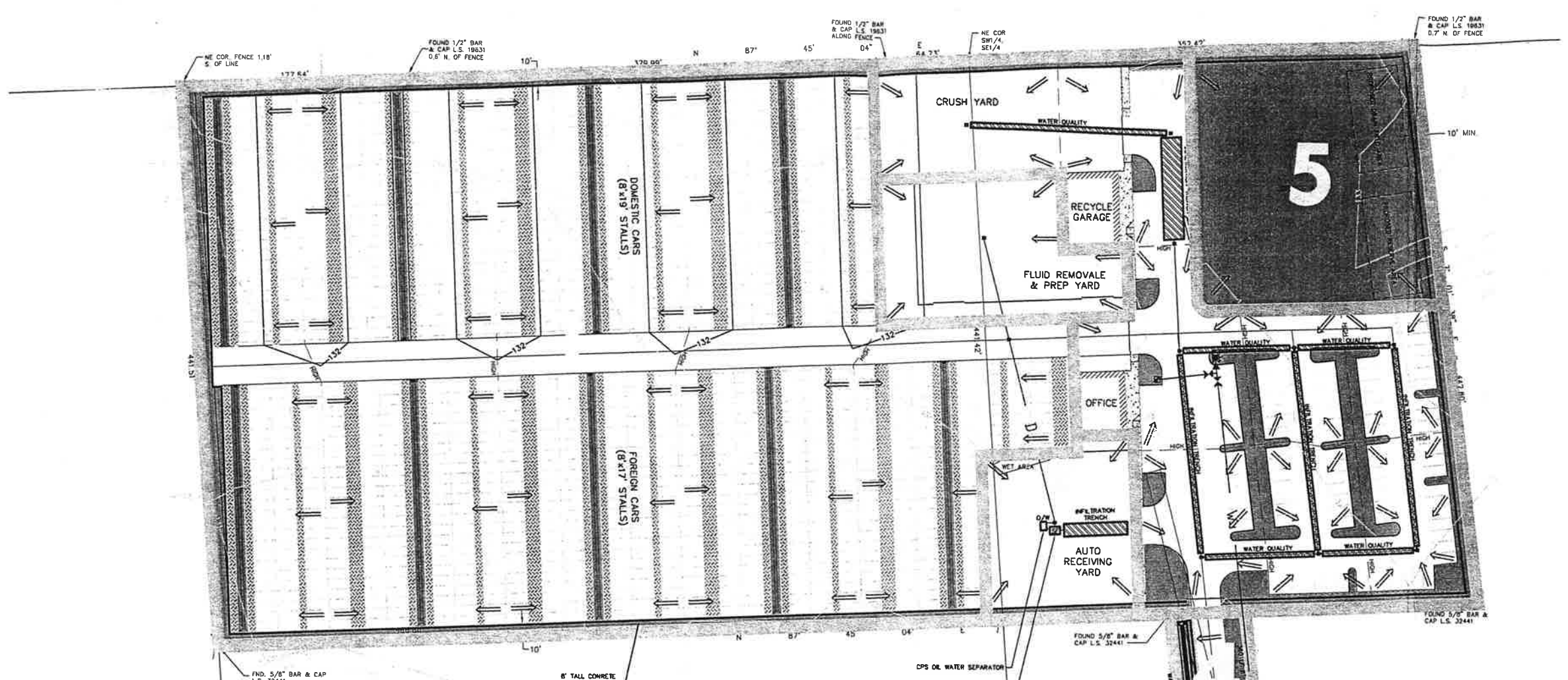
DOWNSTREAM ANALYSIS

Since infiltration is being proposed for this site there is no downstream receiving water.

Stormwater Quantity Control & Water Quality B.M.P.'s

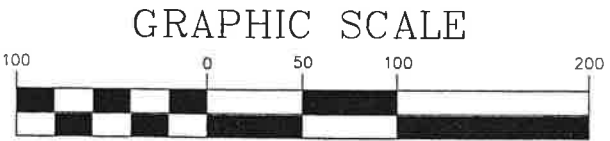
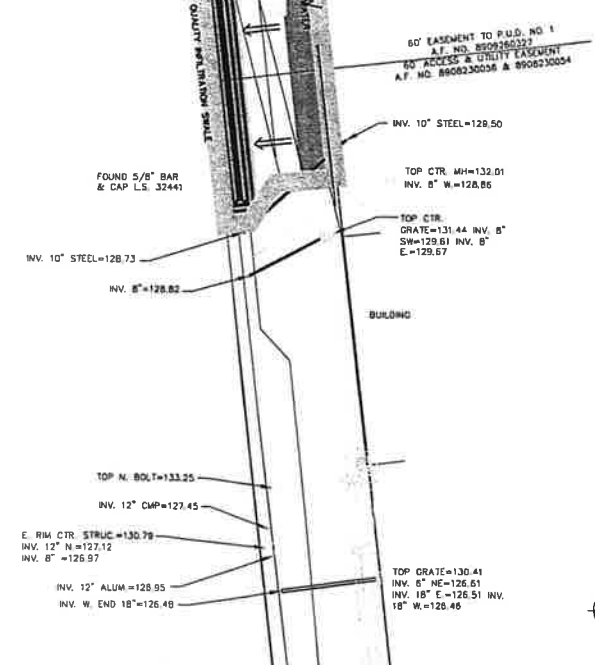
Refer to pages 5 and 6 for details regarding the Water Quality and Quantity Control BMP's.

Appendix



SITE PLAN LEGEND:

- PROPERTY LINE
- ROAD CENTER LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- EXISTING BARBED WIRE FENCE
- EXISTING CHAIN LINK FENCE
- PROPOSED WATER LINE
- GRADING HIGH POINT
- DRAINAGE BASIN AREAS
- DRAINAGE BASIN NUMBER
- EXISTING 1-1/2" PVC MONITORING PIPE
- PROPOSED SHEET FLOW DIRECTION
- PROPOSED GATE VALVE
- PROPOSED HYDRANT ASSEMBLY
- PROPOSED WATER METER



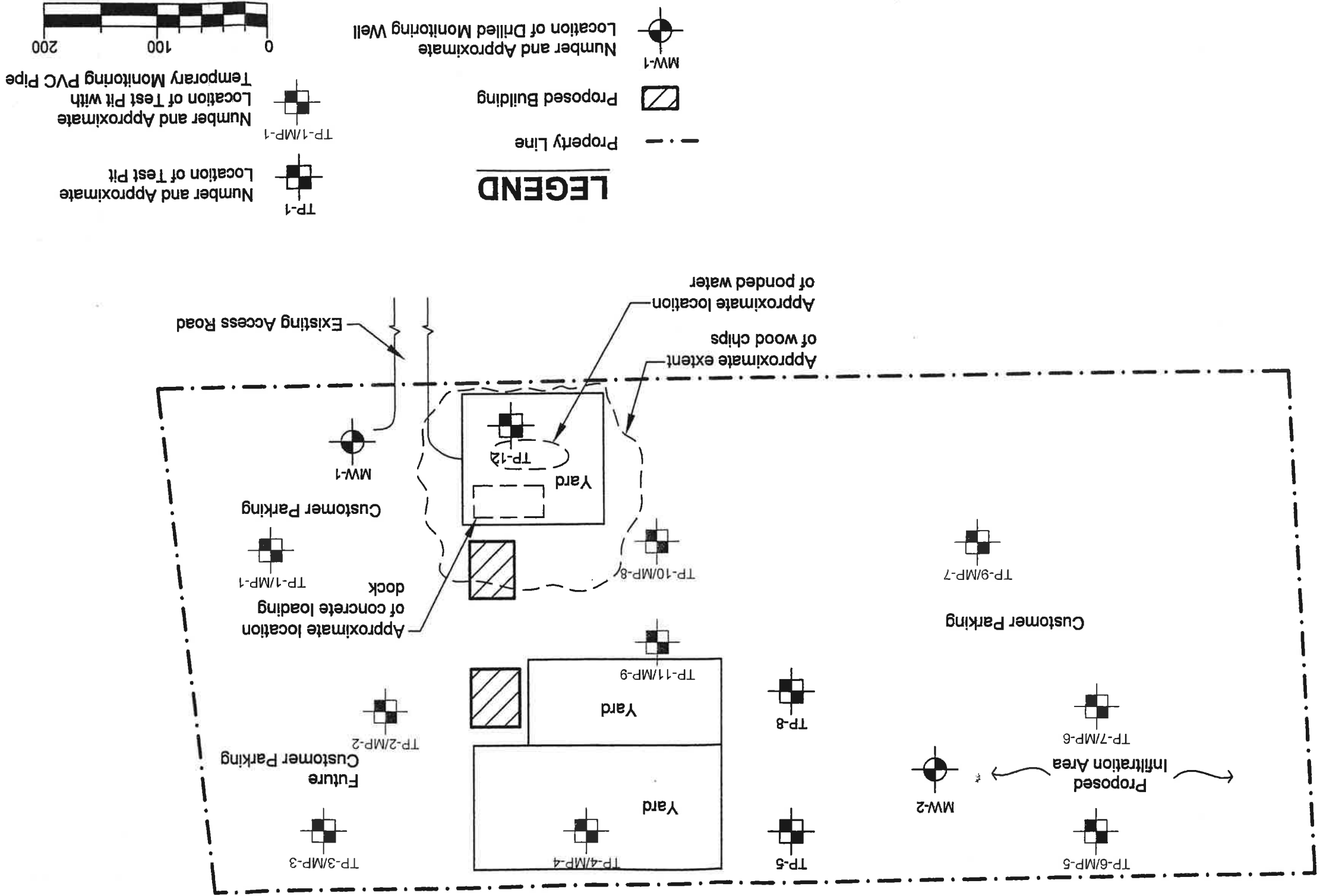
VERTICAL DATUM:
NGVD OF 1929
 TO CONVERT TO NAVD 1988
 ADD 3.72'

TEMPORARY BENCHMARK, A90-1-1
 60D NAIL IN FIELD
 ELEV= 127.43'

SITE PLAN/BASIN MAP

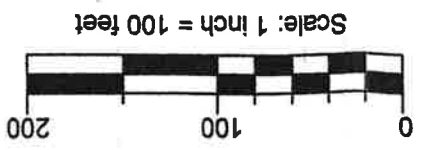
Soil Logs

Information provided by Nelson Geotechnical Associates, Inc. For further details refer to the Geotechnical Engineering Evaluation Report prepared by NGA, dated August 5, 2005.



LEGEND

- Property Line
- Proposed Building
- MW-1
Number and Approximate Location of Drilled Monitoring Well
- TP-1
Number and Approximate Location of Test Pit
- TP-1/MP-1
Number and Approximate Location of Test Pit with Temporary Monitoring PVC Pipe



Project Number
713505

Auto Parts Recycle Center
Site Plan

NGA
NELSON GEOTECHNICAL ASSOCIATES, INC.
GEOTECHNICAL ENGINEERS & GEOLOGISTS

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No.	Date	Revision	By	CK
1	7/11/05	Original	ACO	BAD

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE - GRAINED SOILS <small>MORE THAN 50 % RETAINED ON NO. 200 SIEVE</small>	GRAVEL <small>MORE THAN 50 % OF COARSE FRACTION RETAINED ON NO. 4 SIEVE</small>	CLEAN GRAVEL	GW	WELL-GRADED, FINE TO COARSE GRAVEL
		GRAVEL WITH FINES	GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
		GRAVEL WITH FINES	GC	CLAYEY GRAVEL
	SAND <small>MORE THAN 50 % OF COARSE FRACTION PASSES NO. 4 SIEVE</small>	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
		SAND WITH FINES	SP	POORLY GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
		SAND WITH FINES	SC	CLAYEY SAND
FINE - GRAINED SOILS <small>MORE THAN 50 % PASSES NO. 200 SIEVE</small>	SILT AND CLAY <small>LIQUID LIMIT LESS THAN 50 %</small>	INORGANIC	ML	SILT
		INORGANIC	CL	CLAY
	SILT AND CLAY <small>LIQUID LIMIT 50 % OR MORE</small>	ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
		INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
		INORGANIC	CH	CLAY OF HIGH PLASTICITY, FLAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

- 1) Field classification is based on visual examination of soil in general accordance with ASTM D 2488-93.
- 2) Soil classification using laboratory tests is based on ASTM D 2488-93.
- 3) Descriptions of soil density or consistency are based on interpretation of blowcount data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS:

Dry - Absence of moisture, dusty, dry to the touch

Moist - Damp, but no visible water.

Wet - Visible free water or saturated, usually soil is obtained from below water table

Project Number 713505	Auto Parts Recycle Center	NELSON GEOTECHNICAL ASSOCIATES, INC. GEOTECHNICAL ENGINEERS & GEOLOGISTS <small>17311-195th Ave. NE, A-500 Woodinville, WA 98072 (425) 486-1668 / Fax 481-2610</small>	No.	Date	Revision	By	CK
Figure 3	Soil Classification		1	6/28/05	Original	ACO	ADH

NGA Drafting 2005/713505 FormIT713505 SC.dwg

LOG OF EXPLORATION

DEPTH (FEET)	USC	SOIL DESCRIPTION
TEST PIT ONE		
0.0 – 1.0	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
1.0 – 2.5	SP-SM	ORANGISH-BROWN, FINE TO MEDIUM SAND WITH SILT (MEDIUM DENSE, MOIST)
2.5 – 6.0	SP	GRAY, MEDIUM TO COARSE SAND WITH TRACE GRAVEL AND SILT (DENSE TO VERY DENSE, MOIST)
		SAMPLE WAS COLLECTED AT 3.5 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED TEST PIT CAVING WAS NOT ENCOUNTERED TEST PIT WAS COMPLETED AT 6.0 FEET ON 6/24/05
TEST PIT TWO		
0.0 – 0.5	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
0.5 – 2.3	SP-SM	ORANGISH-BROWN, FINE TO COARSE SAND WITH SILT (MEDIUM DENSE, MOIST)
2.3 – 9.4	SP	GRAY, MEDIUM TO COARSE SAND WITH GRAVEL AND TRACE SILT (DENSE, MOIST)
		SAMPLES WERE COLLECTED AT 2.0, 4.5, AND 8.0 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED TEST PIT CAVING WAS NOT ENCOUNTERED TEST PIT WAS COMPLETED AT 9.4 FEET ON 6/24/05
TEST PIT THREE		
0.0 – 0.8	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
0.8 – 2.1	SM	ORANGISH-BROWN, SILTY FINE TO MEDIUM SAND (MEDIUM DENSE, MOIST)
2.1 – 9.0	SP	GRAY, FINE TO COARSE SAND WITH GRAVEL AND TRACE SILT (DENSE, MOIST)
		SAMPLES WERE COLLECTED AT 5.0 AND 8.8 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED MODERATE TO HEAVY TEST PIT CAVING WAS ENCOUNTERED FROM 2.5 TO 5.0 FEET TEST PIT WAS COMPLETED AT 9.0 FEET ON 6/24/05
TEST PIT FOUR		
0.0 – 0.5	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
0.5 – 2.5	SP-SM	ORANGISH-BROWN, FINE TO MEDIUM SAND WITH SILT (MEDIUM DENSE, MOIST)
2.5 – 8.2	SP	GRAY, FINE TO MEDIUM SAND WITH GRAVEL AND TRACE SILT (DENSE, MOIST)
8.2 – 9.8	SP	GRAY, MEDIUM TO COARSE SAND WITH GRAVEL (DENSE, MOIST)
		SAMPLES WERE COLLECTED AT 2.2, 6.8, AND 9.6 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED TEST PIT CAVING WAS NOT ENCOUNTERED TEST PIT WAS COMPLETED AT 9.8 FEET ON 6/24/05

LOG OF EXPLORATION

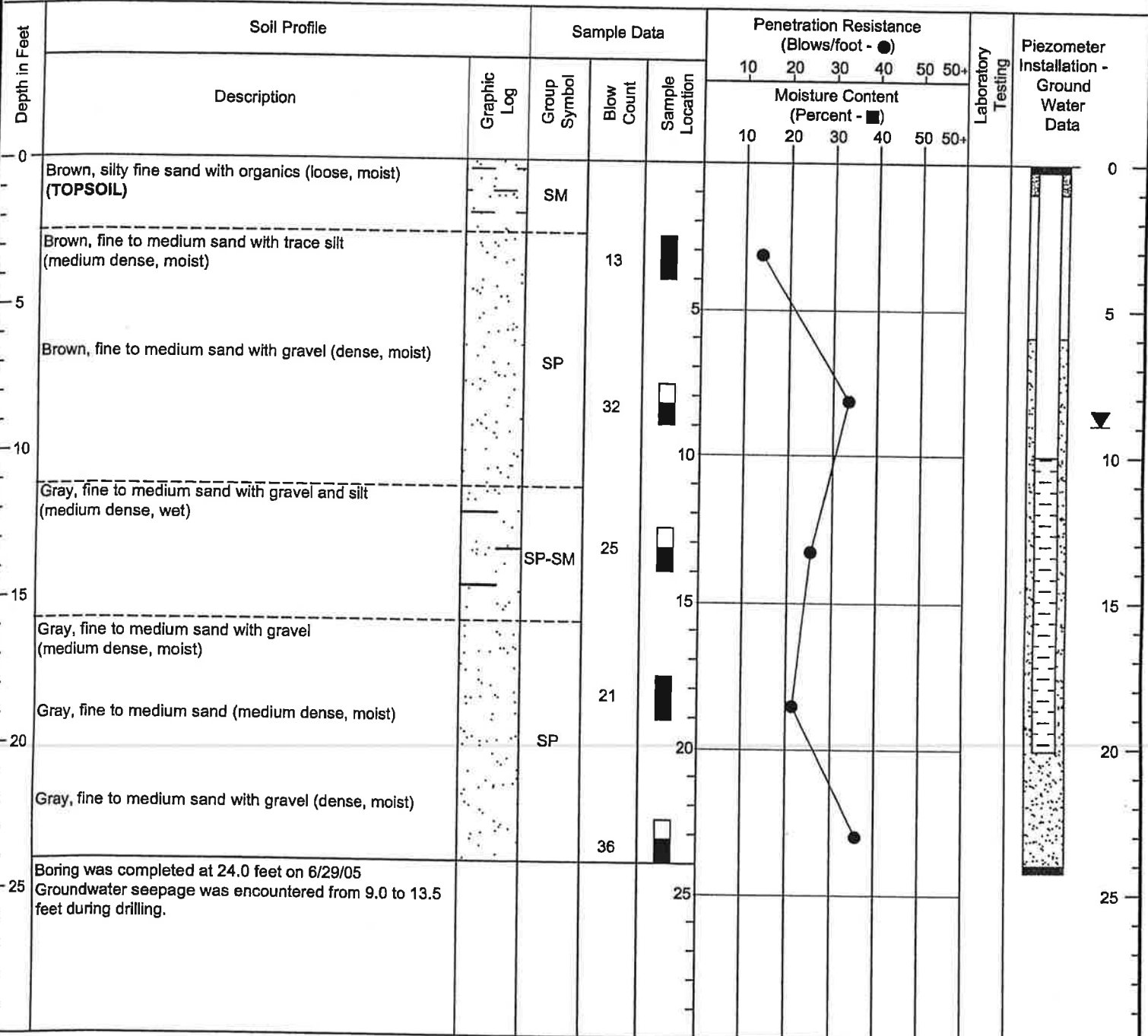
DEPTH (FEET)	USC	SOIL DESCRIPTION
TEST PIT FIVE		
0.0 – 1.0	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
1.0 – 3.2	SM	ORANGISH-BROWN, SILTY FINE TO MEDIUM SAND (MEDIUM DENSE, MOIST)
3.2 – 11.4	SP	GRAY, FINE TO MEDIUM SAND WITH GRAVEL WITH TRACE SILT (DENSE, MOIST)
		SAMPLES WERE NOT COLLECTED GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 4.0 TO 8.0 FEET TEST PIT WAS COMPLETED AT 11.4 FEET ON 6/24/05
TEST PIT SIX		
0.0 – 0.9	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
0.9 – 2.8	SM	ORANGISH-BROWN, SILTY FINE TO MEDIUM SAND (MEDIUM DENSE, MOIST)
2.8 – 9.7	SP	GRAY, FINE TO MEDIUM SAND WITH GRAVEL WITH TRACE SILT (DENSE, MOIST)
		SAMPLES WERE NOT COLLECTED GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED TEST PIT CAVING WAS NOT ENCOUNTERED TEST PIT WAS COMPLETED AT 9.7 FEET ON 6/24/05
TEST PIT SEVEN		
0.0 – 0.7	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
0.7 – 2.6	SM	ORANGISH-BROWN, SILTY FINE TO MEDIUM SAND (MEDIUM DENSE, MOIST)
2.6 – 9.8	SP	GRAY, FINE TO MEDIUM SAND WITH GRAVEL AND TRACE SILT (DENSE, MOIST)
		SAMPLE WAS COLLECTED AT 5.8 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED TEST PIT CAVING WAS NOT ENCOUNTERED TEST PIT WAS COMPLETED AT 9.8 FEET ON 6/24/05
TEST PIT EIGHT		
0.0 – 1.1	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
1.1 – 2.4	SM	ORANGISH-BROWN, SILTY FINE TO MEDIUM SAND (MEDIUM DENSE, MOIST)
2.4 – 8.2	SP	GRAY, FINE TO MEDIUM SAND WITH TRACE SILT (DENSE, MOIST)
8.2 – 13.6	SP	GRAY, FINE TO MEDIUM SAND WITH GRAVEL AND TRACE SILT (DENSE, MOIST)
13.6 – 13.8	SP	GRAY, MEDIUM TO COARSE SAND WITH GRAVEL AND TRACE SILT (DENSE, WET)
		SAMPLES WERE COLLECTED AT 2.0 AND 13.6 FEET SLIGHT GROUNDWATER SEEPAGE WAS ENCOUNTERED AT 13.8 FEET TEST PIT CAVING WAS NOT ENCOUNTERED TEST PIT WAS COMPLETED AT 13.8 FEET ON 6/24/05

LOG OF EXPLORATION

DEPTH (FEET)	USC	SOIL DESCRIPTION
TEST PIT NINE		
0.0 – 0.8	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
0.8 – 2.8	SM	ORANGISH-BROWN, SILTY FINE TO MEDIUM SAND (MEDIUM DENSE, MOIST)
2.8 – 4.8	SP	GRAY, FINE TO MEDIUM SAND WITH TRACE GRAVEL (DENSE, MOIST)
4.8 – 9.6	SP	GRAY, MEDIUM TO COARSE SAND WITH GRAVEL WITH TRACE SILT (DENSE, MOIST)
		SAMPLE WAS COLLECTED AT 5.2 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED MODERATE TEST PIT CAVING WAS ENCOUNTERED FROM 2.0 TO 5.0 FEET TEST PIT WAS COMPLETED AT 9.6 FEET ON 6/24/05
TEST PIT TEN		
0.0 – 1.3	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
1.3 – 2.9	SM	ORANGISH-BROWN, SILTY FINE TO MEDIUM SAND (MEDIUM DENSE, MOIST)
2.9 – 9.1	SP	GRAY, FINE TO MEDIUM SAND WITH TRACE SILT (DENSE, MOIST)
9.1 – 9.6	SP	GRAY, FINE TO MEDIUM SAND WITH GRAVEL AND TRACE SILT (DENSE, MOIST)
		SAMPLE WAS COLLECTED AT 9.0 FEET GROUNDWATER SEEPAGE WAS NOT ENCOUNTERED TEST PIT CAVING WAS NOT ENCOUNTERED TEST PIT WAS COMPLETED AT 9.6 FEET ON 6/24/05
TEST PIT ELEVEN		
0.0 – 0.7	SM	BROWN, SILTY FINE TO MEDIUM SAND (LOOSE, MOIST) (TOPSOIL)
0.7 – 2.0	SM	ORANGISH-BROWN, SILTY FINE TO MEDIUM SAND (MEDIUM DENSE, MOIST)
2.0 – 7.7	SP	GRAY, FINE TO MEDIUM SAND WITH TRACE SILT (DENSE, MOIST)
7.7 – 8.6	SP	BLACK, FINE TO MEDIUM SAND WITH TRACE SILT (DENSE, MOIST)
8.6 – 9.6	SP	GRAY, FINE TO MEDIUM SAND WITH TRACE SILT (VERY DENSE, MOIST)
		SAMPLE WAS COLLECTED AT 8.3 FEET SLIGHT GROUNDWATER SEEPAGE WAS ENCOUNTERED AT 8.2 FEET TEST PIT CAVING WAS NOT ENCOUNTERED TEST PIT WAS COMPLETED AT 9.6 FEET ON 6/24/05
TEST PIT TWELVE		
0.0 – 1.7		SAWDUST AND WOODCHIPS
1.7 – 3.4	ML	BROWN, SILT WITH FINE TO MEDIUM SAND (STIFF, MOIST) (FILL)
3.4 – 12.4	SP	GRAY, FINE TO MEDIUM SAND WITH GRAVEL WITH TRACE SILT (DENSE, MOIST)
		SAMPLES WERE NOT COLLECTED SLIGHT GROUNDWATER SEEPAGE WAS ENCOUNTERED AT 12.0 FEET TEST PIT CAVING WAS NOT ENCOUNTERED TEST PIT WAS COMPLETED AT 12.4 FEET ON 6/24/05

Boring B-1

Approximate Ground Surface Elevation:



LEGEND

Solid PVC Pipe	Concrete	M Moisture Content Lab Test
Depth Driven and Amount Recovered with 2-inch O.D. Split-Spoon Sampler	Bentonite	G Grain-size Analysis
* Liquid Limit	Slotted PVC Pipe	TV Torvane Reading, tons/ft
+ Plastic Limit	Monument/ Cap to Piezometer	PP Pocket Penetrometer Reading, tons/ft
	Native Soil	P Sample Pushed
	Silica Sand	
	Water Level	

NOTE: The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.

Project Number 713505	Auto Recycle Center Boring Log	NELSON GEOTECHNICAL ASSOCIATES, INC. GEOTECHNICAL ENGINEERS & GEOLOGISTS 17311-135th Ave. NE, A-500 Woodinville, WA 98072 (425) 486-1888 / Fax 481-2810 Snohomish County (425) 337-1669 Wenatchee/Chelan (509) 784-2755 www.nelsongeotech.com	No.	Date	Revision	By	CK
Figure 7			1	6/30/05	Original	ACC	ADH
Page 1 of 1							

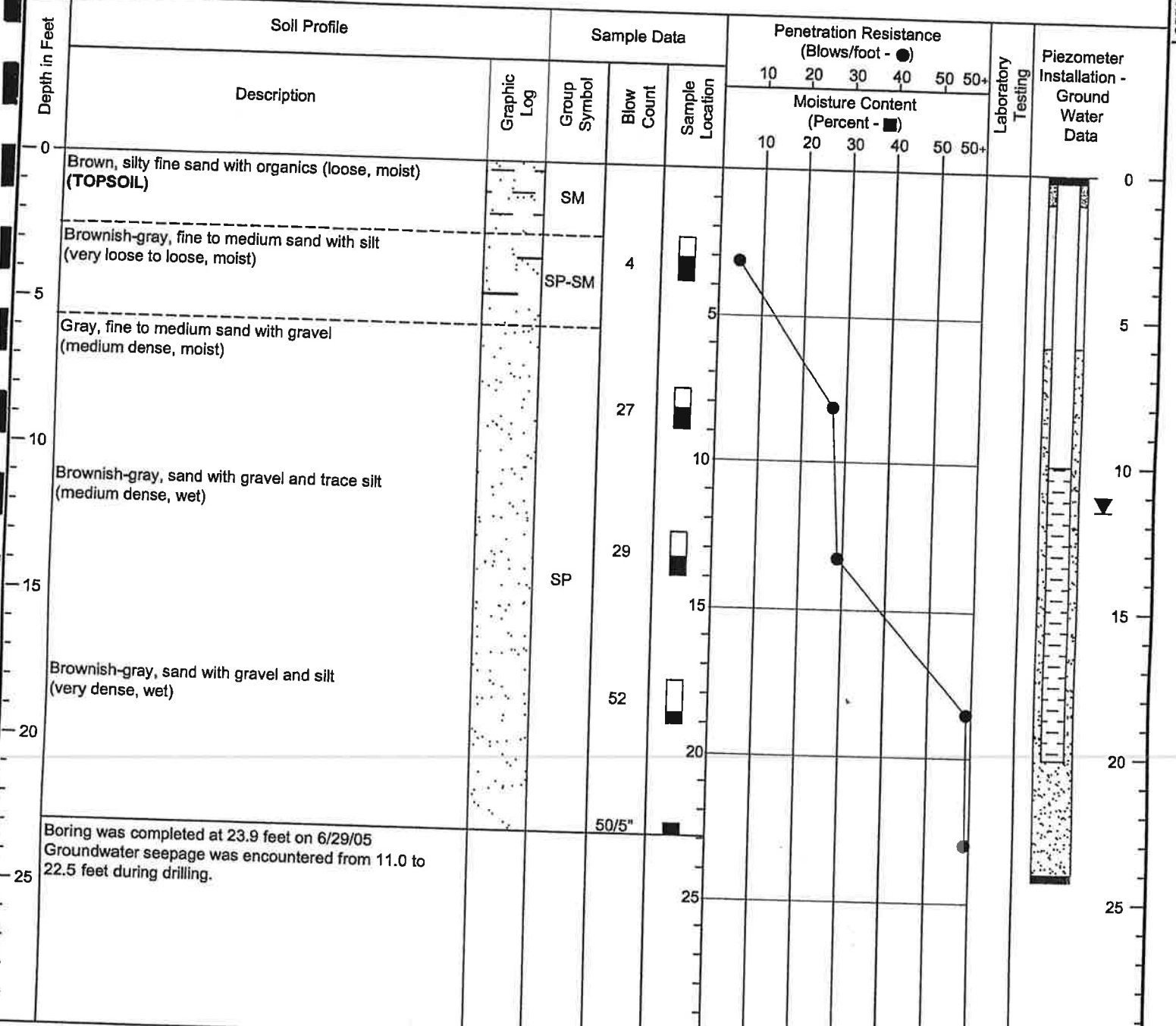
Logged by: ADH on 6/29/05

NGA Drafting 2005/7/14/005 Fennil714005 B logs.dwg

Boring B-2

Logged by: ADH on 6/29/05

Approximate Ground Surface Elevation:



LEGEND

- Depth Driven and Amount Recovered with 2-inch O.D. Split-Spoon Sampler
- Liquid Limit
- Plastic Limit
- Solid PVC Pipe
- Slotted PVC Pipe
- Monument/ Cap to Piezometer
- Concrete
- Bentonite
- Native Soil
- Silica Sand
- Water Level
- M Moisture Content Lab Test
- G Grain-size Analysis
- TV Torvane Reading, tons/ft
- PP Pocket Penetrometer Reading, tons/ft
- P Sample Pushed

NOTE: The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.

Project Number
713505
Figure 8
Page 1 of 1

Auto Recycle Center
Boring Log

NGA
NELSON GEOTECHNICAL ASSOCIATES, INC.
GEOTECHNICAL ENGINEERS & GEOLOGISTS

17311-135th Ave. NE, A-500
Woodinville, WA 98072
(425) 486-1869 / Fax 481-2510

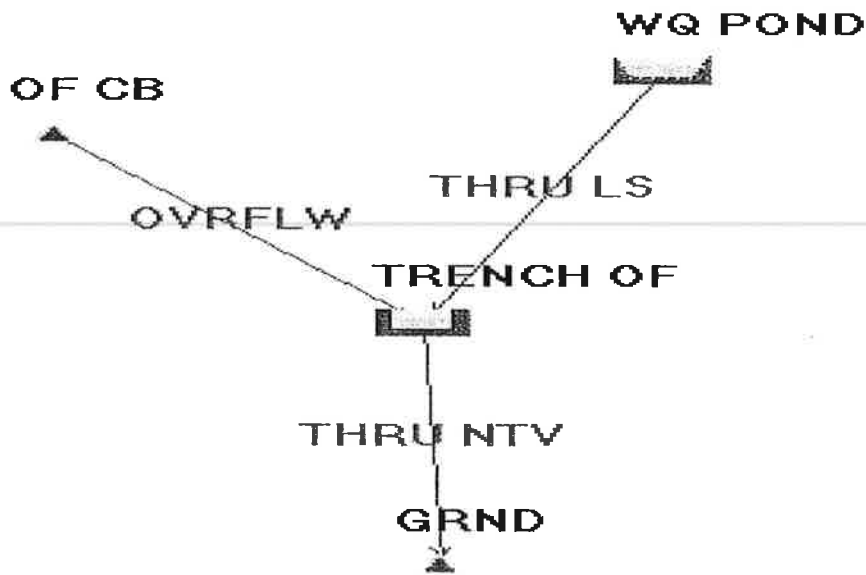
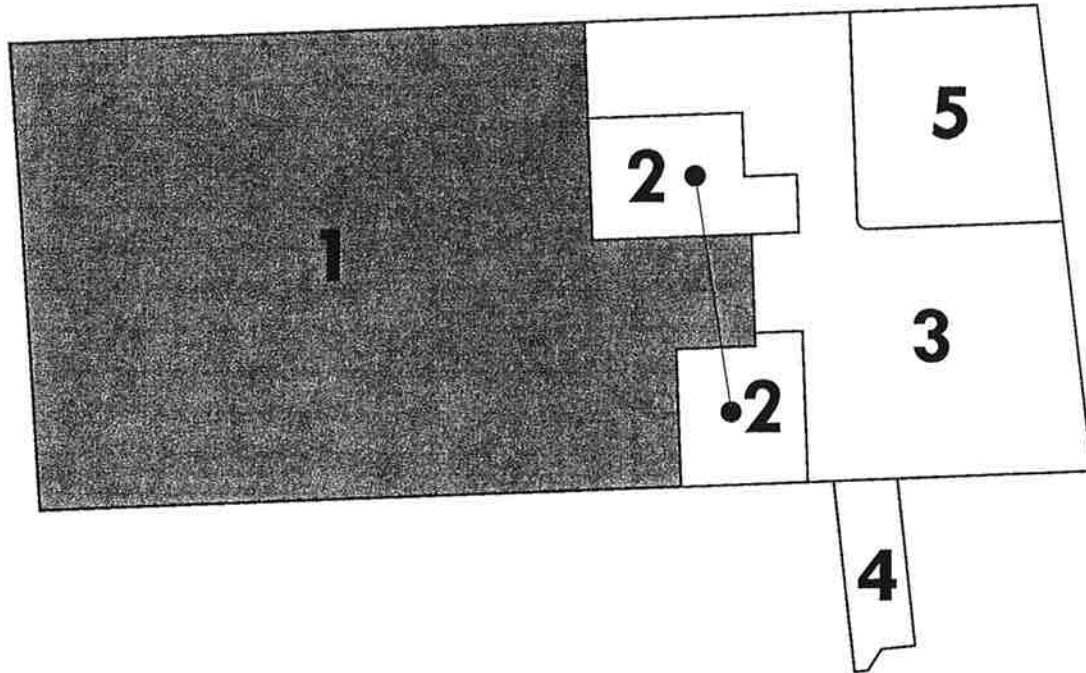
Snohomish County (425) 337-1669
Wenatchee/Chelan (509) 784-2766
www.nelsongeotech.com

No.	Date	Revision	By	CK
1	7/1/05	Original	ACO	ADH

NGA Drafting 2005/7/1/005 Ferril/7/1/005 B loggs.dwg

DRAINAGE MODEL

1 - PART CARS STORAGE YARD



Project Precips

[6 month]	1.15 in
[2 yr]	1.80 in
[10 yr]	2.75 in
[100 yr]	3.75 in
[0]	0.00 in
[0]	0.00 in

Reach Records

Reach ID: OVRFLW

Section Properties:

Shape:	Circular		Routing Method:	Travel Time Translation	
Size	Material	Mannings n	Hyd params By		
48" Diam	Smooth CDEP	0.0120	Mannings Formula		
Length	Slope	Entrance Loss			
2.2500 ft	100.00 %	Square Edge w/Headwall			
Diam					
4.0000 ft					
Up Node	Dn Node	Up Invert	Dn Invert		
OF CB	TRENCH OF	128.7500 ft	126.5000 ft		

Conduit Constraints:

Min Vel	Max Vel	Min Cov	Min Slope	Max Slope	Min drop
2.0000 ft	15.0000 ft	3.0000 ft	0.5000 ft	2.0000 ft	0.0000 ft
In/Exfil	Hold Up	Hold Dn	Match Inv	Allow Smaller	
0.0000 in/hr	NO	NO	YES	NO	

Conduit Summary:

Trib Area	Flow	Capacity	Velocity	Normal Depth	
0.0000 ac	0.0000 cf	1560.3243 cf	14.0840 ft/s	0.0000 ft	
Ent Loss	Exit Loss	Frict Loss	Start TW		
0.000000 ft	0.000000 ft	0.000000 ft	126.5000 ft		

Reach ID: THRU LS

Section Properties:

Shape:	Circular		Routing Method:	Travel Time Translation	
Size	Material	Mannings n	Hyd params By		
48" Diam	Smooth CDEP	0.0120	Mannings Formula		
Length	Slope	Entrance Loss			
1.5000 ft	100.00 %	Square Edge w/Headwall			
Diam					
4.0000 ft					
Up Node	Dn Node	Up Invert	Dn Invert		
WQ POND	TRENCH OF	128.0000 ft	126.5000 ft		

Conduit Constraints:

Min Vel	Max Vel	Min Cov	Min Slope	Max Slope	Min drop
2.0000 ft	15.0000 ft	3.0000 ft	0.5000 ft	2.0000 ft	0.0000 ft
In/Exfil	Hold Up	Hold Dn	Match Inv	Allow Smaller	
0.0000 in/hr	NO	NO	YES	NO	

Conduit Summary:

Trib Area	Flow	Capacity	Velocity	Normal Depth	
0.7200 ac	0.0331 cf	1560.3243 cf	6.0749 ft/s	0.0161 ft	
Ent Loss	Exit Loss	Frict Loss	Start TW		
0.286528 ft	0.573056 ft	0.000000 ft	126.5547 ft		

Reach ID: THRU NTV

Section Properties:

Shape:	Circular		Routing Method:	Travel Time Translation	
Size	Material	Mannings n	Hyd params By		
48" Diam	Smooth CDEP	0.0120	Mannings Formula		
Length	Slope	Entrance Loss			
0.0010 ft	100.00 %	Square Edge w/Headwall			
Diam					

4.0000 ft					
Up Node	Dn Node	Up Invert	Dn Invert		
TRENCH OF	GRND	124.5000 ft	124.4990 ft		
Conduit Constraints:					
Min Vel	Max Vel	Min Cov	Min Slope	Max Slope	Min drop
2.0000 ft	15.0000 ft	3.0000 ft	0.5000 ft	2.0000 ft	0.0000 ft
In/Exfil	Hold Up	Hold Dn	Match Inv	Allow Smaller	
0.0000 in/hr	NO	NO	YES	NO	
Conduit Summary:					
Trib Area	Flow	Capacity	Velocity	Normal Depth	
0.7200 ac	0.1493 cf	1560.3243 cf	9.5934 ft/s	0.0325 ft	
Ent Loss	Exit Loss	Frict Loss	Start TW		
0.714538 ft	1.429076 ft	0.000000 ft	124.6094 ft		

Node Records

Node ID: GRND

Start El: 124.5000 ft Max El: 130.0000 ft
Contrib Basin: Contrib Hyd:
Hgl Elev: 124.6094 ft

Node ID: OF CB

Start El: 128.7500 ft Max El: 130.0000 ft
Contrib Basin: Contrib Hyd:

Node ID: TRENCH OF

Start El: 124.5000 ft Max El: 126.5000 ft
Contrib Basin: Contrib Hyd:
Hgl Elev: 124.5848 ft
Storage Id: STORAGE OF Discharge Id: SND

Node ID: STORAGE OF

Start El: 124.5000 ft Max El: 126.5000 ft
Contrib Basin: Contrib Hyd:
Length Width Void Ratio
195.0000 ft 8.0000 ft 33.00
Bottom area only with infiltration

Control Structure ID: SND - Infiltration control structure

Start El Max El Increment
124.5000 ft 126.5000 ft 0.10
Infil: 4.14 in/hr Multiplier: 1.00

Node ID: WQ POND

Start El: 128.0000 ft Max El: 130.0000 ft
Contrib Basin: CAR LOT BASIN Contrib Hyd:
Hgl Elev: 128.6559 ft
Storage Id: STORAGE WQ Discharge Id: COMBO

Node ID: STORAGE WQ

Start El: 128.0000 ft Max El: 129.0000 ft
Contrib Basin: Contrib Hyd:
Length ss1 ss2 Width ss3 ss4
189.0000 ft 3.00h:1v 3.00h:1v 2.0000 ft 3.00h:1v 3.00h:1v

Control Structure ID: COMBO - Combination Control Structure

Start El Max El Increment
128.0000 ft 130.0000 ft 0.10
ID List: LMY SND OVERLFLOW
Split: Split OutHyd into component hydrographs.

Control Structure ID: LMY SND - Infiltration control structure

Start El Max El Increment
128.0000 ft 130.0000 ft 0.10
Infil: 1.21 in/hr Multiplier: 1.00

Control Structure ID: OVERLFOW - Broad crested weir

Start El	Max El	Increment		
128.7500 ft	130.0000 ft	0.10		
Length:	7.3300 ft		Coefficient:	3.22

Contributing Drainage Areas

Drainage Area: CAR LOT BASIN

Hyd Method:	SBUH Hyd	Loss Method:	SCS CN Number
Peak Factor:	484.00	SCS Abs:	0.20
Storm Dur:	24.00 hrs	Intv:	10.00 min
	Area	TC	
Pervious	0.1300 ac	68.00	0.07 hrs
Impervious	0.5900 ac	98.14	0.02 hrs
Total	0.7200 ac		

Supporting Data:

Pervious CN Data:

LANDSCAPE	68.00	0.1300 ac
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Impervious CN Data:

ASPHALT SURFACES	98.00	0.5500 ac
POND	100.00	0.0400 ac

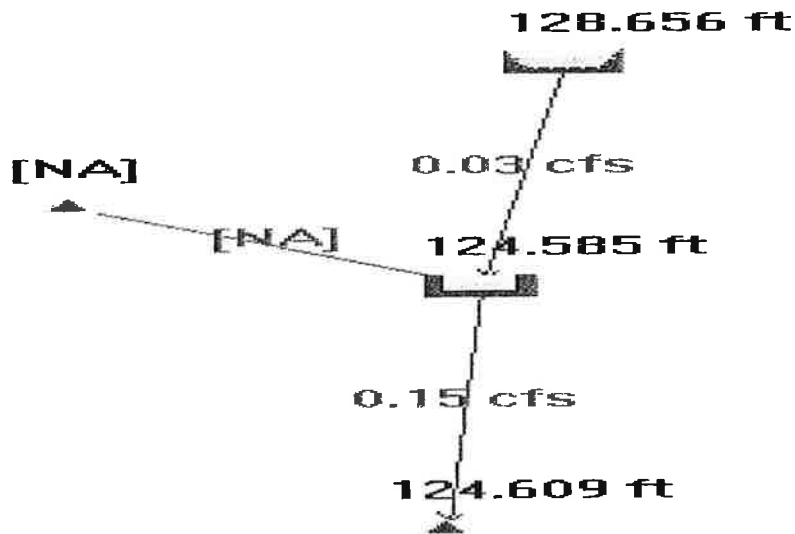
Pervious TC Data:

Flow type:	Description:	Length:	Slope:	Coeff:	Travel Time
Sheet	LAWN/WALK	12.00 ft	2.00%	0.1500	2.40 min
Sheet	ACCROSS ASPHALT	34.00 ft	2.00%	0.0110	0.68 min
Sheet	LAWN WALK	6.00 ft	2.00%	0.1500	1.38 min

Impervious TC Data:

Flow type:	Description:	Length:	Slope:	Coeff:	Travel Time
Sheet	ROAD	75.00 ft	2.00%	0.0110	1.28 min

6-MONTH CALCULATION

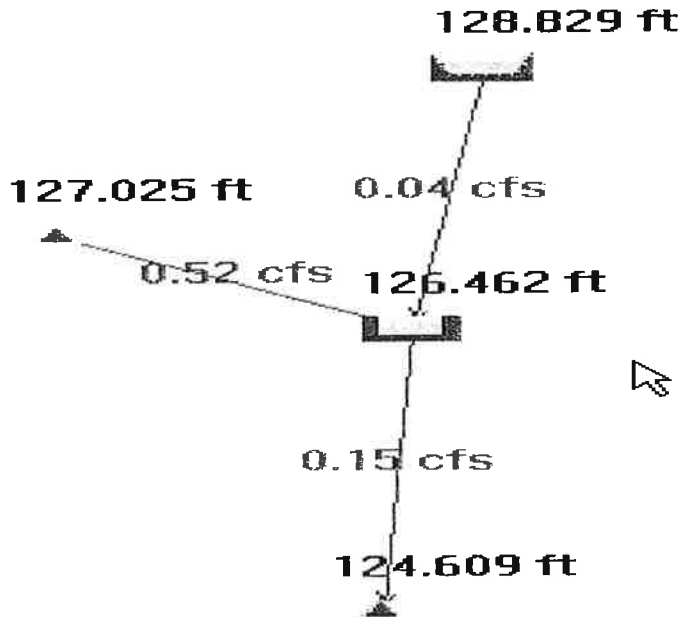


ROUTEHYD [] THRU [DEVELOPED] USING TYPE1A AND [6 month] NOTZERO RELATIVE

Reach	Area ac	Flow cfs	Full Q cfs	% Full ratio	nDepth ft	Size	nVel ft/s	fVel ft/s	CBasin / Hyd
Routing spit hyd [6 month-OVERFLOW-OutHyd] through OVRFLW									
OVRFLW	0.0000	0.0000	1560.32	0.00	0.0000	48" Diam	14.0840	124.1667	
Routing thru RLPool Node WQ POND; 6 month event									
6 month	Match Q: 0.0000 cfs Peak Out Q: 0.0331 cfs - Peak Stg: 128.66 ft - Active Vol: 497.84 cf								
Routing spit hyd [6 month-LMY SND-OutHyd] through THRU LS									
THRU LS	0.7200	0.0331	1560.32	0.00	0.0161	48" Diam	6.0749	124.1667	CAR LOT BASIN
Routing thru RLPool Node TRENCH OF; 6 month event									
6 month	Match Q: 0.0000 cfs Peak Out Q: 0.1493 cfs - Peak Stg: 124.58 ft - Active Vol: 43.66 cf								
THRU NTV	0.7200	0.1493	1560.32	0.00	0.0325	48" Diam	9.5934	124.1667	

From Node	To Node	Rch Loss ft	App Head ft	Bend Loss ft	Junct Loss ft	HW Elev ft	Max El/ Rim El ft
	GRND					124.6094	
TRENCH OF OF CB	GRND	122.6472	--na--	--na--	--na--	124.5848	126.5000
	TRENCH OF	0.0000	--na--	--na--	--na--	0.0000	130.0000
WQ POND	TRENCH OF	126.0694	--na--	--na--	--na--	128.6559	130.0000

100-YR CALCULATION



ROUTEHYD □ THRU [DEVELOPED] USING TYPE1A AND [100 yr] NOTZERO RELATIVE

Reach	Area ac	Flow cfs	Full Q cfs	% Full ratio	nDepth ft	Size	nVel ft/s	fVel ft/s	CBasin / Hyd
-------	------------	-------------	---------------	-----------------	--------------	------	--------------	--------------	--------------

Routing spit hyd [100 yr-OVERFLOW-OutHyd] through OVRFLW

OVRFLW	0.4133	0.5172	1560.32	0.00	0.0576	48" Diam	14.0840	124.1667	
--------	--------	--------	---------	------	--------	----------	---------	----------	--

Routing thru RLPool Node WQ POND; 100 yr event

100 yr Match Q: 0.0000 cfs Peak Out Q: 0.5564 cfs - Peak Stg: 128.83 ft - Active Vol: 713.34 cf

Routing spit hyd [100 yr-LMY SND-OutHyd] through THRU LS

THRU LS	0.3067	0.0392	1560.32	0.00	0.0176	48" Diam	6.3130	124.1667	CAR LOT BASIN
---------	--------	--------	---------	------	--------	----------	--------	----------	---------------

Routing thru RLPool Node TRENCH OF; 100 yr event

100 yr Match Q: 0.0000 cfs Peak Out Q: 0.1493 cfs - Peak Stg: 126.46 ft - Active Vol: 1010.27 cf

THRU NTV	0.7200	0.1493	1560.32	0.00	0.0325	48" Diam	9.5934	124.1667	
----------	--------	--------	---------	------	--------	----------	--------	----------	--

From Node	To Node	Rch Loss ft	App Head ft	Bend Loss ft	Junct Loss ft	HW Elev ft	Max El/ Rim El ft
	GRND					124.6094	
TRENCH OF OF CB	GRND	122.6472	--na--	--na--	--na--	126.4625	126.5000
	TRENCH OF	127.0250	--na--	--na--	--na--	127.0250	130.0000
WQ POND	TRENCH OF	126.0754	--na--	--na--	--na--	128.8285	130.0000

MAINTENANCE REQUIREMENTS

Infiltration Trench Inspection Schedule:

The drainage system should be monitored periodically. For the first year after completion of construction, the system should be monitored after every large storm event (> 1-in in 24-hrs), and, during the period Oct. 1- Mar. 31 inspections should be conducted monthly. From April 1-Sept. 30, the facility should be monitored on a quarterly basis. Once the performance characteristics of the facility have been verified, the monitoring schedule can be reduced to an annual basis unless the performance data indicate that a more frequent schedule is required.

Sediment Removal:

Sediment buildup in the top foot of stone aggregate or the surface inlet should be monitored on the same schedule as the system. Sediment deposits shall not be allowed to build up to the point where it will reduce the rate of infiltration into the trench.

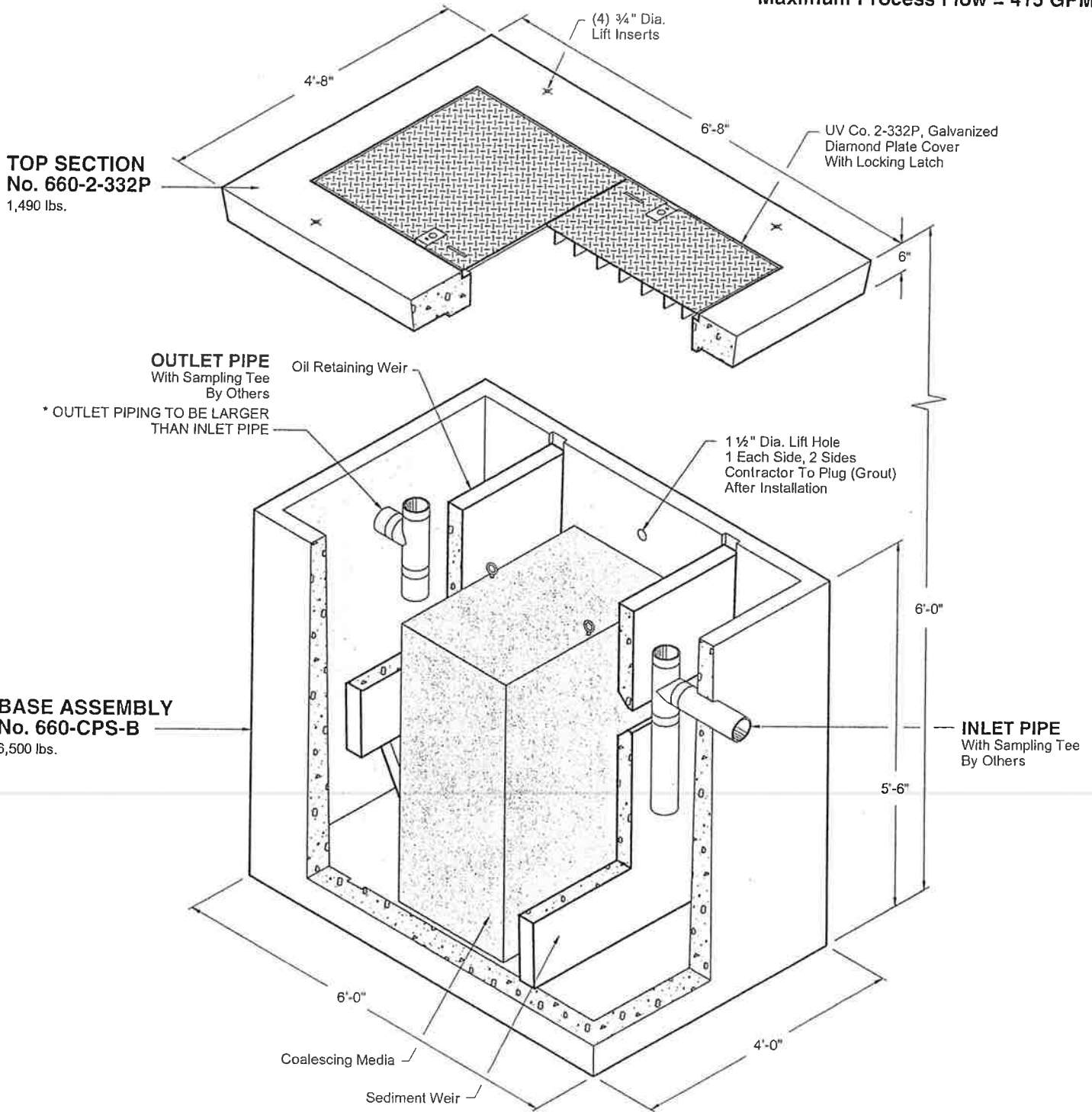
MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
INFILTRATION TRENCH	SEDIMENT	A PERCOLATION TEST PIT OR TEST OF FACILITY INDICATES FACILITY IS ONLY WORKING AT 90% OF ITS DESIGNED CAPABILITIES. IF TWO INCHES OR MORE SEDIMENT IS PRESENT, REMOVE.	SEDIMENT IS REMOVED AND/OR FACILITY IS CLEANED SO THAT INFILTRATION SYSTEM WORKS ACCORDING TO DESIGN.
CATCH BASIN	COVER NOT IN PLACE	COVER IS MISSING OR ONLY PARTIALLY IN PLACE. ANY OPEN MANHOLE REQUIRED MAINTENANCE.	MANHOLE IS CLOSED.
	TRASH & DEBRIS (INCLUDES SEDIMENT)	TRASH OR DEBRIS OF MORE THAN 1/2 CUBIC FOOT WHICH IS LOCATED IMMEDIATELY IN FRONT OF THE CATCH BASIN OPENING OR IS BLOCKING CAPACITY OF BASIN BY MORE THAN 10%.	NO TRASH OR DEBRIS LOCATED IMMEDIATELY IN FRONT OF CATCH BASIN OPENING.
		TRASH OR DEBRIS (IN THE BASIN) THAT EXCEEDS 1/3 THE DEPTH FROM THE BOTTOM OF BASIN TO INVERT T OF THE LOWEST PIPE INTO OR OUT OF THE BASIN.	NO TRASH OR DEBRIS IN THE CATCH BASIN.
		TRASH OR DEBRIS IN ANY INLET OR OUTLET PIPE BLOCKING MORE THAN 1/3 OF ITS HEIGHT.	INLET AND OUTLET PIPES FREE OF TRASH OR DEBRIS.
		DEAD ANIMALS OR VEGETATION THAT COULD GENERATE ODORS THAT WOULD CAUSE COMPLAINTS OR DANGEROUS GASES (E.G., METHANE).	NO DEAD ANIMALS OR VEGETATION PRESENT WITHIN THE CATCH BASIN.
	DEPOSITS OF GARBAGE EXCEEDING 1 CUBIC FOOT IN VOLUME.	NO CONDITION PRESENT WHICH WOULD ATTRACT OR SUPPORT THE BREEDING OF INSECTS OR RODENTS.	
	STRUCTURAL	CORNER OF FRAME EXTENDS MORE THAN 3/4	FRAME IS EVEN WITH

	DAMAGE TO FRAME AND/OR TOP SLAB	INCH PAST CURB FACE INTO THE STREET (IF APPLICABLE).	CURB.
		TOP SLAB HAS HOLES LARGER THAN 2 SQUARE INCHES OR CRACKS WIDER THAN 1/4 INCH (INTENT IS TO MAKE SURE ALL MATERIAL IS RUNNING INTO THE BASIN).	TOP SLAB IS FREE OF HOLES AND CRACKS.
		FRAME NOT SITTING FLUSH ON TOP SLAB, I. E., SEPARATION OF MORE THAN 3/4 INCH OF THE FRAME FROM THE TOP SLAB.	FRAME IS SITTING FLUSH ON TOP SLAB.
	CRACKS IN BASIN WALLS/BOTTOM	CRACKS WIDER THAN 1/2 INCH AND LONGER THAN 3 FEET, ANY EVIDENCE OF SOIL PARTICLES ENTERING CATCH BASIN THROUGH CRACKS, OR MAINTENANCE PERSON JUDGES THAT STRUCTURE IS UNSOUND.	BASIN REPLACED OR REPAIRED TO DESIGN STANDARDS.
		CRACKS WIDER THAN 1/2 INCH AND LONGER THAN 1 FOOT AT THE JOINT OF ANY INLET/OUTLET PIPE OR ANY EVIDENCE OF SOIL PARTICLES ENTERING CATCH BASIN THROUGH CRACKS.	NO CRACKS MORE THAN 1/4 INCH WIDE AT THE JOINT OF INLET/OUTLET PIPE.
	SETTLEMENT/ MISALIGNMENT	BASIN HAS SETTLED MORE THAN 1 INCH OR HAS ROTATED MORE THAN 2 INCHES OUT OF ALIGNMENT.	BASIN REPLACED OR REPAIRED TO DESIGN STANDARDS.
	FIRE HAZARD	PRESENCE OF CHEMICALS SUCH AS NATURAL GAS, OIL, GASOLINE.	NO FLAMMABLE CHEMICALS PRESENT.
	VEGETATION	VEGETATION GROWING ACROSS AND BLOCKING MORE THAN 10% OF THE BASIN OPENING.	NO VEGETATION BLOCKING OPENING TO BASIN.
		VEGETATION GROWING IN INLET/OUTLET PIPE JOINTS THAT IS MORE THAN SIX INCHES TALL AND LESS THAN SIX INCHES APART.	NO VEGETATION OR ROOT GROWTH PRESENT.
	POLLUTION	NONFLAMMABLE CHEMICALS OF MORE THAN 1/2 CUBIC FOOT PER THREE FEET OF BASIN LENGTH.	NO POLLUTION PRESENT OTHER THAN SURFACE FILM.
CATCH BASIN COVER	COVER NOT IN PLACE	COVER IS MISSING OR ONLY PARTIALLY IN PLACE. ANY OPEN CATCH BASIN REQUIRED MAINTENANCE.	CATCH BASIN COVER IS CLOSED.
	LOCKING MECHANISM NOT WORKING	MECHANISM CANNOT BE OPENED BY ONE MAINTENANCE PERSON WITH PROPER TOOLS. BOLTS INTO FRAME HAVE LESS THAN 1/2 INCH OF THREAD.	MECHANISM OPENS WITH PROPER TOOLS.
	COVER DIFFICULT TO REMOVE	ONE MAINTENANCE PERSON CANNOT REMOVE LID AFTER APPLYING 80 LBS. OF LIFT; INTENT IS KEEP COVER FROM SEALING OFF ACCESS TO MAINTENANCE.	COVER CAN BE REMOVED BY ONE MAINTENANCE PERSON.
PIPES	SEDIMENT & DEBRIS	ACCUMULATED SEDIMENT THAT EXCEEDS 20% OF THE DIAMETER OF THE PIPE.	PIPE CLEANED OF ALL SEDIMENT AND DEBRIS.
	VEGETATION	VEGETATION THAT REDUCES FREE MOVEMENT OF WATER THROUGH PIPES.	ALL VEGETATION REMOVED SO WATER

		FLOWS FREELY THROUGH PIPES.
DAMAGED	PROTECTIVE COATING IS DAMAGED; RUST IS CAUSING MORE THAN 50% DETERIORATION TO ANY PART OF PIPE.	PIPE REPAIRED OR REPLACED.
	ANY DENT THAT DECREASES THE CROSS SECTION AREA OF PIPE BY MORE THAN 20%.	PIPE REPAIRED OR REPLACED.
TRASH & DEBRIS	TRASH AND DEBRIS EXCEEDS 1 CUBIC FOOT PER 1,000 SQUARE FEET OF DITCH AND SLOPES.	TRASH AND DEBRIS CLEARED FROM DITCHES.

660-CPS OIL WATER SEPARATOR

Projected Plate Area = 444 Sq/ft
Maximum Process Flow = 415 GPM



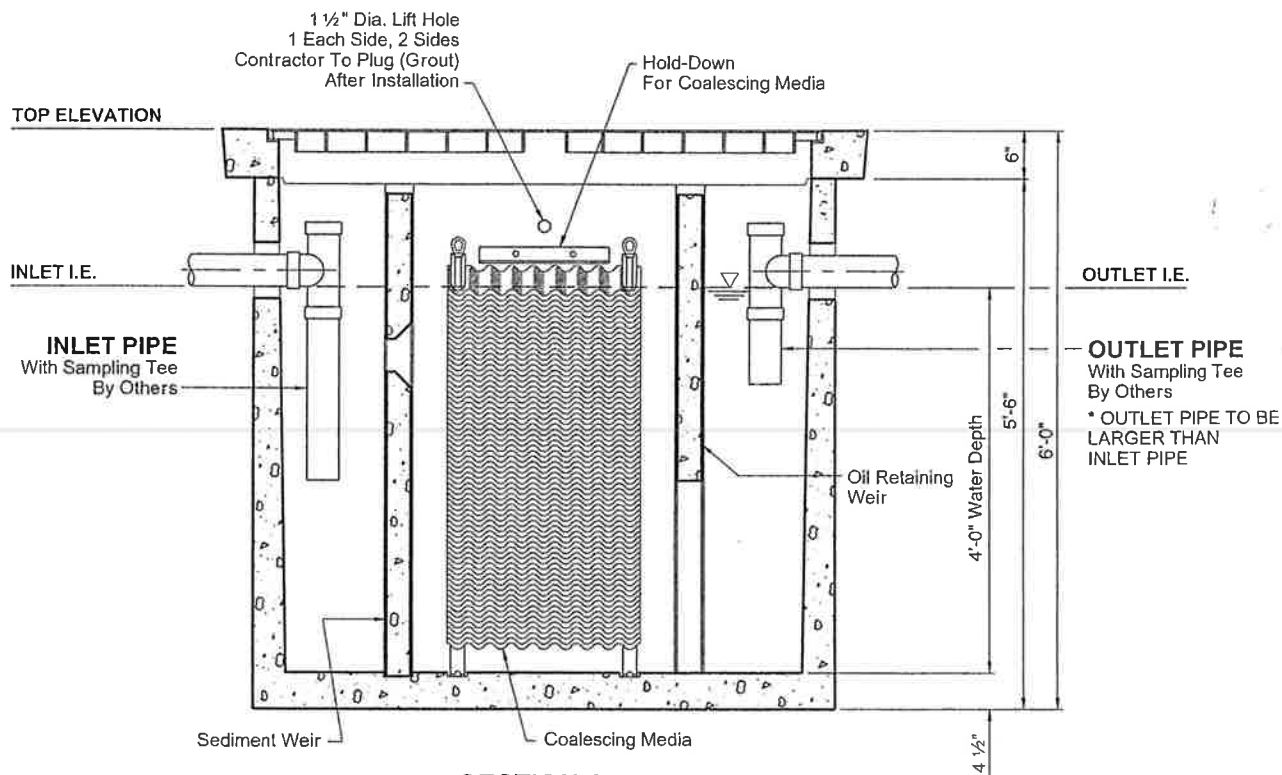
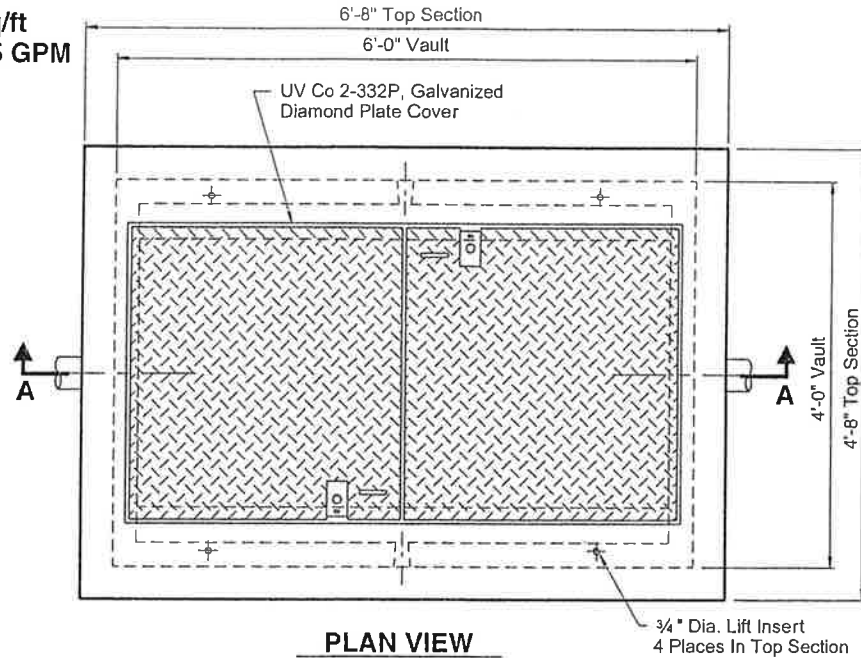
UTILITY VAULT COMPANY

P.O. BOX 563 Phone (206) 839-3500
Auburn, Washington 98071-0563 Fax (206) 735-4221

For Details Of Access Covers, See COVER Section.
* ITEMS SHOWN ARE SUBJECT TO CHANGE WITHOUT NOTICE.
FOR DETAILS SEE REVERSE SIDE.

660-CPS OIL WATER SEPARATOR

Projected Plate Area = 444 Sq/ft
Maximum Process Flow = 415 GPM



STRUCTURAL NOTES:

- Concrete: 28 Day Compressive Strength $f_c = 4500$ psi
- Rebar: ASTM A-615 Grade 60
- Mesh: ASTM A-185 Grade 65
- Design: ACI-318-89 Building Code
ASTM C-857 "Minimum Structural Design
Loading For Underground Precast Concrete
Utility Structures"
- Loads: H-20 Truck Wheel w/ 30% Impact Per AASHTO

GENERAL NOTES:

- All Baffles and Weirs To Be Precast Concrete
- Static Water Depth = 4'-0"
- Contractor To:
Supply and Install All Piping & Sampling Tees
Grout In All Pipes
Fill w/ Clean Water Prior To "Start-Up" Of System
Verify All Blockout Sizes and Locations

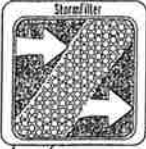
INFORMATION NEEDED:

- Top Of Separator Elevation _____
- Inlet Pipe Size _____
- Inlet Pipe Elevation _____
- Outlet Pipe Size _____
- Outlet Pipe Elevation _____

BASIC DESIGN INFORMATION:

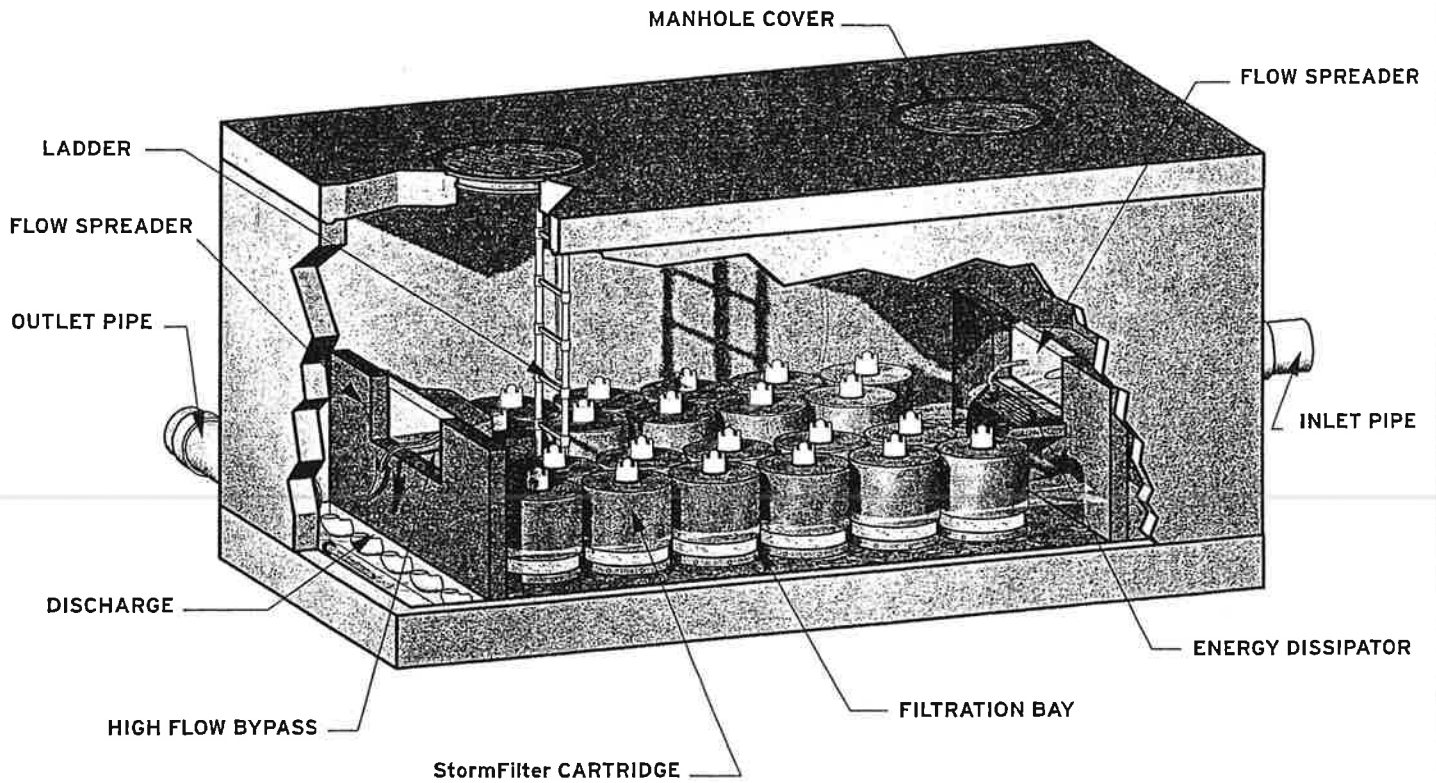
INFLUENT CHARACTERISTICS -
Oil Specific Gravity = 0.88
Operating Temperature = 50°
Influent Oil Concentration = 100 ppm
Mean Oil Droplet Size = 130 micron
0.033 ft/min Oil Rise Rate
Designed Per Washington State Department Of Ecology

FLOW RATE	EFFLUENT QUALITY	100% COLLECTED SIZE
110 GPM	10 ppm	60 Micron



THE STORMWATER MANAGEMENT StormFilter®

StormFilter





THE STORMWATER MANAGEMENT StormFilter®

The StormFilter is the leading stormwater treatment technology. It is a passive siphon-actuated, flow-through, stormwater filtration system consisting of a concrete vault that houses rechargeable, media-filled filter cartridges. The StormFilter works by passing stormwater through these media-filled cartridges, which trap particulates and adsorb pollutants such as dissolved metals, nutrients, and hydrocarbons.

The StormFilter is offered in four different configurations: cast-in-place, precast, linear, and catch basin. The precast, linear and catch basin models use pre-manufactured vaults to ease the design and installation process. The cast-in-place units are customized for larger flows and may be either uncovered or covered underground units.

APPLICATIONS

The StormFilter excels in a wide variety of applications and is being used to treat stormwater runoff in a wide variety of sites throughout the United States. For jurisdictional authorities, the system offers high levels of pollutant removal and improved water quality. For developers, the StormFilter is cost-effective, easy to install, and uses no additional land (entirely underground). For engineers, full design support, provided by Stormwater Management at no extra cost, is invaluable. These benefits, coupled with unsurpassed versatility, make the StormFilter the best long-term solution for stormwater treatment.

TYPICAL DEVELOPMENT APPLICATIONS:

- Parking lots
- Commercial and industrial sites
- High-density and single-family housing
- Maintenance, transportation and port facilities

TYPICAL ROADWAY APPLICATIONS:

- Arterial roads
- Freeways
- Bridge decks
- Light rail and transit facilities

For specialized applications, laboratory evaluation of the water is normally required to establish the operational parameters. Stormwater Management can perform these studies through its outstanding Research and Development department.

DESIGN CRITERIA

The StormFilter is approved as a Best Management Practice (BMP) with many agencies throughout the United States. Regulatory requirements for designing BMPs vary from state to state, and may be based on a water quality flow rate determined from a design storm, a water quality volume, or removal efficiency for a target pollutant. Stormwater Management will help you work with your local governing agency to ensure that your StormFilter system meets their requirements.

SYSTEM SIZING AND HYDRAULIC DROP

System sizing is determined by analyzing data from either a volume-based or flow-based design, depending on which criterion is required by the relevant jurisdiction. Using the required criterion, Stormwater Management engineers will work with you to determine the optimum number of cartridges and system vault size. The StormFilter typically requires 2.3 feet of head differential between the inlet and the outlet. For a size evaluation and cost estimation, complete the project information sheet contained in this package, and fax it to Stormwater Management.

PRETREATMENT AND BYPASSING

Stormwater Management evaluates the need for pretreatment devices for each site. The StormFilter typically does not require pretreatment, but if pretreatment is needed the following devices may be used: the StormGate Separator™, StormScreen™, sedimentation vaults, manholes, oil/water separators, detention/sedimentation tanks or ponds. Stormwater Management can provide recommendations on the need for and size of these facilities. Depending on individual site characteristics, some systems should be equipped with a StormGate™ high-flow bypass. The StormGate is used when the peak storm event generates a flow that exceeds the overflow capacity or design capacity of the StormFilter.

CONSTRUCTION AND INSTALLATION

Stormwater Management provides precast StormFilters to the end user as a complete system. The StormFilter is typically delivered to the project site in two separate shipments. The precast vault is first delivered to the site by the local precastor. Once the project is near completion, the site is paved, landscaping is complete, and the storm drains are clean, filter cartridges are delivered for installation in the vault. The filter cartridges can be installed by the on-site contractor or Stormwater Management.