

# STORM DRAINAGE REPORT

FOR

Soil Containment Project Site  
Orofino, Idaho

**May 2012**

**W.O. No. 12-131**

Prepared by:

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This report has been prepared by JM Engineering under the direction of the undersigned professional engineer whose seal and signature appears hereon.



John E. McKervery, P.E.

## **INTRODUCTION**

This project is located within the town of Orofino on 118<sup>th</sup> Street near its intersection with Tabor Drive. See Figure 1, Vicinity Map. This project proposes to construct a retaining wall to contain contaminated soil. A majority of the area will be covered by asphalt for a parking lot and the remaining area at the west end will be grass. This report will address drainage for the site in accordance with industry standards.

## **PURPOSE**

The purpose of this report is to determine the extent of storm drainage facilities which will be required to treat and dispose of the increase in stormwater runoff created by the development of the subject parcel. The storm drainage facilities on this project will be designed to treat and dispose of runoff from a 25-year storm event. For this project a 25-year intensity of 2.2 inches was used.

## **ANALYSIS METHODOLOGY**

The proposed drainage facilities for this site were designed by the use of a water budget analysis.

## **PROJECT DESCRIPTION**

The proposed site is 2.93 acres in size and will consist of 60,782 square feet of impervious area and 66,790 square feet of pervious area.

## **TOPOGRAPHY**

The site is located near the intersection of 118<sup>th</sup> Street and Tabor Drive. The site slopes to the north and to the west.

## **STREAM HYDROLOGY**

No existing or intermittent streams are located on this property. No visual display of flows onsite other than sheet flow can be found; therefore, no shallow concentrated ditch flows were considered to have entered or exited the parcel area.

## SOILS

I have included a soils map for this project, however the soil classifications for this site were not used to determine the infiltration capacity of the soil. A geo-tech study was completed by Allwest to determine the infiltration rate for the soils. I have also included a copy of the geo-tech report. An infiltration rate of 12 inches per hour was reported by Allwest and an infiltration rate of 6 inches per hour was used for design, incorporating a safety factor of 2.

## DRAINAGE NARRATIVE

### Off-site

Off site drainage from adjacent properties are cutoff by 118<sup>th</sup> Street and do not flow onto this site.

### Onsite

All increase in drainage generated by development of this parcel will be collected within an evaporative/infiltrative swale located at the west end of the property. The size of the proposed storm drainage facility was determined using a water budget analysis which started with a 25-year storm in the swale and then analyzed a two year cycle of normal rainfall.

For this project there is 1 basin.

**Table No. 1 - Pond and Basin Summary**

<b>POND AND BASIN SUMMARY</b> <b>Areas in SF</b>					
<b>Basin and Swale/ Pond</b>	<b>Total Area (sf)</b>	<b>Total Impervious Area (sf)</b>	<b>Total Pervious Area (sf)</b>	<b>Swale Area (sf)</b>	<b>Max Pond Storage Depth (ft)<sup>1</sup></b>
Basin 1	127,572	60,782	66790	9,963	1.44

<sup>1</sup> = See Basin Calculation Worksheet in Appendix

The swale was designed with a depth of 1.75' to provide a small amount of freeboard in the swale.

## **APPENDIX**

**Vicinity Map**

**Soils Map**

**Geo-Tech Report**

**25 Year Water Budget Calculations**

**Basin Map**

# VICINITY MAP



PROJECT LOCATION

## JM ENGINEERING

2706 N. BLUE RAVEN LANE  
SPOKANE, WASHINGTON 99224  
(509) 244-1619 / CELL (509) 953-9771

## OROFINO, IDAHO SOIL CONTAINMENT PROJECT VICINITY MAP


































JOB #: 12-131  
DATE: MAY 2012

# SOILS MAP

Soil Map—Clearwater Area, Idaho  
(Orofino Soil Containment Site)



## MAP LEGEND

<b>Area of Interest (AOI)</b>		Area of Interest (AOI)
<b>Soils</b>		Soil Map Units
<b>Special Point Features</b>		Blowout
		Borrow Pit
		Clay Spot
		Closed Depression
		Gravel Pit
		Gravelly Spot
		Landfill
		Lava Flow
		Marsh or swamp
		Mine or Quarry
		Miscellaneous Water
		Perennial Water
		Rock Outcrop
		Saline Spot
		Sandy Spot
		Severely Eroded Spot
		Sinkhole
		Slide or Slip
		Sodic Spot
		Spoil Area
		Stony Spot
<b>Special Line Features</b>		Gully
		Short Steep Slope
		Other
<b>Political Features</b>		Cities
<b>Water Features</b>		Streams and Canals
<b>Transportation</b>		Rails
		Interstate Highways
		US Routes
		Major Roads
		Local Roads

## MAP INFORMATION

Map Scale: 1:881 if printed on A size (8.5" x 11") sheet.  
The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.  
Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clearwater Area, Idaho  
Survey Area Data: Version 4, Jan 26, 2007

Date(s) aerial images were photographed: 6/21/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Clearwater Area, Idaho (ID612)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
114	Itzee sandy loam, 0 to 5 percent slopes	0.4	12.7%
125	Johnson-Swayne complex, 20 to 40 percent slopes	0.3	8.5%
144	Klickson ashy silt loam, 15 to 35 percent slopes	2.5	78.8%
<b>Totals for Area of Interest</b>		<b>3.1</b>	<b>100.0%</b>

# 25 YEAR WATER BUDGET CALCULATIONS

NET INCREASE IN RUNOFF VOLUME PER ANNUM

Note: User to fill in shaded areas

Project:	Orofino
Job No.	12-131
Basin:	1
Date:	May-12
Reviewer:	John Mc Kervey

Curve Numbers (CN)				
	AMC II	AMC III	Winter	
	Apr - Oct	Nov, Mar	Dec - Feb	
Pre-Developed Conditions	82	92	95	
Post-Developed Conditions				
Pervious Area	82	92	95	
Impervious Area	98	98	98	

<b>Basin Data</b>	
Total Basin Area (acres) =	2.93 acres
Developed Conditions:	
Pervious Area (acres) =	1.53 acres
Impervious Area (acres) =	1.40 acres

Precipitation Adjustment Factor = 17.1 /16.18 = 1.057

Pre-Developed Conditions			Post-Developed Pervious Area			Post-Developed Impervious Area		
Month	Precipitation (inches)	Adjusted Precipitation (inches)	CN	S	Runoff (inches)	Runoff (cubic ft)	CN	S
Jan	2.05	2.17	95	0.53	1.64	17,456	95	0.53
Feb	1.57	1.66	95	0.53	1.16	12,341	95	0.53
Mar	1.38	1.46	92	0.87	0.77	8,143	92	0.87
Apr	1.11	1.17	82	2.20	0.18	1,956	82	2.20
May	1.37	1.45	82	2.20	0.32	3,377	82	2.20
Jun	1.27	1.34	82	2.20	0.26	2,799	82	2.20
Jul	0.5	0.53	82	2.20	0.00	37	82	2.20
Aug	0.6	0.63	82	2.20	0.02	169	82	2.20
Sep	0.8	0.85	82	2.20	0.06	675	82	2.20
Oct	1.22	1.29	82	2.20	0.24	2,524	82	2.20
Nov	2.02	2.13	92	0.87	1.36	14,442	92	0.87
Dec	2.22	2.35	95	0.53	1.81	19,293	95	0.53
Annual Total =	16.11	17.03				0 cf		
						7.83		
						43,566 cf		
						68,777 cf		

Increase in Runoff Volume/year = [(Post Impervious) + (Post Pervious)] - Pre-Developed

Increase in Runoff Volume/year = 112,343 cubic ft. Mean Annual Increase in Runoff Volume

**NET INCREASE IN RUNOFF VOLUME PER ANNUM**

Note: User to fill in shaded areas

Precipitation with 25-yr storm

2.2 inches

Design Infiltration Rate =  
Pond Bottom Area =

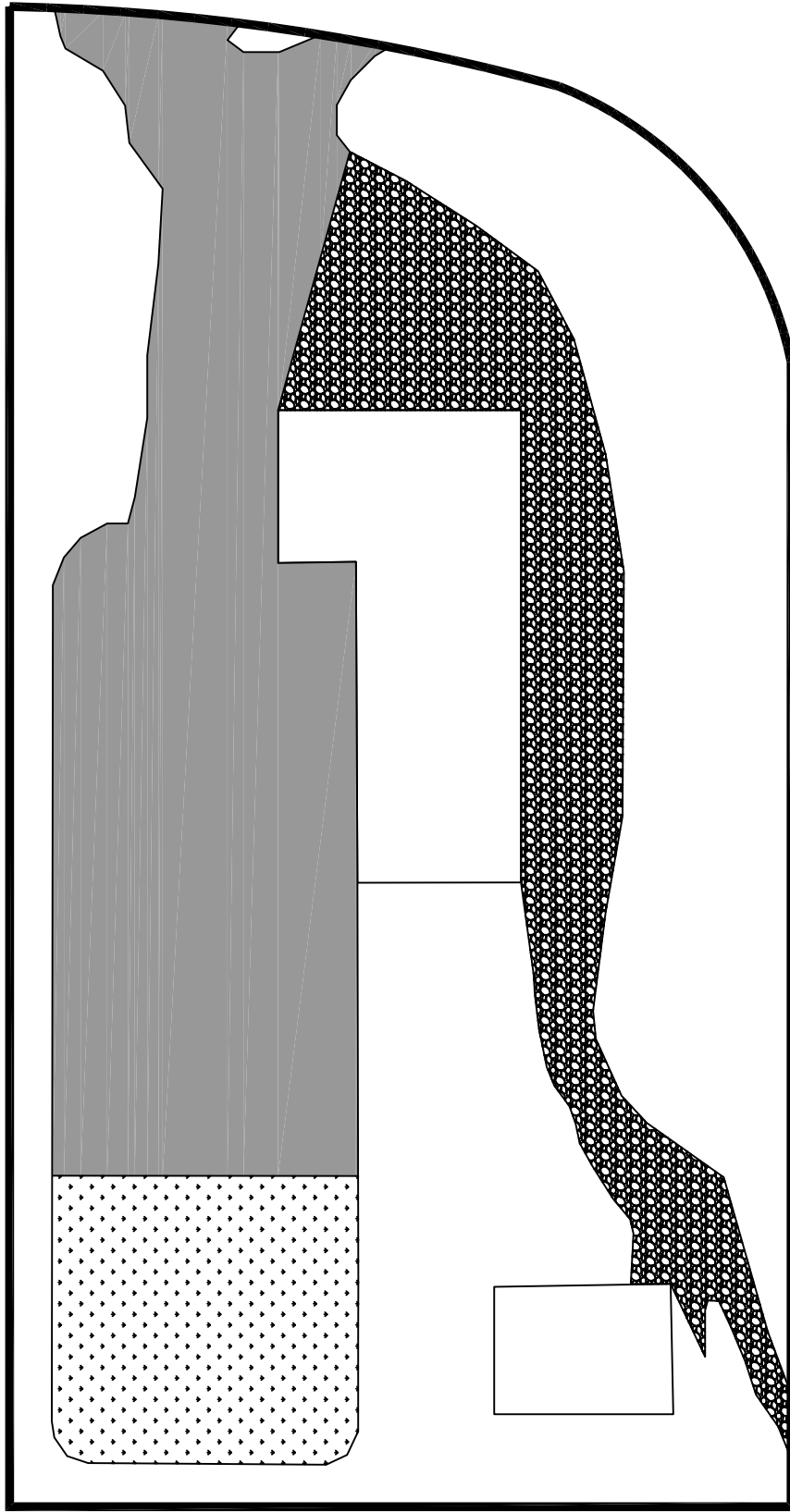
6 inches/hr  
314 sq. ft.

	Pervious Area	Impervious Area
Runoff from 25-yr storm =	S 2.20 0.78	S 0.20 1.97

Total Runoff				Outflows			
(cf)	Pan Evap (inches)	Adjusted Evaporation (inches)	Initial Pond Elev	Initial Pond Surface Area, (sq ft)	Pond Evaporation (cf)	Pond Overflow (cf)	Pond Infiltration Max, (cf)
25-yr storm	14,355		100.00	9,963			
Nov	17,226	0.92	101.44	9,963	550	0	16,676
Dec	19,293	0.51	100.00	9,963	305	0	18,988
Jan	17,456	0.61	100.00	9,963	365	0	17,092
Feb	12,341	1.11	100.00	9,963	664	0	11,677
Mar	10,540	2.28	100.00	9,963	1,363	0	9,178
Apr	5,883	4.45	100.00	9,963	2,660	0	3,223
May	7,992	6.69	100.00	9,963	3,999	0	3,993
Jun	7,164	8.14	100.00	9,963	4,866	0	2,298
Jul	1,761	10.70	100.00	9,963	6,396	0	-4,636
Aug	2,325	9.42	100.00	9,963	5,631	0	-3,306
Sep	3,605	5.90	100.00	9,963	3,527	0	78
Oct	6,757	2.58	100.00	9,963	1,542	0	5,215
Nov	17,226	0.92	100.00	9,963	550	0	16,676
Dec	19,293	0.51	100.00	9,963	305	0	18,988
Jan	17,456	0.61	100.00	9,963	365	0	17,092
Feb	12,341	1.11	100.00	9,963	664	0	11,677
Mar	10,540	2.28	100.00	9,963	1,363	0	9,178
Apr	5,883	4.45	100.00	9,963	2,660	0	3,223
May	7,992	6.69	100.00	9,963	3,999	0	3,993
Jun	7,164	8.14	100.00	9,963	4,866	0	2,298
Jul	1,761	10.70	100.00	9,963	6,396	0	-4,636
Aug	2,325	9.42	100.00	9,963	5,631	0	-3,306
Sep	3,605	5.90	100.00	9,963	3,527	0	78
Oct	6,757	2.58	100.00	9,963	1,542	0	5,215

	Change in Pond vol. (cf)	Final Pond Elev
25-yr storm	14355.01	101.44
Nov	0	100.00
Dec	0	100.00
Jan	0	100.00
Feb	0	100.00
Mar	0	100.00
Apr	0	100.00
May	0	100.00
Jun	0	100.00
Jul	0	100.00
Aug	0	100.00
Sep	0	100.00
Oct	0	100.00
Nov	0	100.00
Dec	0	100.00
Jan	0	100.00
Feb	0	100.00
Mar	0	100.00
Apr	0	100.00
May	0	100.00
Jun	0	100.00
Jul	0	100.00
Aug	0	100.00
Sep	0	100.00
Oct	0	100.00

# BASIN MAP



BASIN BOUNDARY

## JM ENGINEERING

W. 8306 TRAILS ROAD  
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OROFINO, SOIL CONTAINMENT PROJECT  
BASIN MAP

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