Addendum: McNearney Design Report & Drawings

To: City of Ponderay

From: Ian Ehrsam (7B Engineering)

Date: March 16, 2022

Introduction

This addendum has been prepared to address design changes on a Site, Grading, Stormwater, and Erosion Control Plan & Report for Lot 6 of McNearney Mill Subdivision in Ponderay, Idaho on behalf of Phil McNearney. The plans were also updated and modified. The Operations and Maintenance Plan is included on the plans.

Stormwater Facility Calculations

For the pre- and post-developed 25-Year storm event for the on-site conveyance ditch/swale, the Modified Rational Method-Bowstring Method was used and it was assumed that the Intensity-Duration-Frequency Curve for Zone C was appropriate. Infiltration as required in a GIA design is not ideal in Ponderay (Odenson silt loams) so low infiltration rate (0.125 in/hr) was assumed for the Peak Runoff calculation. The pre-developed Peak Runoff rates are calculated and post-developed runoff is to be controlled by the low infiltration rate which is less than the pre-developed (maximum rate).

Table 1: 25-Year, 24-Hour Peak Runoff Rate of Site

25-Year Peak Runoff		
Critical Storm	Pre-Developed	Post-Developed
24 Hour	0.03 cfs	0.01 cfs

Attached to this addendum are the Modified Rational Calculations for Predeveloped and Post Developed Storm events.

Sincerely

Ian C Ehrsam

Stormwater Management Calculations
Rational Method
Pre-Developed 25 Year

Pre-Developed Runoff from Table 6-2 kennedy report

		Area(ft^2)	Area(acres)	CN	Runoff C	CA
Colville Lane		770	0.02	90	0.90	0.02
Industrial Areas Light	Flat	25355	0.59	88	0.50	0.30
	Totals	26125	0.610	178	1.40	0.31

	Predeveloped "C"	0.51	
Time increment	5	min	
Time of concentration	**10.6252886**	min	
Outflow	0	cfs	1) input outflow (0.3 cfs 600 gal drywell,
Design year	25		1.0 cfs 1000 gal drywell)
Area (sqft)	26125	sqft	2) input surface area for basin (in sqft)
Area (acres)	0.60		3) input the basins "C" factor
Area x "C"	0.31		
Developed "C" factor	0.51		

Time Inc. (min)	Time Inc. (sec)	Intensity (in / hr)	Q (cfs)	Volume (cf)	
5	300	2.80	0.86	346	
10	600	2.10	0.65	520	
11	660	2.00	0.62	540	
12	720	1.90	0.58	548	
13	780	1.85	0.57	567	
14	840	1.75	0.54	569	
15	900	1.70	0.52	584	
20	1200	1.60	0.49	698	
25	1500	1.40	0.43	740	
30	1800	1.20	0.37	745	
35	2100	1.10	0.34	784	
40	2400	0.95	0.29	765	
45	2700	0.90	0.28	808	
50	3000	0.87	0.27	861	
55	3300	0.85	0.26	920	
60	3600	0.78	0.24	916	
65	3900	0.75	0.23	950	
70	4200	0.70	0.22	951	
75	4500	0.69	0.21	1002	
80	4800	0.67	0.21	1034	
85	5100	0.65	0.20	1064	
90	5400	0.63	0.19	1089	
95	5700	0.60	0.18	1092	
100	6000	0.59	0.18	1129	
105	6300	0.58	0.18	1163	
110	6600	0.55	0.17	1154	
115	6900	0.52	0.16	1139	
120	7200	0.5	0.15	1141	
125	7500	0.49	0.15	1152	
130	7800	0.48	0.15	1173	
135	8100	0.48	0.15	1217	
140	8400	0.46	0.14	1210	
145	8700	0.45	0.14	1225	
150	9000	0.44	0.13	1239	
155	9300	0.43	0.13	1251	
160	9600	0.42	0.13	1262	
165	9900	0.41	0.13	1270	
170	10200	0.40	0.12	1277	
175	10500	0.39	0.12	1282	
180	10800	0.38	0.12	1285	
360	21600	0.25	0.08	1678	
720	43200	0.17	0.05	2283	
1440	86400	0.11	0.03	2888	24 Hr Storm

25 year design (store or discharge 25 year / 2-hour storm event)
24-Hour Volume (pre-developed) 2888 cu ft

Time of concentration calculation

n = manning roughness(Gravel)	0.035		USDA
p=2 year, 24 hour rainfall	2		
Slope (S)	0.01		
Length (L)	250	feet	
Tc=[0.007(nL)^0.8] / (((P)^0.50)*S^0.4))*60	10.6252886	min	

Stormwater Management Calculations
Rational Method

25-Year Storms **Post-Developed**

Post-Developed Runoff and Developed "C" Factor

		Area(ft^2)	Area(acres)	Runoff	C*A	
Gravel		11852	0.28	0.90	0.25	Excluding Area Under Roof
Building		7738	0.18	0.90	0.16	
Misc		770	0.02	0.90	0.02	Collville Lane
Landscape		5765	0.14	0.20	0.03	Greenspace
	Totals	26125	0.6200	2.90	0.46	

	Developed "C"	0.74	
Time increment	5	min	
Time of concentration	5	min	
Outflow (Infiltration)	0.0096	cfs	Exifiltration through engineered soils
Design year	25		1) input outflow (0.3 cfs 600 gal drywell,
Area (sqft)	26125	sqft	1.0 cfs 1000 gal drywell)
Area (acres)	0.60	Ac	2) input surface area for basin (in sqft)
Area x "C"	0.44		3) input the basins "C" factor
Developed "C" factor	0.74		Weighted value

Time Inc. (min)	Time Inc. (sec)	Intensity (in / hr)	Q dev (cfs)	V in	Q pre (cfs)	V pre	Predeveloped Release Storage No Infiltration	V infl	Infiltration Release Storage Required Infiltration only	Controlled Release Combined Storage Required
5	300	2.80	1.25	501	0.86	346	154	2.87	498	152
10	600	2.10	0.93	656	0.65	520	136	5.73	650	131
11	660	2.00	0.89	678	0.62	540	139	6.30	672	132
12	720	1.90	0.85	695	0.58	548	147	6.88	688	140
13	780	1.85	0.82	726	0.57	567	159	7.45	719	151
14	840	1.75	0.78	734	0.54	569	164	8.02	726	156
15	900	1.70	0.76	758	0.52	584	174	8.60	749	165
20	1200	1.60	0.71	927	0.49	698	229	11.46	916	218
25	1500	1.40	0.62	998	0.43	740	258	14.33	984	244
30	1800	1.20	0.53	1016	0.37	745	271	17.19	998	254
35	2100	1.10	0.49	1078	0.34	784	294	20.06	1058	274
40	2400	0.95	0.42	1058	0.29	765	293	22.92	1035	270
45	2700	0.90	0.40	1122	0.28	808	314	25.79	1096	289
50	3000	0.87	0.39	1201	0.27	861	340	28.65	1172	311
55	3300	0.85	0.38	1287	0.26	920	367	31.52	1255	335
60	3600	0.78	0.35	1285	0.24	916	369	34.39	1251	334
65	3900	0.75	0.33	1336	0.23	950	385	37.25	1298	348
70	4200	0.70	0.31	1340	0.22	951	389	40.12	1300	348
75	4500	0.69	0.31	1413	0.21	1002	411	42.98	1370	368
80	4800	0.67	0.30	1461	0.21	1034	427	45.85	1416	381
85	5100	0.65	0.29	1505	0.20	1064	441	48.71	1456	392
90	5400	0.63	0.28	1542	0.19	1089	453	51.58	1491	402
95	5700	0.60	0.27	1549	0.18	1092	457	54.44	1495	402
100	6000	0.59	0.26	1602	0.18	1129	473	57.31	1545	416
105	6300	0.58	0.26	1652	0.18	1163	489	60.17	1592	429
110	6600	0.55	0.24	1640	0.17	1154	486	63.04	1577	423
115	6900	0.52	0.23	1620	0.16	1139	481	65.91	1554	415
120	7200	0.5	0.22	1625	0.15	1141	483	68.77	1556	415
125	7500	0.49	0.22	1641	0.15	1152	489	71.64	1569	417
130	7800	0.48	0.21	1672	0.15	1173	499	74.50	1597	424
135	8100	0.48	0.21	1735	0.15	1217	518	77.37	1658	441
140	8400	0.46	0.20	1726	0.14	1210	516	80.23	1646	436
145	8700	0.45	0.20	1749	0.14	1225	524	83.10	1666	441
150	9000	0.44	0.19	1770	0.13	1239	530	85.96	1684	444
155	9300	0.43	0.19	1788	0.13	1251	536	88.83	1699	447
160	9600	0.42	0.19	1803	0.13	1262	541	91.69	1711	450
165	9900	0.41	0.18	1816	0.13	1270	546	94.56	1721	451
170	10200	0.40	0.18	1826	0.12	1277	549	97.43	1729	452
175	10500	0.39	0.17	1834	0.12	1282	552	100.29	1734	452
180	10800	0.38	0.17	1839	0.12	1285	554	103.16	1736	451
360	21600	0.25	0.11	2414	0.08	1678	736	206.31	2208	529
720	43200	0.17	0.08	3292	0.05	2283	1009	412.63	2879	597
1440	86400	0.11	0.05	4170	0.03	2888	1282	825.25	3345	457

25 year design	(store or infiltrate 25 year peak flow and volume)		
24 Hour Storm Volume	4170	cu ft	
24 Hour Infiltration	825	cu ft	
Peak Storm	1440.00	Min	
Peak Storm Volume	4170	cu ft	

Discharge Control Structure Without Infiltation

Developed Runoff	0.05	cfs	discharge control structure req
Required Storage	1282	cu ft	no Infiltration

Discharge Control Structure With Infiltation

Infiltration Rate	0.5731	CFM	discharge rate through infiltration
Required Storage with Controled Release	597	cu ft	with a discharge control structure

Infiltation Only (No Discharge)

Infiltration Rate	0.5731	CFM	discharge rate through infiltration	Selected method
Required storage	3345	cu ft	low infiltation rate used	

Overall Treatment Req and Soil Infiltraion Rate

Impervious Area	20,360	SF
Req Treatment	848.33	CF
Req Treatment Area (8" depth)	1,272.50	SF
Proposed Infiltration Area	3,301	SF
Proposed Treatment Volume	1,547	CF
Design Infiltration Rate	0.125	in/hr
Infiltration Outflow Rate	0.0096	CFS

Proposed Grassed Infiltration Area for Controlled Release

3,301	Proposed Area (SF)
0.66	Depth (ft)
1,547	Proposed Volume (CF)

Soil Infiltration Rate	0.125	in/hr
Infiltration Outflow Rate	0.0096	CFS