



Trepanier Engineering

Professional Civil Engineering

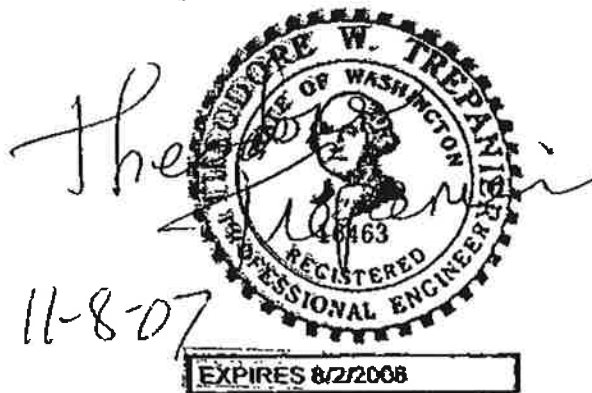
DRAINAGE REPORT

FOR

**170XX 59TH AVE EAST
STILLAGUAMISH COUNSELING CENTER**

FOR

STILLAGUAMISH TRIBE



BY

TREPANIER ENGINEERING

NOVEMBER 7, 2007

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INTRODUCTION

The site is located in on the west side of 59th Ave. approximately 300 feet south of the intersection with 172nd. The site is flat but generally slopes north to south. The project size is about 1 acre in size.

PLANNED DEVELOPMENT

The proposal is for a counseling center for the Stillaguamish Tribes with parking and handicapped stalls. Access to the site is through a private easement road that the subject applicant is anticipated to construct to half-street improvement standards. There will also be an access point onto 59th directly off the site.

EXISTING DRAINAGE CONDITIONS

The property was pastured prior to the short plat. Existing conditions today consist of disturbed sand and gravel and an excavated pond (probably for the short plat and Gale Industries construction along with a few stockpiles). The access road has been raised for drainage onto 59th, but it is still graveled.

Frontage improvements along 59th have already been constructed.

Lot drainage has also been accounted for since the lot retention/detention will be infiltrated in the Gale Industries infiltration beds (north end and report included with this submittal).

PLANNED DRAINAGE CONDITIONS

Approximately 80 l.f. of road drainage from the south half of the access road will be treated for water quality and discharged into the Gale Infiltration Beds, the west side parking lot drainage will collect stormwater from the asphaltic surfaces and run through a Contech Stormwater Filter, while the roof downspouts will discharge directly into the Gale Infiltration Beds without the need for water quality treatment; the southeast parking lot will have its own stormwater filter system.

Calculations provided will be the original Gale Infiltration System calculations (reader to refer to the north beds in particular) and the Contech Catch Basin calculations for water quality treatment.

When water quality was first planned for the site, it was anticipated that stormwater manholes would be required, and with the manhole, the stormwater would need to be pumped into the Gale Infiltration Beds. However, the designer discovered catch basin filters were available and were within the ability to discharge by gravity if minimum

grades were allowed on storm piping and the site were raised an additional 2 feet. This was done to avoid pumping.

OPERATION AND MAINTENANCE

The soils are marginal for infiltration. Therefore, the system needs to be maintained on a regular basis to prolong the life of the infiltration bed.

These include:

1. Clean catch portion of all catch basins four times per year;
2. Sweep asphalt areas monthly;
3. Pump out o/w separator four times per year;
4. Continue maintenance contract with Stormwater Management at least once per year and change media as recommended by Contech;
5. Inspect infiltration trench at cleanouts yearly and flush when sediment deposits get to 1" or greater. Note that most of sedimentation will occur within 50 feet of the inlet basin.



N 02°07'21" E

667.21'

N 02°07'21" E

6' HIGH WOOD FENCE

3.09'

WEST

10 PARKING SPACES

0.42 ACRE

TRASH

7 PARKING SPACES

13 PARKING SPACES

4 PARKING SPACES

PAVEMENT AREA=18,962 SF

7 PARKING SPACES

LOT 2
45,839 SQ. FT.

DIRECTLY TO GALE

NEW DEWESLING
CENTER
9,000 S.F.

GRAPHIC SCALE

1" = 30'

SOUTHEAST

10 PARKING SPACES

0.15 AC

10 PARKING SPACES

**SITE AREA
1.05 ACRES**

DRAINAGE PATE ↓ TO BED RN

125

125

N 88°30'28" W

SMH

RIM=128.0±

CB

PUMP
DN

PUMP
DN

84'

80'

125

24'

38'

60'

118'

192.56'

N 88°30'28" W

8" D.I.

6" D.I. FM

FM

SS

FM

FM

FM

SS

FM

SS

SS

N 02°12'08" E

231.74'

N 02°17'08" E

TYPE 'C' BUFFER

N 02°12'08" E

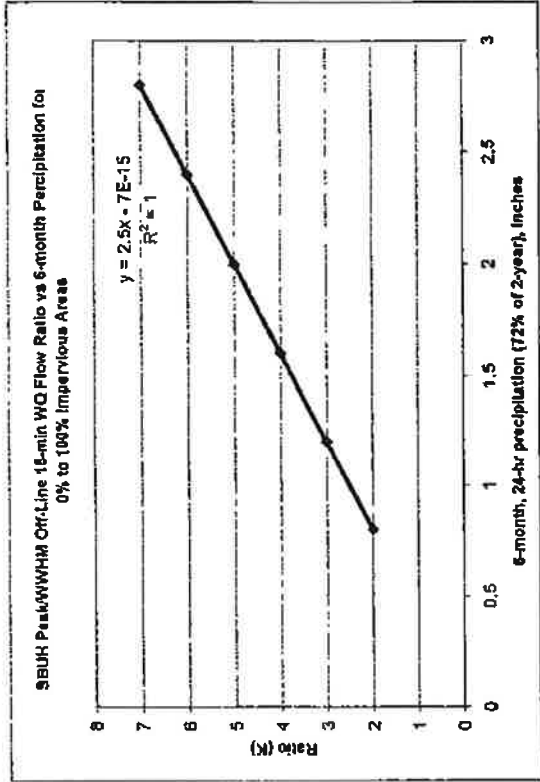
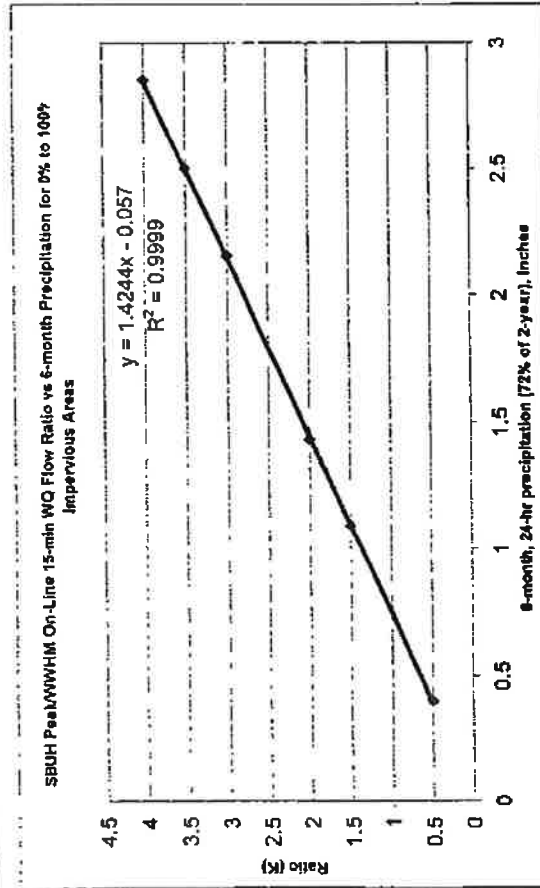
WOODS CU

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Project Name: STILLAQUAMISH MED CENTER-SE
SBUH/WWHM Ratio Calc.

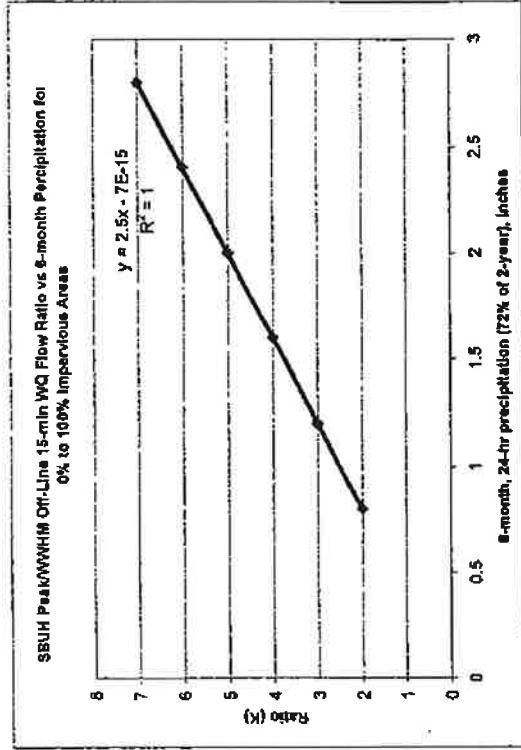
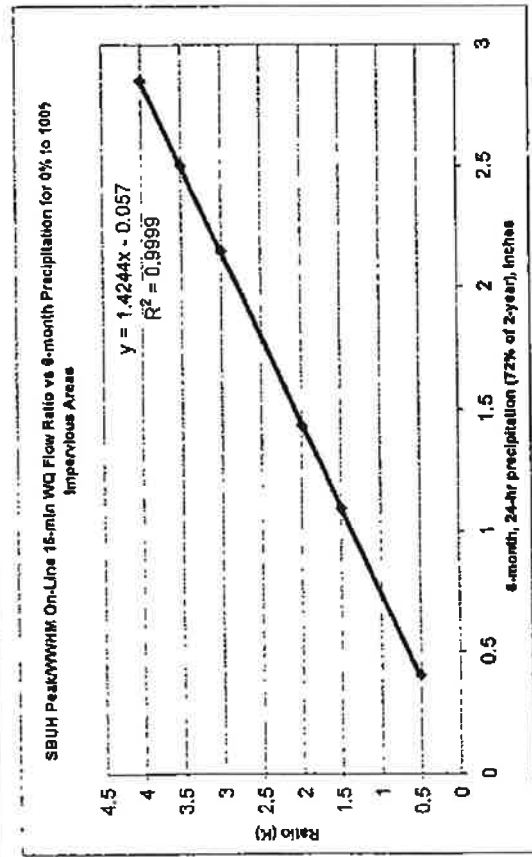
6-month/24 hr precip	1.44	in	Enter Precip. of city
Online or Offline	online		Enter if system is online or offline
SBUH WQ Flow Rate	0.05	cfs	Enter SBUH calculated WQ flow rate
Computed Ratio	1.99		
Filtration brand	StormFilter		Enter brand of filter to use
Cartridge height	18	in	Enter maximum height of cartridge allowed
Specific Flow Rate	1.0	gpm/sf	Enter specific flow rate
Flow rate per cartridge	7.5	gpm/cart	Cartridge flow rate based on brand, height, spec flow rate
WWHM WQ Flow Rate	0.03	cfs	Adjusted flow rate to WWHM
# of Cartridges	2	Cartridges	Number of Cartridges required using adjusted water quality flow





Project Name: STILLAQUAMISH MED CENTER-WEST
SBUH/WWHM Ratio Calc.

6-month/24 hr precip	1.44	in	Enter Precip. of city
Online or Offline	Online		Enter if system is online or offline
SBUH WQ Flow Rate	0.13	cfs	Enter SBUH calculated WQ flow rate
Computed Ratio	1.99		
Filtration brand	Storm Filter		Enter brand of filter to use
Cartridge height	18	in	Enter maximum height of cartridge allowed
Specific Flow Rate	1.0	gpm/sf	Enter specific flow rate
Flow rate per cartridge	7.5	gpm/cart	Cartridge flow rate based on brand, height, spec flow rate
WWHM WQ Flow Rate	0.07	cfs	Adjusted flow rate to WWHM
# of Cartridges	4	Cartridges	Number of Cartridges required using adjusted water quality flow





Size and Cost Estimate

Prepared by Christina Totland on November 8, 2007

Stillaguamish Medical Center– Stormwater Treatment System Arlington,WA

Information provided:

- Structure ID = W SE
- Total Area = acre 0.47 0.15
- Impervious Area = 0.42 0.15
- Water Quality Flow, WQF = 0.13 0.05
- Presiding agency = City of Arlington
- **Assumptions:**
- Media = ZPG cartridges – 7.5gpm
- Drop required from inlet to outlet = 2.3' minimum

Size and cost estimates:

The StormFilter is a flow-based system, and therefore, is sized by calculating the water quality flow rate associated with the design storm. The water quality flow rate was calculated by the design engineer using the SBUH Method and converting to WWHM per Washington DOE 2005.

The StormFilter for this site was sized based on a water quality flow rates shown below. To accommodate this flow rate, CONTECH Stormwater Solutions Inc. recommends using StormFilter CatchBasins (see attached detail). The estimated cost of this system is complete and delivered to the job site. The final system cost will depend on the actual depth of the units and whether extras like doors rather than castings are specified. The contractor is responsible for setting the 6x8 StormFilter and all external plumbing.

Structure ID	Water Quality Flow	No. of Cartridges	System Size	Estimated Cost
W	0.13	4	CatchBasin	\$17,000
SE	0.05	2	CatchBasin	\$9,700

The StormFilter has an internal bypass capacity of 1.0 cfs. If the peak discharge off the site is expected to exceed that rate, we recommend placing a high-flow bypass upstream of the StormFilter system. CONTECH Stormwater Solutions could provide our high-flow bypass, the StormGate, which provides a combination weir-orifice control structure to limit the flow to the StormFilter, for approximately \$4,500. The final cost would depend on the actual depth and size of the unit.