Targeted Drainage Report for the *Dwayne Lane SR530 Grading Permit*

Prepared for:
Tom Lane
Dwayne Lane's Chrysler/Plymouth
10515 Evergreen Way
Everett, WA 98204

Prepared by:
Derek I. Hann, E.I.T.

Reviewed by:
Todd D. Powell, PE

March 19, 2009

Revised May 7, 2009

hba DESIGN GROUP
land use planning + civil engineering

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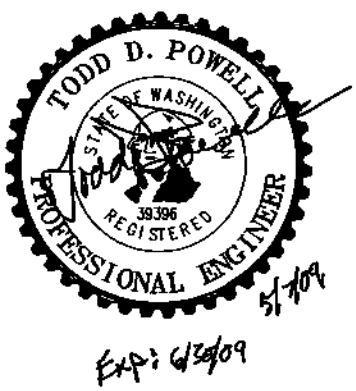

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- Down Stream Analysis Maps
- Geotech Report

SUMMARY

The Grading Plan for the Dwayne Lane Auto Dealership proposes to raise the elevation of the existing 8.9 acre site for future development. The Grading Plan has been prepared with the intention of obtaining a grading permit for the first phase of a longer-term project that will ultimately lead of commercial development on the property.

Structural fill will be hauled onto the site and compacted to structural specifications. The Grading Plan will include Temporary Erosion and Sedimentation measures to protect the site during and after the fill import process. A temporary infiltration trench located near the northern property boundary will infiltrate stormwater runoff from the graded site into the native onsite soils.

The project site is located at 21117 59th Avenue NE on the southeast corner of the intersection of SR 530 and 59th Avenue NE. in the City of Arlington, Washington.

EXISTING CONDITIONS

The project site is currently undeveloped. The site is nearly flat, except for a small rise (approximately 4 feet) across the southern quarter of the property. The site is covered with pasture and lawn grasses.

The USDA "Soil Survey of Snohomish County Area, Washington" indicates that there are two soil types located on the property. The northern two-thirds of the site are composed of Lynnwood loamy sand, a Type A soil with rapid permeability and a slight threat of water erosion. The southern third of the site is classified as a Terric Medisaprists soil. This is a Type C soil that is very poorly drained with a slight threat of water erosion.

Western Geotechnical Consultants, Inc. conducted a subsurface site exploration and dug 6 test pits at various locations. Subsurface conditions were found to vary between the north and south sides of the property. According to soil logs and laboratory data. soil on the northern two-thirds of the site is composed of a layer of silty sand over gravelly sand. Soil on the north side of the property has a design infiltration rate of 2.0 inches per hour and, the seasonal high groundwater table is approximately 4.5-6 feet below existing grade. Soil testing results on the north end of the property were consistent with the SCS Lynnwood loamy sand soil classification.

The soil on the south end of the site is of much poorer quality than that on the north end. According to soil logs and laboratory data the southern third of the site is composed of sandy silt over gravelly sand. Soil on the south side of the property has a design infiltration rate of 0.5 inches per hour and the seasonal high groundwater table is approximately 2.5-3 feet below existing grade.

Following a site exploration, including investigation and observations of soils, vegetation and hydrology, the Jay Group, LLC determined that there are no wetlands located on the site. One stream is located approximately 180-feet to the south of the property. According to the Snohomish County Water Types Classification Map 15, February 2001, the stream is categorized as a Type-3 stream. However, the Jay Group believes that the stream would be classified as a

Type-4 stream per WAC 22-16-030, due to the average width of the stream and the highly degraded state of the aquatic habitat.

The majority of the site is bowled to the center of the property. Given the rapid-draining characteristics of the majority of the site soil and the fact that there has been no ponding of stormwater observed near the center of the site, it can be concluded that the majority of stormwater runoff infiltrates into the native onsite soils.

Runoff does not appear to flow either onto or off of the site from or to adjacent properties or the state, county or city rights-of-way. The site is devoid of surface water channels or standing water.

A Geotechnical Report prepared by Western Geotechnical Consultants, Inc. is attached to this drainage report for your review.

DEVELOPED CONDITIONS

The Grading Permit phase of the Dwayne Lane SR530 project proposes to import fill onto the site and raise the relative elevation of the site. Due to the well draining characteristics of the northern soils and the poor draining characteristics of the southern soils, the site will be graded so the south end of the site has a greater elevation than the north end of the site. Stormwater runoff will flow to the northern property boundary.

There is no impervious area proposed for this phase of the project. Additionally, proposed site slope grades will be similar to the existing site slope grades. Therefore, no water quality or detention is required. The majority of runoff on the existing site appears to drain to the center of the site and infiltrate into native soil. Runoff from the graded site will run to the northern perimeter of the property to a temporary infiltration trench. Runoff will infiltrate into the native soils at the temporary infiltration trench. The proposed drainage runoff patterns will roughly match those of the existing site as both involve infiltrating the majority of runoff onsite.

The proposed temporary infiltration trench will be approximately 20 feet wide and 3 feet deep. Based on geotechnical site exploration, the approximately high water elevation for the northern soils is approximately 57.5. The proposed infiltration trench bottom will be located at an elevation of approximately 61. This allows for 3.5 feet of separation between the bottom of the trenches and the high water table. The proposed temporary infiltration trench will be composed of a trench lined with filter fabric and back filled with 1.5 inch diameter clean rock. The trench has been designed using the WWHM design method required by the 2005 DOE manual. (See attached report for details).

FRONTAGE IMPROVEMENTS

There are no frontage improvements proposed at this stage of the project.

WATER QUALITY

There are no pollution generating surfaces proposed for the grading phase of this project. No water quality facilities are required. However the project will be seeded after it has been final graded. As rainwater sheet flows through the proposed vegetation it will be effectively treated by the native grasses and brush. Any polluted runoff will be adequately treated prior to infiltration.

UPSTREAM ANALYSIS

Based on site topography, there are no offsite areas tributary to the project site's drainage. The proposed development will not change any upstream drainage course or pattern and no impact on upstream drainage is anticipated.

DOWNSTREAM ANALYSIS

The majority of stormwater runoff infiltrates onsite into the native soils. Runoff from the southern end of the property that does not infiltrate will sheet flows south approximately 180' to an unnamed stream. This stream drains to the southwest approximately 1 mile before tying into Portage Creek near the intersection of 204th Street and 43rd Avenue. (see the Downstream Drainage Map in the Appendix.)

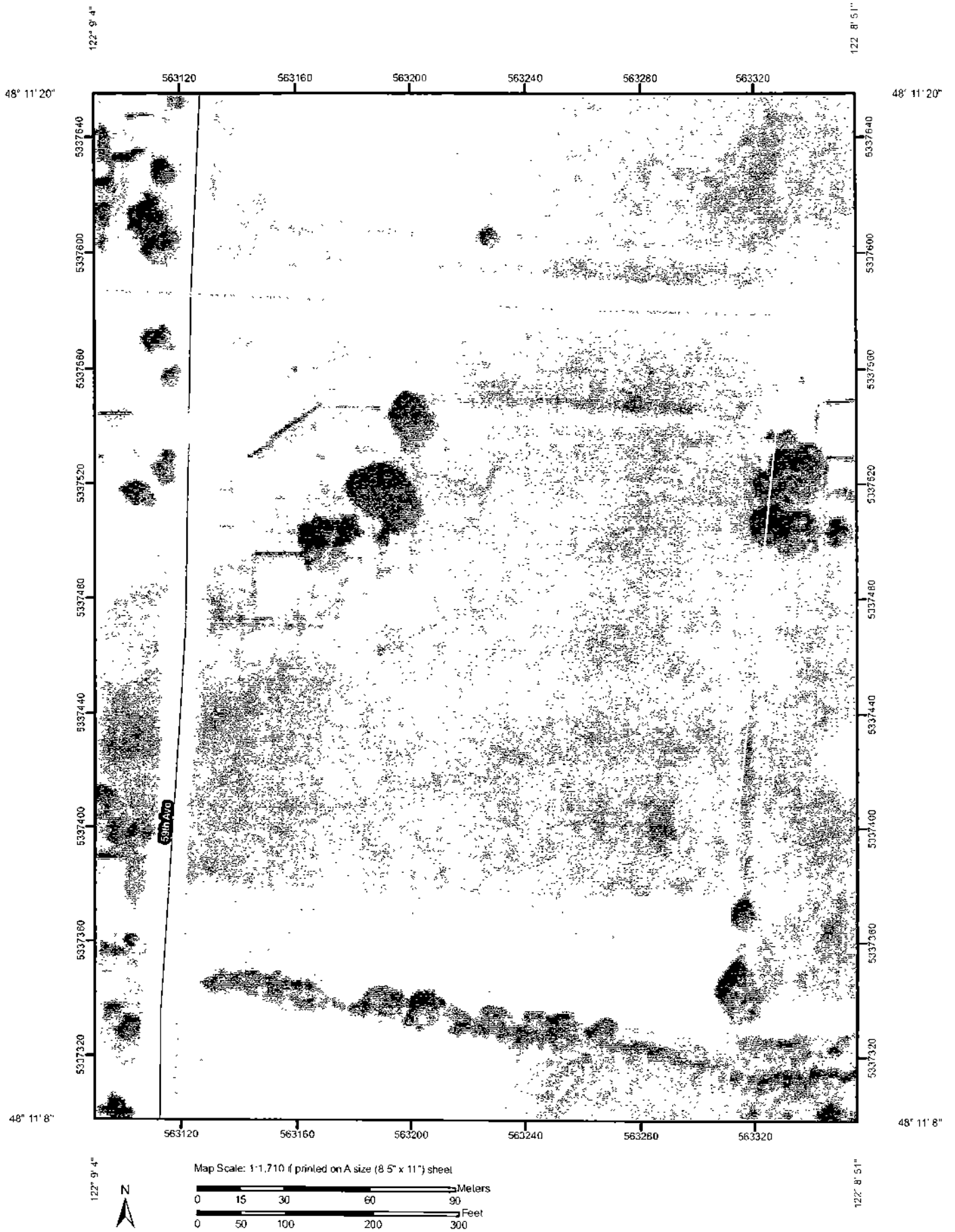
Due to the rapidly infiltrating soils onsite and within the surrounding area there does not appear to be any obvious drainage pattern established for stormwater leaving the site in directions other than the southern stream. Site exploration and survey have confirmed this analysis. In the event that water exits the site in any direction other than to the south, runoff will likely simply infiltrate into the offsite soils a short distance from the property.

APPENDIX

Soils Map & Information
Temporary Infiltration Trench Sizing Calculations (WWHM3)
Down Stream Analysis Maps
Geotech Report

Soils Map & Information

Soil Map—Snohomish County Area, Washington
(Dwayne Lane Auto Dealership)



Map Unit Legend

Snohomish County Area, Washington (WA661)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
30	Lynnwood loamy sand, 0 to 3 percent slopes	10.1	96.4%
69	Terric Medisaprists, nearly level	0.4	3.6%
Totals for Area of Interest		**10.5**	**100.0%**

Temporary Infiltration Trench Sizing Calculations (WWHM3)

File Edit View Zoom Help

Map Information

SCENARIOS

Predeveloped

Mitigated

Run Scenario

ELEMENTS

Move Elements

Save x,y Load x,y

X 20

Y 0

Facility Name Temporary Infiltration Trench

	Outlet 1	Outlet 2	Outlet 3
Downstream Connection	0	0	0

Facility Type Gravel Trench/Bed

Precipitation Applied to Facility ... Quick Trench

Evaporation Applied to Facility

Facility Bottom Elevation (ft) 0

Facility Dimensions

Trench Length	606
Trench Bottom Width	20
Effective Total Depth	4
Bottom slope of Trench	0.001
Left Side Slope	0
Right Side Slope	0

Outlet Structure

Riser Height (ft)	3
Riser Diameter(in)	24
Riser Type	Flat
Notch Type	

Material Layers for

Layer 1 Thickness (ft)	3
Layer 1 porosity	0.35
Layer 2 Thickness (ft)	0
Layer 2 porosity	0
Layer 3 Thickness (ft)	0
Layer 3 porosity	0

Orifice Number	Diameter (In)	Height (Ft)	QMax (cfs)
1	0	0	0
2	0	0	0
3	0	0	0

Infiltration YES

Measured Infiltration Rate (in/hr)	2
Infiltration Reduction Factor	1
Use Wetted Surface Area (sidewalls)	YES
Total Volume Infiltrated(acre-ft)	436.266
Total Volume Through Riser(acre-ft)	0

Trench Volume at Riser Head (acre-ft) .302

Pond Increment 0.10

Show Pond Table Open Table

Total Volume Through Facility(acre-ft) 436.266

Percent Infiltrated 100

Western Washington Hydrology Model
PROJECT REPORT

Project Name: Dwayne Lanes 59th Avenue Grading Permit
Site Address: 21117 59th Avenue NE
City : Arlington
Report Date : 5/7/2009
Gage : Everett
Data Start : 1948/10/01
Data End : 1997/09/30
Precip Scale: 1.20
WWHM3 Version: 3.0

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
A B, Forest, Flat	8.17

Impervious Land Use	Acres

Element Flows To:

Surface	Interflow	Groundwater

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C, Pasture, Flat	8.17

Impervious Land Use	Acres

Element Flows To:

Surface	Interflow	Groundwater
Temporary Infiltration Trench,	Temporary Infiltration Trench,	

Name : Temporary Infiltration Trench

Bottom Length: 606ft.
Bottom Width : 20ft.
Trench bottom slope 1: 0.001 To 1
Trench Left side slope 0: 0 To 1
Trench right side slope 2: 0 To 1
Material thickness of first layer : 3
Pour Space of material for first layer : 0.35
Material thickness of second layer : 0
Pour Space of material for second layer : 0
Material thickness of third layer : 0
Pour Space of material for third layer : 0
Infiltration On
Infiltration rate : 2
Infiltration saftey factor : 1
Wetted surface area On
Discharge Structure
Riser Height: 3 ft.
Riser Diameter: 24 in.

Element Flows To:
Outlet 1 **Outlet 2**

Gravel Trench Bed Hydraulic Table

Stage(ft)	Area(acr)	Volume(acr-ft)	Dschrg(cfs)	Infilt(cfs)
0.000	0.278	0.000	0.000	0.000
0.044	0.278	0.004	0.000	0.564
0.089	0.278	0.009	0.000	0.566
0.133	0.278	0.013	0.000	0.569
0.178	0.278	0.017	0.000	0.571
0.222	0.278	0.022	0.000	0.574
0.267	0.278	0.026	0.000	0.577
0.311	0.278	0.030	0.000	0.579
0.356	0.278	0.035	0.000	0.582
0.400	0.278	0.039	0.000	0.584
0.444	0.278	0.043	0.000	0.587
0.489	0.278	0.048	0.000	0.589
0.533	0.278	0.052	0.000	0.592
0.578	0.278	0.056	0.000	0.595
0.622	0.278	0.061	0.000	0.597
0.667	0.278	0.065	0.000	0.600
0.711	0.278	0.069	0.000	0.602
0.756	0.278	0.074	0.000	0.605
0.800	0.278	0.078	0.000	0.607
0.844	0.278	0.082	0.000	0.610
0.889	0.278	0.087	0.000	0.613
0.933	0.278	0.091	0.000	0.615
0.978	0.278	0.095	0.000	0.618
1.022	0.278	0.100	0.000	0.620
1.067	0.278	0.104	0.000	0.623
1.111	0.278	0.108	0.000	0.626
1.156	0.278	0.113	0.000	0.628
1.200	0.278	0.117	0.000	0.631
1.244	0.278	0.121	0.000	0.633
1.289	0.278	0.126	0.000	0.636

1.333	0.278	0.130	0.000	0.638
1.378	0.278	0.134	0.000	0.641
1.422	0.278	0.139	0.000	0.644
1.467	0.278	0.143	0.000	0.646
1.511	0.278	0.147	0.000	0.649
1.556	0.278	0.151	0.000	0.651
1.600	0.278	0.156	0.000	0.654
1.644	0.278	0.160	0.000	0.656
1.689	0.278	0.164	0.000	0.659
1.733	0.278	0.169	0.000	0.662
1.778	0.278	0.173	0.000	0.664
1.822	0.278	0.177	0.000	0.667
1.867	0.278	0.182	0.000	0.669
1.911	0.278	0.186	0.000	0.672
1.956	0.278	0.190	0.000	0.674
2.000	0.278	0.195	0.000	0.677
2.044	0.278	0.199	0.000	0.680
2.089	0.278	0.203	0.000	0.682
2.133	0.278	0.208	0.000	0.685
2.178	0.278	0.212	0.000	0.687
2.222	0.278	0.216	0.000	0.690
2.267	0.278	0.221	0.000	0.692
2.311	0.278	0.225	0.000	0.695
2.356	0.278	0.229	0.000	0.698
2.400	0.278	0.234	0.000	0.700
2.444	0.278	0.238	0.000	0.703
2.489	0.278	0.242	0.000	0.705
2.533	0.278	0.247	0.000	0.708
2.578	0.278	0.251	0.000	0.711
2.622	0.278	0.255	0.000	0.713
2.667	0.278	0.260	0.000	0.716
2.711	0.278	0.264	0.000	0.718
2.756	0.278	0.268	0.000	0.721
2.800	0.278	0.273	0.000	0.723
2.844	0.278	0.277	0.000	0.726
2.889	0.278	0.281	0.000	0.729
2.933	0.278	0.286	0.000	0.731
2.978	0.278	0.290	0.000	0.734
3.022	0.278	0.302	0.065	0.736
3.067	0.278	0.315	0.335	0.739
3.111	0.278	0.327	0.721	0.741
3.156	0.278	0.339	1.195	0.744
3.200	0.278	0.352	1.742	0.747
3.244	0.278	0.364	2.354	0.749
3.289	0.278	0.377	3.024	0.752
3.333	0.278	0.389	3.749	0.754
3.378	0.278	0.401	4.523	0.757
3.422	0.278	0.414	5.344	0.759
3.467	0.278	0.426	6.209	0.762
3.511	0.278	0.438	7.117	0.765
3.556	0.278	0.451	8.066	0.767
3.600	0.278	0.463	9.053	0.770
3.644	0.278	0.475	10.08	0.772
3.689	0.278	0.488	11.14	0.775
3.733	0.278	0.500	12.23	0.778
3.778	0.278	0.513	13.36	0.780
3.822	0.278	0.525	14.52	0.783

3.867	0.278	0.537	15.72	0.785
3.911	0.278	0.550	16.94	0.788
3.956	0.278	0.562	18.19	0.790
4.000	0.278	0.574	19.48	0.793

MITIGATED LAND USE

ANALYSIS RESULTS

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.119499
5 year	0.196607
10 year	0.262114
25 year	0.363856
50 year	0.455114
100 year	0.561135

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Yearly Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1950	0.089	0.000
1951	0.229	0.000
1952	0.068	0.000
1953	0.093	0.000
1954	0.127	0.000
1955	0.207	0.000
1956	0.236	0.000
1957	0.111	0.000
1958	0.189	0.000
1959	0.303	0.000
1960	0.099	0.000
1961	0.095	0.000
1962	0.333	0.000
1963	0.176	0.000
1964	0.302	0.000
1965	0.089	0.000
1966	0.083	0.000
1967	0.057	0.000
1968	0.108	0.000
1969	0.126	0.000
1970	0.330	0.000
1971	0.068	0.000
1972	0.133	0.000
1973	0.272	0.000

1974	0.084	0.000
1975	0.100	0.000
1976	0.106	0.000
1977	0.073	0.000
1978	0.064	0.000
1979	0.074	0.000
1980	0.325	0.000
1981	0.074	0.000
1982	0.098	0.000
1983	0.109	0.000
1984	0.104	0.000
1985	0.097	0.000
1986	0.158	0.000
1987	0.289	0.000
1988	0.130	0.000
1989	0.067	0.000
1990	0.152	0.000
1991	0.087	0.000
1992	0.088	0.000
1993	0.095	0.000
1994	0.055	0.000
1995	0.070	0.000
1996	0.090	0.000
1997	0.246	0.000
1998	0.494	0.199

Ranked Yearly Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.4938	0.1990
2	0.3333	0.0000
3	0.3301	0.0000
4	0.3248	0.0000
5	0.3028	0.0000
6	0.3017	0.0000
7	0.2890	0.0000
8	0.2717	0.0000
9	0.2464	0.0000
10	0.2364	0.0000
11	0.2290	0.0000
12	0.2073	0.0000
13	0.1893	0.0000
14	0.1765	0.0000
15	0.1578	0.0000
16	0.1517	0.0000
17	0.1335	0.0000
18	0.1296	0.0000
19	0.1268	0.0000
20	0.1257	0.0000
21	0.1110	0.0000
22	0.1092	0.0000
23	0.1084	0.0000
24	0.1056	0.0000
25	0.1044	0.0000
26	0.1001	0.0000
27	0.0992	0.0000
28	0.0981	0.0000

29	0.0971	0.0000
30	0.0952	0.0000
31	0.0952	0.0000
32	0.0933	0.0000
33	0.0903	0.0000
34	0.0892	0.0000
35	0.0887	0.0000
36	0.0884	0.0000
37	0.0875	0.0000
38	0.0844	0.0000
39	0.0830	0.0000
40	0.0742	0.0000
41	0.0742	0.0000
42	0.0727	0.0000
43	0.0702	0.0000
44	0.0678	0.0000
45	0.0678	0.0000
46	0.0670	0.0000
47	0.0639	0.0000
48	0.0568	0.0000
49	0.0551	0.0000

POC #1
The Facility PASSED

The Facility PASSED.

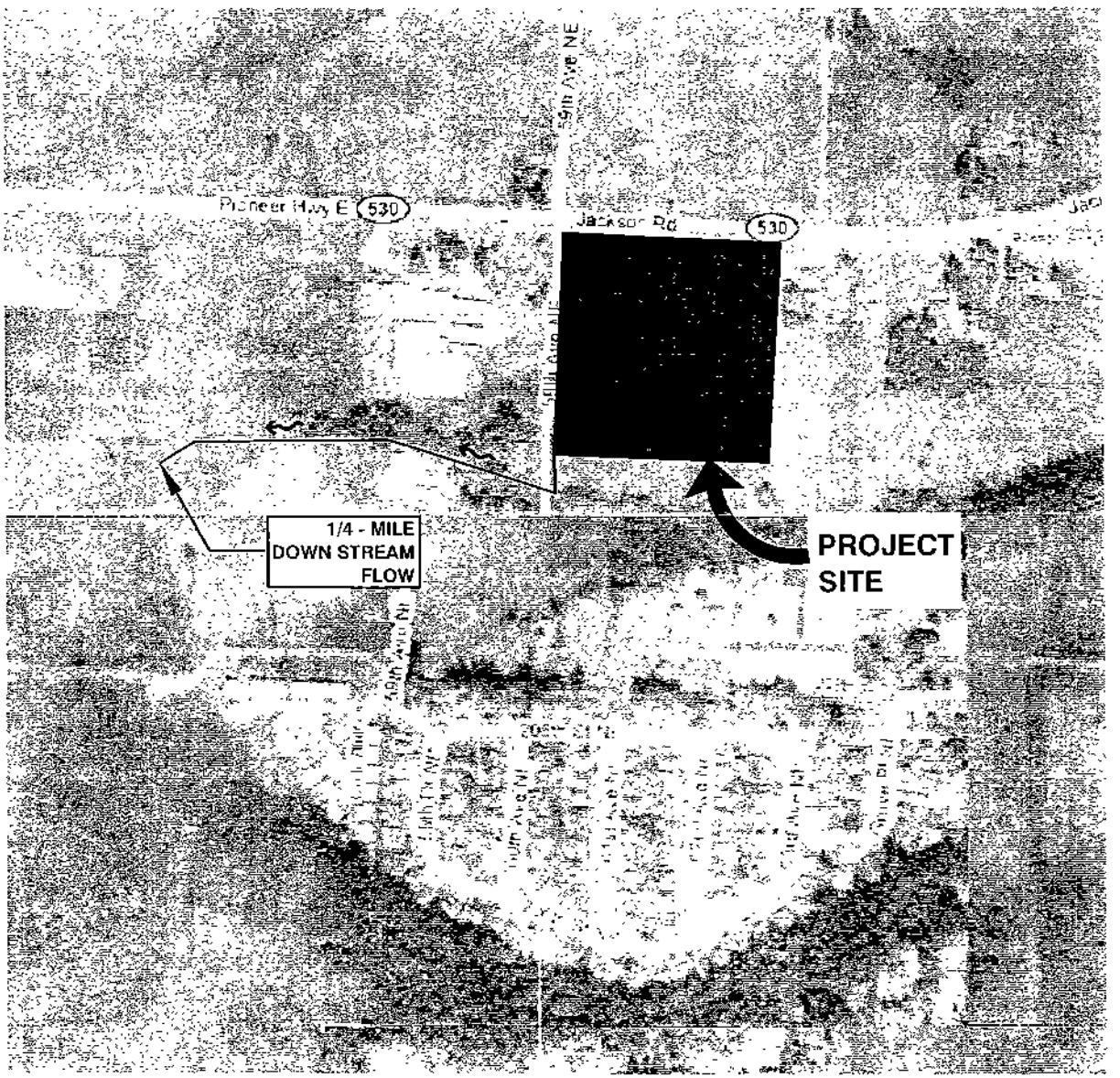
Flow(CFS)	Predev	Dev	Percentage	Pass/Fail
0.0597	2228	11	0	Pass
0.0637	1759	10	0	Pass
0.0677	1376	9	0	Pass
0.0717	1080	9	0	Pass
0.0757	879	8	0	Pass
0.0797	705	7	0	Pass
0.0837	583	7	1	Pass
0.0877	477	7	1	Pass
0.0917	396	7	1	Pass
0.0957	330	7	2	Pass
0.0997	275	7	2	Pass
0.1037	242	5	2	Pass
0.1077	207	5	2	Pass
0.1117	185	4	2	Pass
0.1157	170	4	2	Pass
0.1197	156	4	2	Pass
0.1236	143	4	2	Pass
0.1276	130	4	3	Pass
0.1316	125	4	3	Pass
0.1356	117	4	3	Pass
0.1396	113	3	2	Pass
0.1436	110	3	2	Pass
0.1476	99	3	3	Pass
0.1516	97	3	3	Pass
0.1556	89	3	3	Pass
0.1596	84	2	2	Pass
0.1636	81	2	2	Pass
0.1676	76	2	2	Pass

0.1716	74	2	2	Pass
0.1756	72	2	2	Pass
0.1796	66	1	1	Pass
0.1836	64	1	1	Pass
0.1875	61	1	1	Pass
0.1915	58	1	1	Pass
0.1955	55	1	1	Pass
0.1995	51	0	0	Pass
0.2035	46	0	0	Pass
0.2075	44	0	0	Pass
0.2115	41	0	0	Pass
0.2155	38	0	0	Pass
0.2195	36	0	0	Pass
0.2235	33	0	0	Pass
0.2275	31	0	0	Pass
0.2315	26	0	0	Pass
0.2355	23	0	0	Pass
0.2395	20	0	0	Pass
0.2435	20	0	0	Pass
0.2474	18	0	0	Pass
0.2514	16	0	0	Pass
0.2554	16	0	0	Pass
0.2594	14	0	0	Pass
0.2634	13	0	0	Pass
0.2674	13	0	0	Pass
0.2714	13	0	0	Pass
0.2754	12	0	0	Pass
0.2794	12	0	0	Pass
0.2834	12	0	0	Pass
0.2874	12	0	0	Pass
0.2914	10	0	0	Pass
0.2954	10	0	0	Pass
0.2994	10	0	0	Pass
0.3034	8	0	0	Pass
0.3074	7	0	0	Pass
0.3113	7	0	0	Pass
0.3153	6	0	0	Pass
0.3193	5	0	0	Pass
0.3233	4	0	0	Pass
0.3273	3	0	0	Pass
0.3313	2	0	0	Pass
0.3353	1	0	0	Pass
0.3393	1	0	0	Pass
0.3433	1	0	0	Pass
0.3473	1	0	0	Pass
0.3513	1	0	0	Pass
0.3553	1	0	0	Pass
0.3593	1	0	0	Pass
0.3633	1	0	0	Pass
0.3673	1	0	0	Pass
0.3712	1	0	0	Pass
0.3752	1	0	0	Pass
0.3792	1	0	0	Pass
0.3832	1	0	0	Pass
0.3872	1	0	0	Pass
0.3912	1	0	0	Pass
0.3952	1	0	0	Pass

0.3992	1	0	0	Pass
0.4032	1	0	0	Pass
0.4072	1	0	0	Pass
0.4112	1	0	0	Pass
0.4152	1	0	0	Pass
0.4192	1	0	0	Pass
0.4232	1	0	0	Pass
0.4272	1	0	0	Pass
0.4312	1	0	0	Pass
0.4351	1	0	0	Pass
0.4391	1	0	0	Pass
0.4431	1	0	0	Pass
0.4471	1	0	0	Pass
0.4511	1	0	0	Pass
0.4551	1	0	0	Pass

Down Stream Analysis Maps

DWAYNE LANE SR530 GRADING PERMIT
¼ - MILE DOWNSTREAM ANALYSIS MAP



AERIAL VICINITY MAP

SCALE: 1" = 500'

Reference: ©2009 Google-Imagery ©2009DigitalGlobe, GeoEye, Map data ©2009 Tela Atlas
Accessed March 18, 2009

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Geotech Report

Western Geotechnical Consultants, Inc.
4183 Saltsprings Dr., Ferndale, WA 98248 Phone/FAX (360)380-2507

March 14, 2009

Mr. Tom Lane
Dwayne Lane's Chrysler Plymouth
10515 Evergreen Way
Everett, WA 98204

Re: Geotechnical Site Investigation
Car Dealership Site
Southeast Corner of 59th Ave. NE & SR530
Arlington, WA

Western Geotechnical Consultants, Inc. is pleased to provide this geotechnical engineering report prepared for the above referenced property. On March 2, 2009 a geotechnical engineer from our firm traveled to the site to oversee the excavation of 6 test pits at the approximate locations shown on the attached Site Plan, Figure 1. The property is a rectangular shaped parcel that is about 8 acres in size, and the property is located on the southeast corner of the intersection of 59th Ave. NE and SR 530 in Arlington, WA. The property will be developed with a centrally located car dealership with parking on the remainder of the site with the exception of two lots on the west side adjacent to 59th Ave. NE. Stormwater infiltration trenches are planned along the north, west and south sides of the car dealership property. Figure 1 shows the site layout, topography and other relevant site features.

The purpose of our investigation was to evaluate the site with respect to developing the site using Low Impact Development (LID) methods. If feasible, stormwater infiltration trenches will be developed to provide temporary stormwater storage and otherwise an infiltration media. The specific scope of our investigation for the site included the following services:

- Review available published geologic, geotechnical and topographic information for the area including soil and groundwater information contained in our files for previous work performed on the site.
- Excavate 6 test pits and obtain samples to explore soil and groundwater conditions across the site. Piezometers were installed in all of the test pits for future monitoring of groundwater levels.
- Classify soils in accordance with the Unified Soils Classification System (USCS).
- Perform field and laboratory testing as deemed necessary in support of our conclusions and recommendations. Laboratory testing included soil inspection under controlled laboratory conditions, moisture content tests and grain size/hydrometer analyses performed in accordance with the USDA textural triangle methodology so as to determine design infiltration rates for the site soils. Cation exchange capacity tests were also performed to evaluate the need for pretreatment of stormwater.
- Return to the site on March 14, 2009 to read the static groundwater levels through the piezometers.

- Prepare this engineering report including a summary of work performed and our conclusions and recommendations regarding:
  - Soil and groundwater information for use in designing infiltration facilities and possibly porous asphalt concrete access roads and parking within the site.
  - Provide design infiltration rates for use in stormwater facilities design.
  - Provide recommended subgrade strength values (California Bearing Ratio) for use in designing the parking areas.
  - Provide seismic design parameters for structural design.
  - Provide rough stripping criteria and the depth to suitable bearing soil for relatively light foundations and paved areas.
  - Structural fill criteria including the suitability of on site material for use as structural fill.
  - General site development recommendations with respect to geotechnical issues identified during our field investigation.

Site Conditions

Surface Conditions

The site is a relatively flat rectangular parcel that is approximately 8 acres in size. The property is presently mostly grass and weed covered with a fence around the perimeter of the site. A majority of the site will be developed as a car dealership along with two lots along the west side to be developed for the other commercial interests. Figure 1 is a site plan showing the proposed development plan.

Subsurface Conditions

Subsurface soil and groundwater conditions were explored on March 2, 2009 when a total of 6 test pits were advanced using a small tracked excavator with a 1.5-foot wide bucket. The test pits were excavated at the approximate locations shown on the attached Site Plan, Figure 1. Soil and groundwater conditions were continuously logged using the Unified Soils Classification System (USCS) and soil samples were obtained for inspection and testing under controlled laboratory conditions. Edited tabulated test pit logs are included in this report together with a USCS chart explaining soil descriptions.

Subsurface conditions were found to vary between the north and south sides of the property. The subsurface profile on the north side consists of about a foot of dark brown sandy organic SILT to silty SAND (topsoil) with numerous roots and organic debris (SM/OL by USCS) that was in a relatively soft and wet state. Below the topsoil layer we encountered fine to medium SAND with some silt grading to trace silt (SM and SP/SM by USCS) that extended to depths of 2-1/2 to 5 feet below grade. This layer is underlain by gravelly SAND (SP and SP/SW by USCS) that extended to the bottom of the test pits (7.5 feet maximum).

On the south side of the property the subsurface profile consists of about a foot of topsoil similar to the topsoil identified on the north side of the property. Below the topsoil a brown gray mottled SILT with trace very fine SAND (ML by USCS) was encountered that extended to a depth of around 3 feet below grade. Below this layer test Pit 4 encountered a silty SAND (SM by USCS) that extended to 4.5 feet, which was underlain by gravelly SAND (SP by USCS). In Test Pits 5 and 6 we encountered sands with variable amounts of gravel, trace SILT (SP and SP/SM by USCS) that extended to the depth of the test pits (6.6 feet maximum).

The USDA Soils Classification Service "Soil Survey of Snohomish County Area, Washington" has classified the soils on the northern two-thirds of the property as Lynnwood loamy sand. Lynnwood soils are very deep, somewhat excessively drained soils and are located in terraces and outwash plains. The soil formed in glacial outwash. The permeability of Lynnwood soils is rapid and the threat of water erosion is slight. The soils encountered in Test Pits 1 through 3 during our site investigation were consistent with the SCS soil description.

The southern approximately one-third of the property has been mapped as Terric Medisaprists soils. These very deep poorly drained soils are found in depression area on till plains. They formed in organic material and alluvium. The permeability of Terric Medisaprists soils is moderate, runoff is ponded and the hazard of water erosion is slight. The soils encountered in Test Pits 4, 5 and 6 are similar to these soils except a till plain was not encountered in any of the test pits.

Groundwater

Groundwater seepage was encountered in all of the test pits at the time of the investigation on March 2, 2009 at depths ranging between 3 and 7 feet below grade. Piezometers were installed in all of the test pits for future monitoring of the groundwater levels.

We returned to the site on March 14, 2009 to read the piezometers and the water level indicator showed that the water table is between 4.57 and 6.19 feet below grade on the north side of the property (Test Pits 1, 2 and 3). On the south side of the property (Test Pits 4, 5 and 6) the water table was measured between 2.55 and 2.68 feet below grade. The individual readings are summarized below.

Test Pit No.	Water Level (BGS)
1	5.62'
2	4.57'
3	6.19'
4	2.55'
5	2.68'
6	2.61'

Laboratory Testing

Laboratory tests were performed on selected soil samples obtained during our test pit investigation. Our testing included sample inspection under controlled laboratory conditions, moisture content determination, grain size/hydrometer test to determine soil infiltration rates and the determination of soil cation exchange capacity for water quality. Cation Exchange capacity tests were performed to evaluate the need for pretreatment of stormwater. The moisture content test results are included in the tabulated log of test pits and the results of the grain size/hydrometer testing are attached to this report in the form of grain size distribution curves. We also plotted the grain size test results on the USDA Textural Triangle for classification purposes. The organic content test results are attached to this report and are also presented in tabular form in the Cation Exchange Capacity section to this report.

Conclusions and Recommendations

General

Based on our geotechnical investigation, we conclude that the site is conducive for the type of development proposed. The site can support vehicle loading as parking will be part of the development of the property. It appears that the northern approximately two-thirds of the property will provide an adequate infiltration media for the design of infiltration trenches. The southern one-third of the property has less desirable soil and groundwater conditions for infiltration facility design, but the site soils will infiltrate stormwater from a soil gradation perspective.

The following sections provide our analyses and recommendations for design infiltration rate and water quality potential of site soils based on our geotechnical investigation and subsequent laboratory testing of the representative granular soils located around 3 feet below grade.

Infiltration Rate

We determined the infiltration rate for representative soils encountered in the test pits at the site in accordance with the 2005 edition of the Washington Department of Ecology (DOE) Stormwater Management Manual for Western Washington. The soils were classified in the field and are recorded on the test pit logs as sand except Test Pit 4 where silty SAND was encountered. A total of six grain size analyses and hydrometer tests were performed. Subsequent testing using the USDA textural triangle methodology classified the near surface soils as a sand and loamy sand. The loamy sand soils (Test Pits 2 and 6) have a D_{10} = 0.0149 mm and 0.0100 mm.

Based on the testing the Textural Class of the soil at infiltration elevation are classified as sand or loamy sand per Table 3.7, Vol. 3 of the 2005 Stormwater Management Manual. Soils encountered in Test Pits 2 and 6 were the only soils classified as loamy sand but soils in Test Pits 3, 4 and 5 do not meet the pretreatment exemption criteria as detailed in the next section to this report. Those soils could be amended by adding organic soil to the material which would likely result in the material being re-classified as a loamy sand.

Therefore, the soil located at infiltration elevation should be treated as a loamy sand and the Stormwater Management Manual recommends a long term (design) infiltration rate of 0.5 inches an hour.

Cation Exchange Capacity

The requirements for soil treatment exceptions are specified by the Washington DOE "Stormwater Management Manual for Western Washington" and a cation exchange capacity of greater than 5 meq. per 100 grams is required to meet the soil treatment exemption criteria. The exemption is satisfied if both of the following criteria are met.

The first 2 feet or more of the soil beneath an infiltration facility must meet one of the following specifications for general protection of groundwater:

a) The soil must have an organic content greater than 0.5% to meet the a cation exchange capacity greater than 5 meq. per 100 grams AND
b) The soil must be composed of less than 25% gravel by weight with at least 75% of the soil passing the #4 sieve, and the portion passing the #4 sieve must meet one of the following gradations:

1. At least 50% must pass the #40 sieve and at least 2% must pass the #100 sieve, OR
2. At least 25% must pass the #40 sieve and at least 5% must pass the #200 sieve.

We analyzed site soils using a) organic content. The results are summarized below.

	TP-1/S-2	TP-2/S-1	TP-3/S-1	TP-4/S-2	TP-5/S-2	TP-6/S-2
Organic Content	0.55%	0.82%	0.23%	0.27%	0.34%	0.63%
Meets Minimum Requirement	Yes	YES	No	No	No	Yes

We also analyzed the site soils using b)1., namely less than 25% gravel with at least 75% passing the #4 sieve, at least 25% must pass the US #40 sieve, and at least 5% must pass the US #100 sieve. The results of our analyses are summarized below.

Grain Size Distributions for the Soil Treatment Exemption (Category b)1

Test Pit No./Sample No.	TP-1/S-2	TP-2/S-1	TP-3/S-1	TP-4/S-2	TP-5/S-2	TP-6/S-2
Sample Depth	3.0'	3.3'	3.1'	3.2'	3.2'	3.0'
No. 4 Sieve (Required Passing 75%)	100%	100%	52%	100%	100%	99%
No. 40 Sieve (Required Passing 50%)	73%	81%	14%	97%	99%	85%
No. 100 Sieve (Required Passing 2%)	15%	45%	3%	60%	63%	26%
Meets Minimum Requirement	Yes	Yes	Yes	Yes	Yes	Yes

As the results indicate the site soils at Test Pit 1, 2 and 6 meet the Soil Treatment exemption criteria under category 1(b) but the site soils in Test Pits 3, 4 and 5 do not meet the exemption criteria due to a low organic content. These soils could be amended with organic soil to meet the Soil Treatment Exemption criteria. A copy of the grain size distribution curves including the organic contest test results are attached to this report.

General Site Development

The following sections of this report contain recommendations for general site development. Note that these recommendations are based on the limited scope of subsurface exploration performed as a part of our geotechnical services for the project.

Site Preparation: All topsoil or other organic, soft or deleterious material and old foundations, must be stripped and removed from those areas to be developed. Based on our test pit investigation, a stripping depth of about 1 foot should be anticipated. Note that deeper over-excavation may be required where deeper unsuitable soils are encountered.

International Building Code (IBC) Site Classification: Based on our geotechnical investigation the site soils are classified as soil type E, soft soil profile. The earthquake spectral responses (S_{ms} and S_{m1}) may be computed using Soil Class E and Tables 1615.1.2 (1) and 1615.1.2(2) of the IBC.

Structural Fill and Compaction: Structural fill may be required where buildings or other structural improvements will be placed. Structural fill is defined as compacted fill material supporting buildings, parking areas, driveways, etc. All structural fill should be placed and compacted on a horizontal subgrade surface. Structural fill should extend beyond the edge of any future structural improvements by a distance equal to the thickness of the fill beneath the structural improvements.

The on site non-organic sandy soils could be used as structural fill provided the water content can be carefully controlled and adequate compaction can be achieved.

If import fill is used we recommend using a material consisting of relatively clean sandy gravel containing less than 5% fines (GW by USCS). Structural fill should be placed in maximum 8- to 10-inch loose, horizontal lifts and be thoroughly compacted. All structural fill should be compacted to a minimum of 95% of maximum dry density as determined by the ASTM D-1557 test procedure.

Pavement Subgrade Strength Design Parameters
On the basis of our review of site soil conditions on the property a minimum CBR value of 10 should be used for the near surface sandy soils. This value is based on correlation with sandy soils and our experience at sites with similar soil conditions.

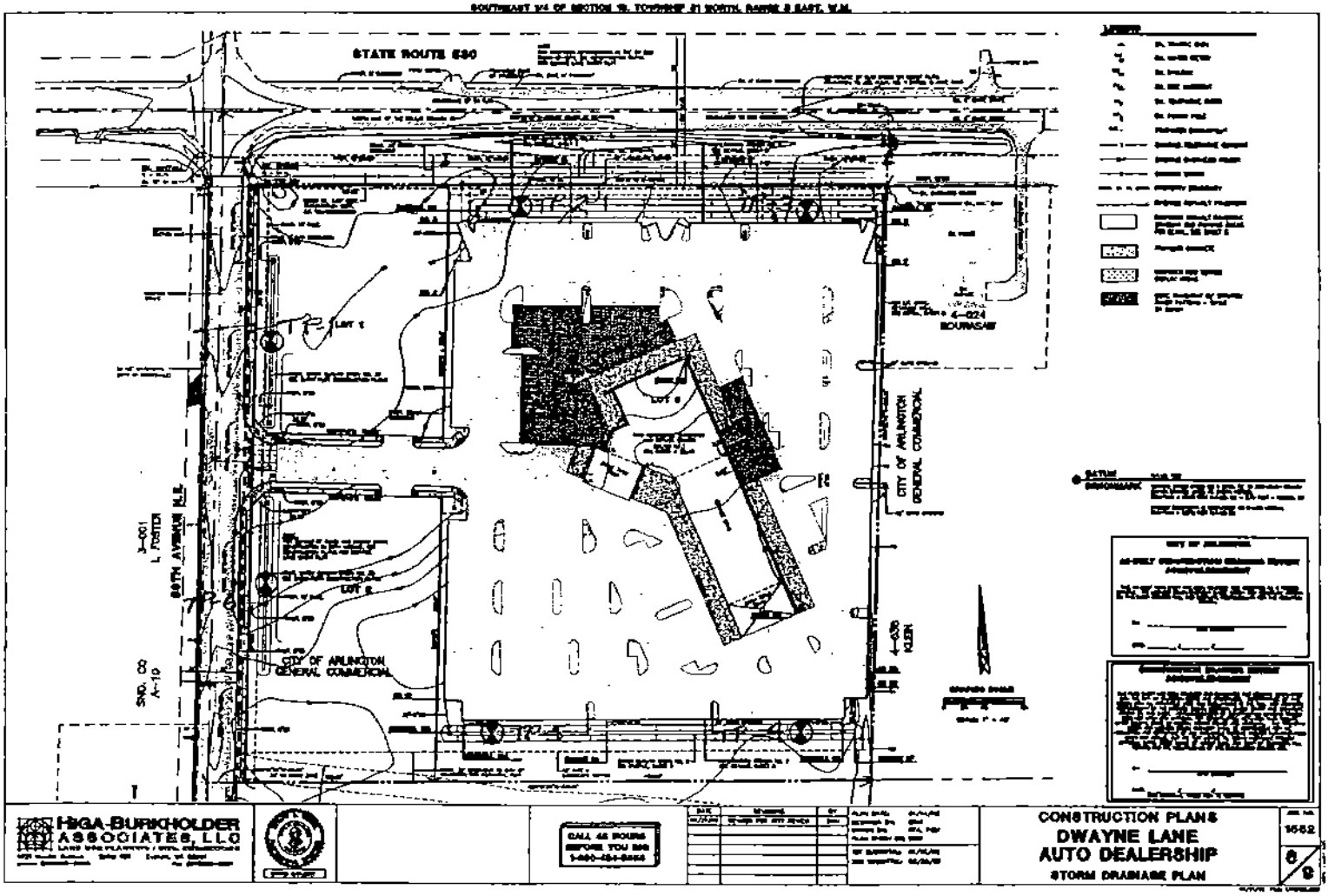
Some of the important factors that affect the durability of pavement surfacing include stability and permeability of the subgrade soils and base materials, the presence of ground water, design life of the road section, the traffic volume, and the frequency of heavy truck traffic. The pavement section design should include the factors listed above.

The pavement section should be installed over firm sub-grade. Following excavation and/or filling to establish sub-grade elevation, but immediately prior to paving, the sub-grade surface should be proof rolled with a loaded 10 cubic yard dump truck, or equivalent. Any soft areas exposed by the proof rolling, which cannot be easily compacted should be over-excavated and back filled with compacted granular fill (structural fill).

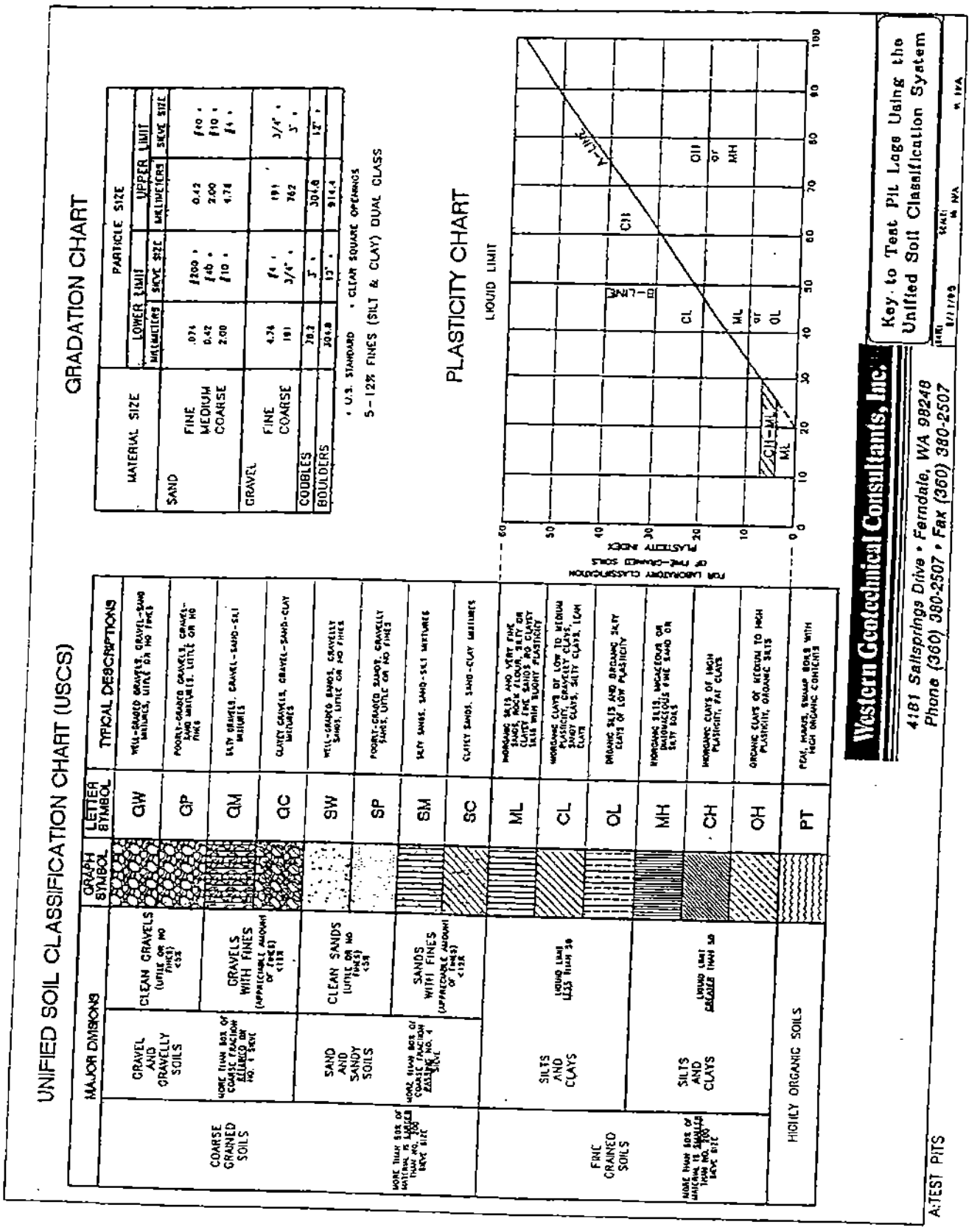
Erosion Control: Erosion control during construction of the proposed facilities can be accomplished through placement of proper sedimentation control facilities. We recommend siltation control facilities, consisting of either hay bales or silt fences, be fabricated around all construction areas. Typical details for siltation control facilities using either hay bales or silt fences are attached to this report.

Siltation devices should be placed down gradient of all construction areas and cleared areas to provide siltation control during construction. All siltation control devices should be maintained in operable condition during construction, and left in operable condition until the site has been revegetated and siltation is no longer a threat. At that time the siltation facilities should be removed.

Figure 1
Site Plan & Test Pit Locations
Dwayne Lane 59th Ave. NE Site
Arlington, Washington



USCS Chart & Key to Test Pit Descriptions



			Log of Test Pits		File: 09 19 1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Lab Testing
TP-1	0.0-0.7	OL/SM	Dark brown sandy organic SILT to silty SAND with numerous roots and organic material (soft) (topsoil)	1-1/0.5'	16.5%	
	0.7-2.5	SM to SP/SM	Brown silty fine to medium SAND grading slightly silty (moist, relatively compact)			
	2.5-5.0	SP	Brown fine to medium SAND, trace gravel (moist, relatively compact)	1-2/3.0'	7.3%	*GS/HYD & CE
	5.0-7.2	SP	Gray gravelly fine to course SAND (gravel is rounded 3" minus) (very gravelly at 6.2') (heavy seepage at 6.5', sidewall caving)			

Notes:

- Test Pit terminated on 03/02/09 at 7.2 feet.
- Groundwater seepage sidewall caving encountered at 6.5 feet.
- Piezometer installed full depth.
- Piezometer read on 3/14/09 & the water level was measured at 5.62 feet.
- Test pit backfilled upon completion.

*GS/HYD/C: Grain size analyses/hydrometer test and cation exchange capacity tests performed.

			Log of Test Pits		File: 09 19 1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Lab Testing
TP-2	0.0-1.4	OL/SM	Dark brown sandy organic SILT to silty SAND with numerous roots and organic material (soft) (topsoil)			
	1.4-5.0	SP/SM	Brown slightly silty fine to medium SAND, trace fine gravel (moist, relatively compact)	2-1/3.3'	25.2%	*GS/HYD & CE
	5.0-6.3	SP	Gray gravelly fine to course SAND (gravel is rounded 3" minus) (moist, relatively compact) (seepage at 5', sidewall caving)			

Notes:

- Test Pit terminated on 03/02/09 at 6.3 feet.
- Groundwater seepage encountered at 5.0' with sidewall caving.
- Piezometer installed full depth.
- Piezometer read on 3/14/09 & the water level was measured at 4.57 feet.
- Test pit backfilled upon completion.

*GS/HYD/C: Grain size analyses/hydrometer test and cation exchange capacity tests performed.

			Log of Test Pits		File: 09 19 1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Lab Testing
TP-3	0.0-1.0	OL/SM	Dark brown sandy organic SILT to silty SAND with numerous roots and organic material (soft) (topsoil)			
	1.0-2.6	SM to SP/SM	Brown silty fine to medium SAND grading slightly silty (moist, relatively compact)			
	2.6-7.5	SP/SW	Brown gray very gravelly fine to course SAND (wet, relatively compact) (groundwater seepage at 7')	3-1/3.1' 3-2/7.0'	8.4% 28.3%	*GS/HYD & CE

Notes:

- Test Pit terminated on 03/02/09 at 7.5 feet.
- Groundwater seepage encountered at 7 feet.
- Piezometer installed full depth.
- Piezometer read on 3/14/09 & the water level was measured at 6.19 feet.
- Test pit backfilled upon completion.

*GS/C: Grain size analyses/hydrometer test and cation exchange capacity tests performed.

			Log of Test Pits		File: 09 19 1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Lab Testing
TP-4	0.0-0.8	OL	Dark brown organic SILT with numerous roots and organic material (soft) (topsoil)			
	0.8-2.8	ML	Gray with some orange mottling SILT, trace very fine sand	4-1/1.5'	25.5%	
	2.8-4.5	SM	Gray with some brown mottling, silty fine to medium SAND (wet grading saturated, relatively compact) (gravel zone at 4.0')			
	4.5-6.0	SP	Gray gravelly fine to medium SAND (wet grading saturated, relatively compact) (seepage at 5.3', caving)	4-2/3.2'	28.7%	*GS/HYD & CE

Notes:

- Test Pit terminated on 03/02/09 at 6.0 feet.
- Groundwater seepage and sidewall caving at 5.3 feet.
- Piezometer installed full depth.
- Piezometer read on 3/14/09 & the water level was measured at 2.55 feet.
- Test pit backfilled upon completion.

*GS/C: Grain size analyses/hydrometer test and cation exchange capacity tests performed.

			Log of Test Pits		File: 09 19 1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Lab Testing
TP-5	0.0-0.8	OL/SM	Dark brown sandy organic SILT to silty very fine SAND with numerous roots and organic material (soft) (topsoil)			
	0.8-3.0	ML	Gray with some brown mottling very fine sandy SILT (wet, relatively non-compact)	5-1/1.5'	31.3%	
	3.0-5.0	SP	Gray with some brown mottling fine to medium SAND, trace coarse sand (very wet, relatively compact)	5-2/3.2'	27.3%	*GS/HYD & CE
	5.0-5.8	SP/SM	Gray fine SAND, trace silt (wet grading saturated, relatively compact) (strong seepage at 5.5')	5-3/5.5'	34.0%	
	5.8-6.6	SP	Gray gravelly fine to course SAND (gravel is rounded 3" minus)			

Notes:

- Test Pit terminated on 02/02/09 at 6.6 feet.
- Strong groundwater seepage at 5.5 feet.
- Piezometer installed full depth.
- Piezometer read on 2/14/09 & the water level was measured at 2.68 feet.
- Test pit backfilled upon completion.

*GS/C: Grain size analyses/hydrometer test and cation exchange capacity tests performed.

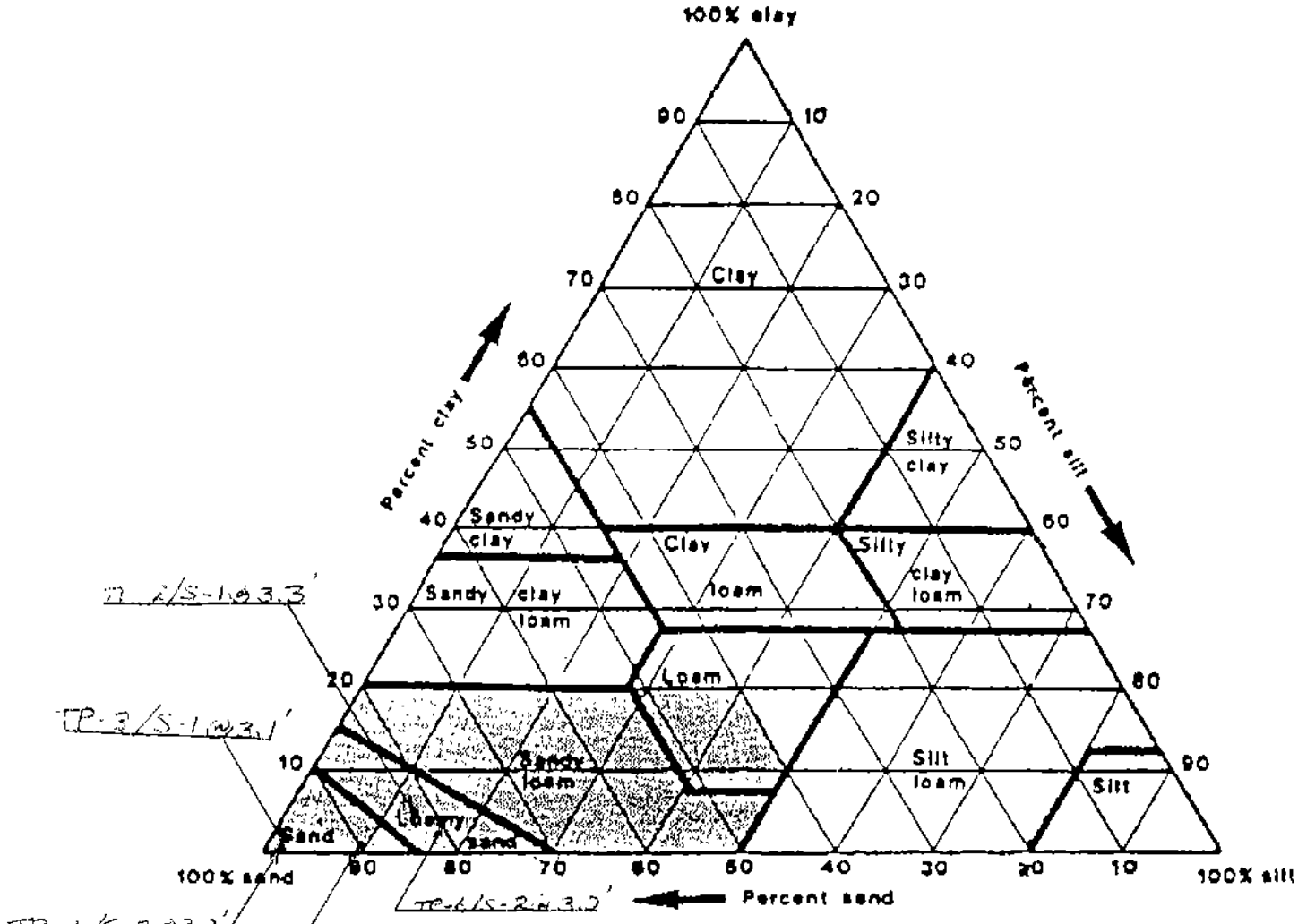
			Log of Test Pits		File: 09 19 1	
Test Pit No.	Depth Interval (feet)	USCS Class.	Soil Description	Sample No./ Depth (feet)	Water Content (%)	Lab Testing
TP-6	0.0-1.1	OL/SM	Dark brown very fine sandy organic SILT to silty SAND with numerous roots and organic material (soft) (topsoil)			
	1.1-2.8	ML	Gray brown mottled very fine sandy SILT (very wet, relatively non-compact)	6-1/2.0'	54.7%	
	2.8-4.5	SP/SM	Brown gray mottled fine to medium SAND, trace silt (wet grading saturated, relatively compact) (seepage at 3.1', sidewall caving) (small piece of plywood at 4.5', fill?)	6-2/3.0'	28.7%	*GS/HYD & CE

Notes:

- Test Pit terminated on 03/02/09 at 3.1 feet.
- Groundwater seepage and sidewall caving encountered at 3.1 feet.
- Piezometer installed full depth.
- Piezometer read on 3/14/09 & the water level was measured at 2.61 feet.
- Test pit backfilled upon completion.

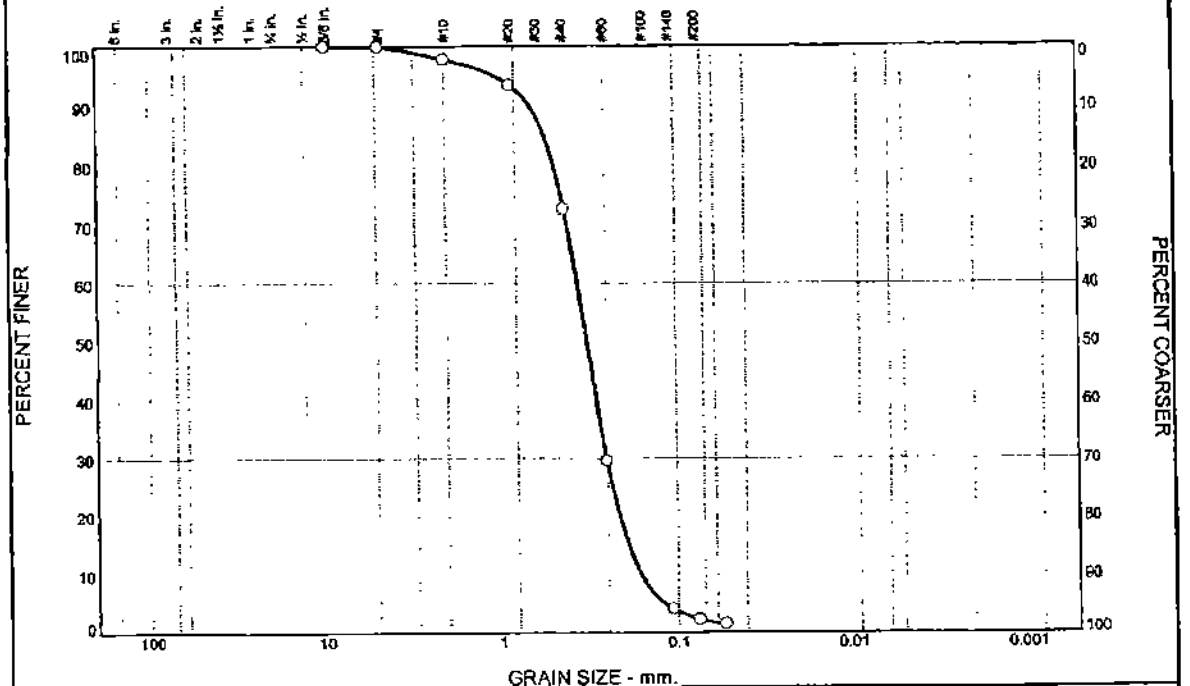
*GS/C: Grain size analyses/hydrometer test and cation exchange capacity tests performed.

Textural Triangle U.S.D.A.



JOB NO.	Western Geotechnical Consultants
REVIEWED BY	4189 Salt Spring Drive Ferndale, WA 98248 (360) 380-2607
DRAWN BY	
CHECKED BY	DATE SCALE N/A

Sieve Analysis Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	2	25	71	2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	100		
#10	98		
#20	93		
#40	73		
#60	30		
#140	4		
#200	2.2		
#270	1.5		

* (no specification provided)

Material Description

poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.6546 D_{85}= 0.5438 D_{60}= 0.3603
D_{50}= 0.3210 D_{30}= 0.2516 D_{15}= 0.1905
D_{10}= 0.1625 C_u= 2.22 C_c= 1.08

Classification

USCS= SP AASHTO=

Remarks

Organic Content: 0.55%

Location: Dwayne Lane 59th St. Native (1-2)
Sample Number: 6842

Date: 3-3-09

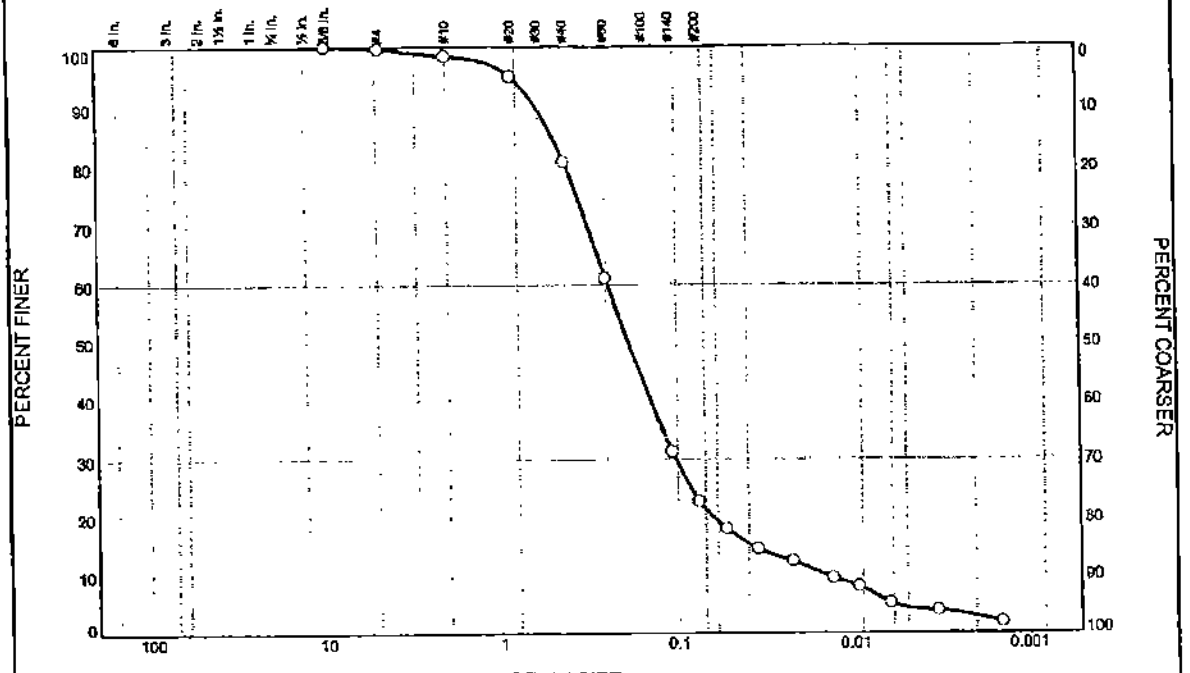
GEOTEST
741 Marine Drive
Bellingham, WA 98225
www.GeoTest-Inc.com

Client: Western Geotechnical
Project: General Services

Project No: 08-0042 **Report** S39-6842

Tested By: ES **Checked By:** ES

Sieve Analysis Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	2	17	58	19	4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8"	100		
#4	100		
#10	98		
#20	95		
#40	81		
#60	61		
#140	31		
#200	23		
#270	18		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{90}= 0.6069 D_{85}= 0.4895 D_{60}= 0.2431
D_{50}= 0.1870 D_{30}= 0.1018 D_{15}= 0.0384
D_{10}= 0.0149 C_U= 16.34 C_C= 2.86

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Organic Content: 0.82%

Location: Dwayne Lane 59th St. Native (2-1)
Sample Number: 6843

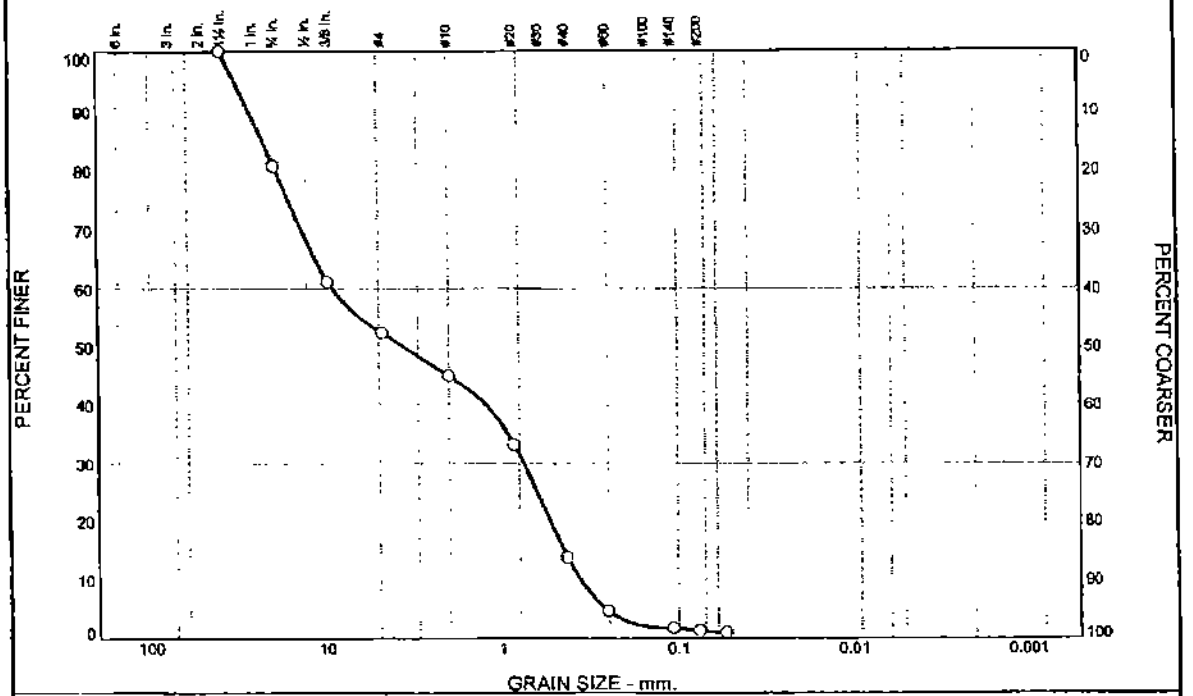
Date: 3-3-09

GEOTEST
741 Marine Drive
Bellingham, WA 98225
www.GeoTestInc.com

Client: Western Geotechnical
Project: General Services
Project No: 08-0042 **Report** S40-6843

Tested By: ES **Checked By:** ES

Sieve Analysis Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	19	29	7	31	13	1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100		
3/4"	81		
3/8"	61		
#4	52		
#10	45		
#20	33		
#40	14		
#60	5		
#140	2		
#200	1.3		
#270	0.9		

* (no specification provided)

Material Description

poorly graded sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 26.3553 D_{85}= 22.0816 D_{60}= 8.9930
D_{50}= 3.6245 D_{30}= 0.7525 D_{15}= 0.4488
D_{10}= 0.3614 C_u= 24.89 C_c= 0.17

Classification

USCS= SP AASHTO=

Remarks

Organic Content: 0.23%

Location: Dwayne Lane 59th St. Native (3-1)
Sample Number: 6844

Date: 3-3-09

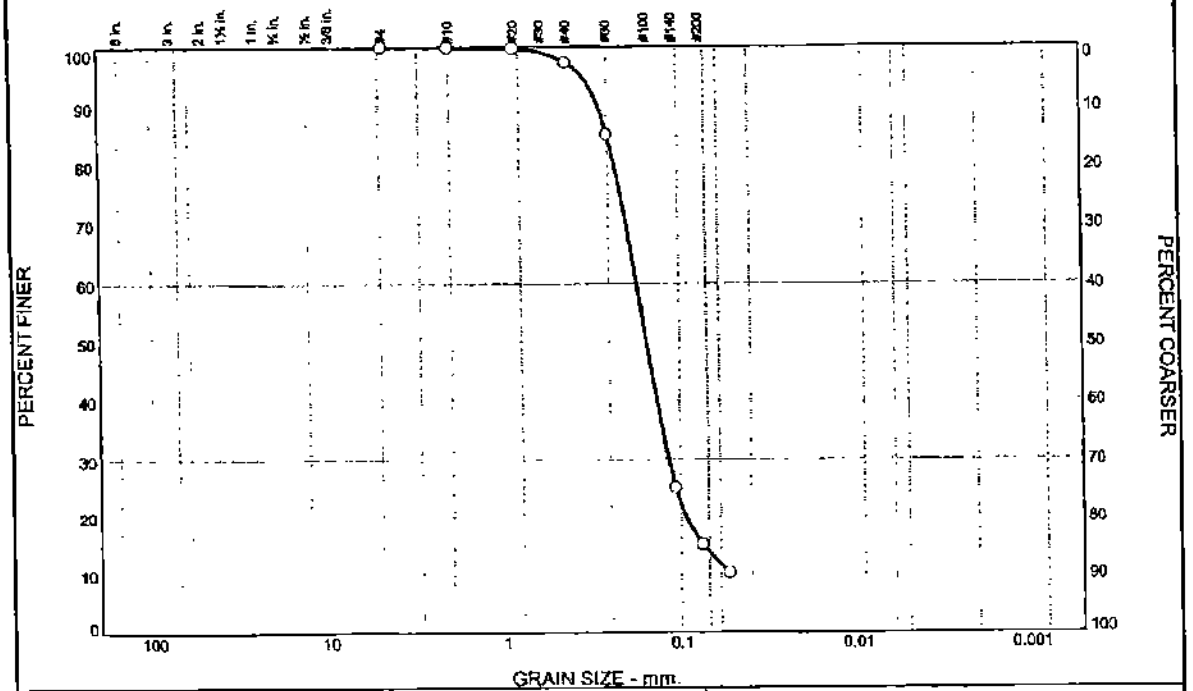
GeoTest
741 Market Drive
Bellingham, WA 98225
www.GeoTest-lab.com

Client: Western Geotechnical
Project: General Services

Project No: 08-0042 **Report** S41-6844

Tested By: ES **Checked By:** ES

Sieve Analysis Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	3	82	15	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	97		
#60	85		
#140	25		
#200	15		
#270	10		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{90}= 0.2798 D_{85}= 0.2488 D_{60}= 0.1732
D_{50}= 0.1530 D_{30}= 0.1160 D_{15}= 0.0755
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Organic Content: 0.27%

Location: Dwayne Lane 59th St. Native (4-2)
Sample Number: 6845

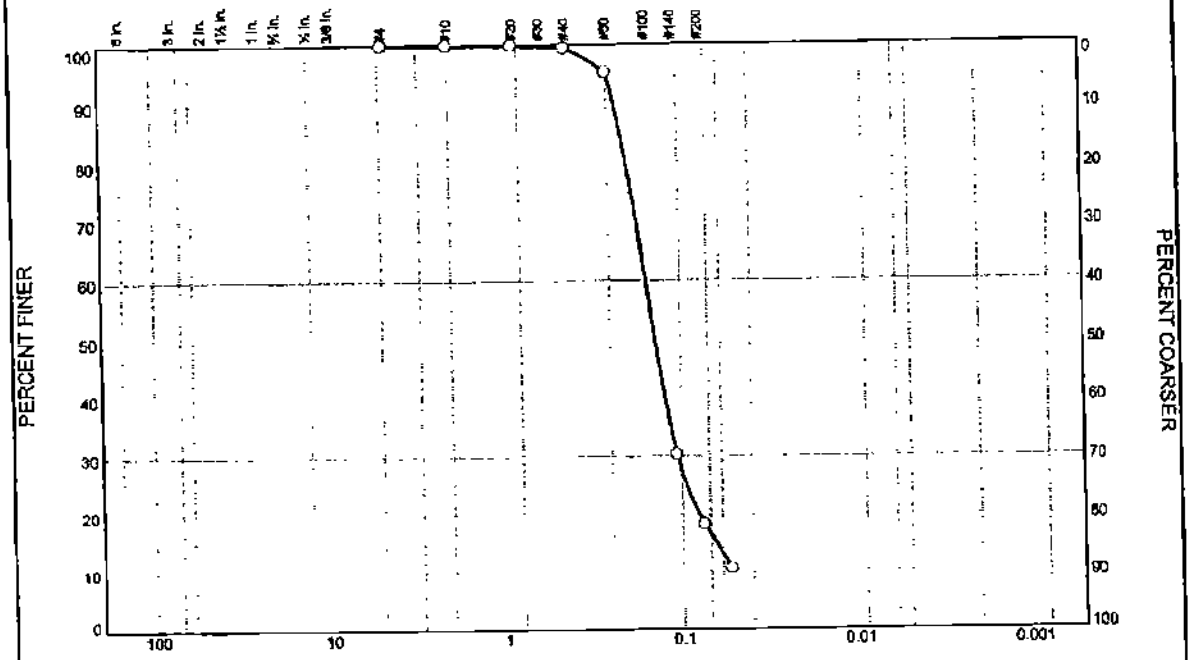
Date: 3-3-09

GEOTEST
241 Marine Drive
Bellingham, WA 98225
www.GeoTest-Inc.com

Client: Western Geotechnical
Project: General Services
Project No: 08-0042 **Report** S42-6845

Tested By: ES **Checked By:** ES

Sieve Analysis Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	81	18	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	99		
#60	95		
#140	30		
#200	18		
#270	10		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{90}= 0.2256 D_{85}= 0.2092 D_{60}= 0.1553
D_{50}= 0.1387 D_{30}= 0.1055 D_{15}= 0.0652
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Organic Content: 0.34%

Location: Dwayne Lane 59th St. Native (5-2)
Sample Number: 6846

Date: 3-3-09

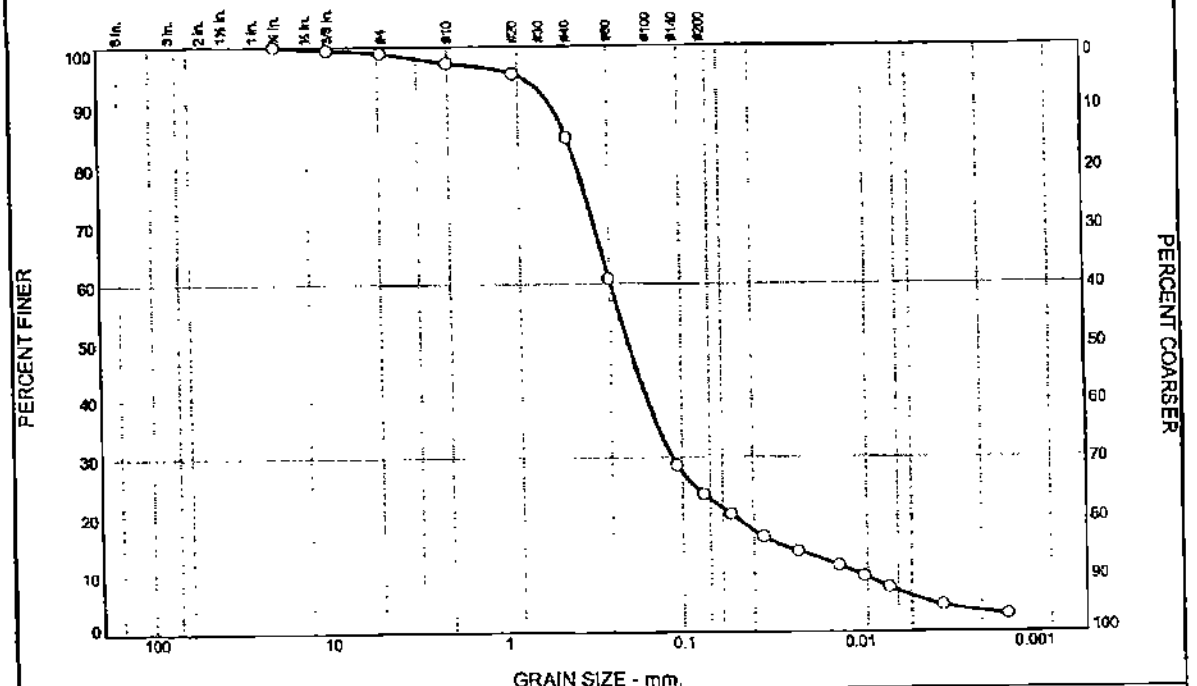
GEOTEST 741 Marine Drive Bellingham, WA 98225 www.GeoTest-Inc.com

Client: Western Geotechnical
Project: General Services

Project No: 08-0042 **Report** S43-6846

Tested By: ES **Checked By:** ES

Sieve Analysis Report - ASTM D422



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	2	12	61	18	6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100		
3/8"	99		
#4	99		
#10	97		
#20	95		
#40	85		
#60	61		
#140	29		
#200	24		
#270	20		

* (no specification provided)

Material Description

silty sand

Atterberg Limits

PL= np LL= nv PI=

Coefficients

D_{90}= 0.5156 D_{85}= 0.4272 D_{60}= 0.2458
D_{50}= 0.1986 D_{30}= 0.1129 D_{15}= 0.0280
D_{10}= 0.0100 C_u= 24.52 C_c= 5.17

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Organic Content: 0.63%

Location: Dwayne Lane 59th St. Native (6-2)
Sample Number: 6847

Date: 3-3-09

GEOTEST 741 Marine Drive Bellingham, WA 98225 www.GeoTest Inc.com

Client: Western Geotechnical
Project: General Services
Project No: 08-0042 **Report** S44-6847

Tested By: ES **Checked By:** ES