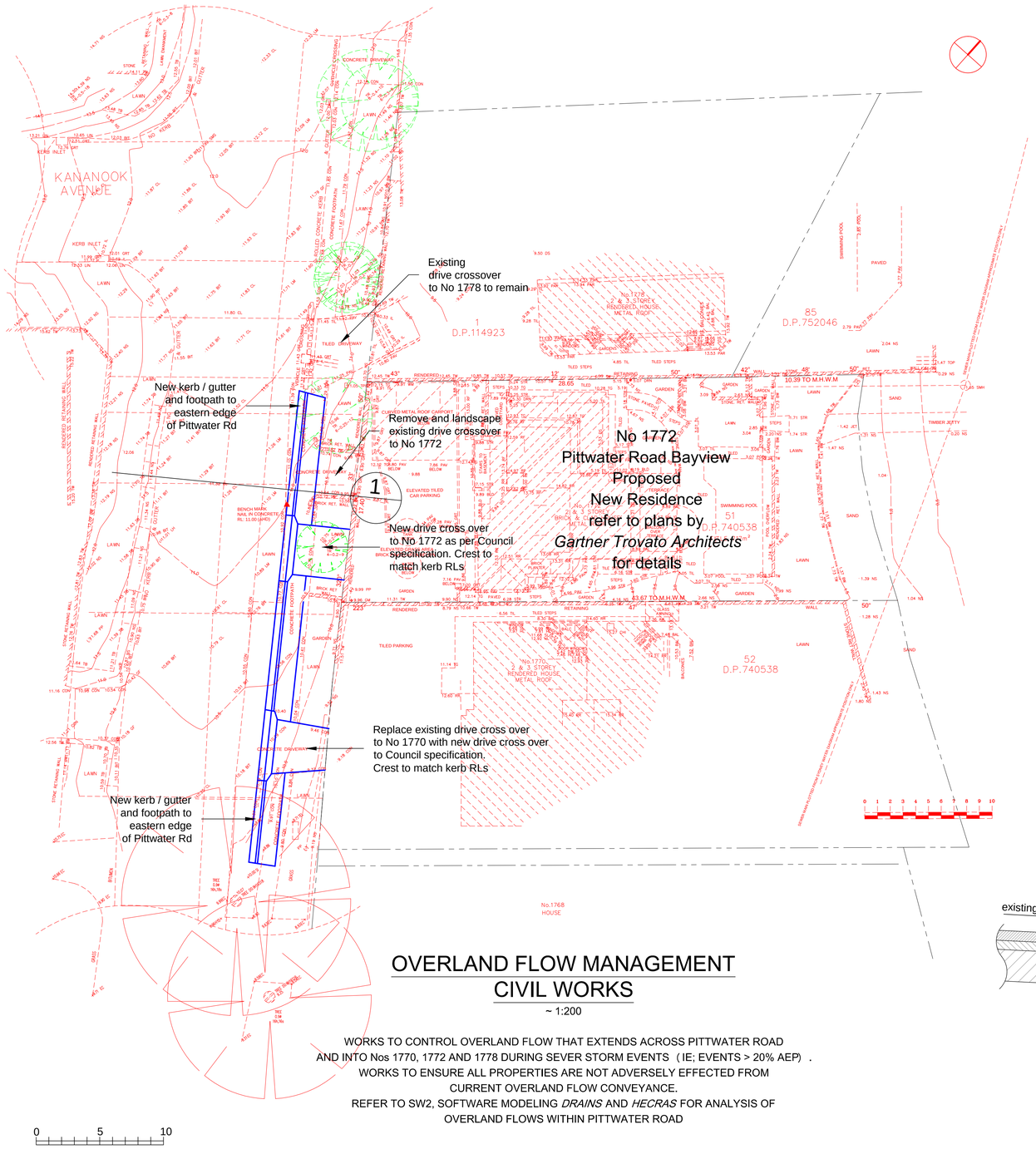


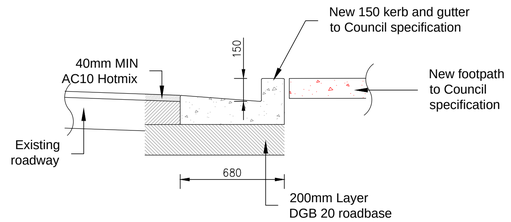
OVERLAND FLOW MANAGEMENT CIVIL WORKS

~ 1:200

WORKS TO CONTROL OVERLAND FLOW THAT EXTENDS ACROSS PITTWATER ROAD AND INTO Nos 1770, 1772 AND 1778 DURING SEVER STORM EVENTS (IE; EVENTS > 20% AEP) .
WORKS TO ENSURE ALL PROPERTIES ARE NOT ADVERSELY EFFECTED FROM CURRENT OVERLAND FLOW CONVEYANCE.
REFER TO SW2, SOFTWARE MODELING *DRAINS* AND *HECRAS* FOR ANALYSIS OF OVERLAND FLOWS WITHIN PITTWATER ROAD

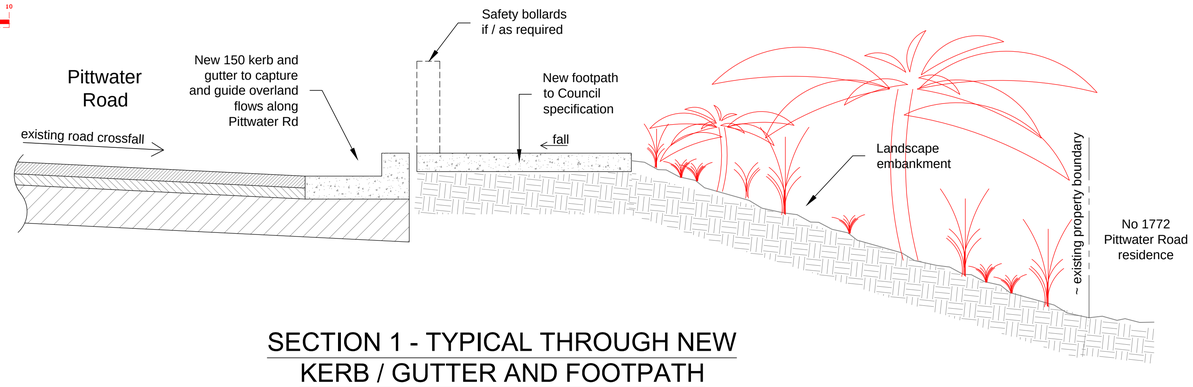
OVERLAND FLOWS DURING STORM EVENT

(FROM KANANOOK AVE LOOKING EAST)



STANDARD KERB AND GUTTER DETAIL

NTS



SECTION 1 - TYPICAL THROUGH NEW KERB / GUTTER AND FOOTPATH

~ 1:20

A1

ISSUE:		
Prelim	23. 03. 2020	Issued for comment

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PROJECT: PITTWATER ROAD CIVIL WORKS

DRAWING : OVERLAND FLOW CIVIL WORKS PLAN & DETAILING

Job No : 200303

Drawing No SW1 PreLim

Document Certification
Barrenjoey Consulting Engineers pty ltd
per
Lucas Molloy MIEA CPEng NER Director

DRAINS results prepared from Version 2018.01

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arrivng (cu.m/s)	Max Pond Volume (cu.m)	Version 8 Min Freeboard (cu.m/s) (m)	Overflow (cu.m/s)	Constraint
SPS4319	32.35		0.200		0.67	0.106	Inlet Capacity
SPS4320	24.98		0.204		0.02	0.128	Inlet Capacity
SPS4326	17.54		0.144		0.00	0.183	Outlet System
SPS4325	12.12		0.313		0.00	0.336	Outlet System
SPS4327	10.30		0.335		1.13	0.197	Inlet Capacity
Pittwater	1.17		0.197				
SPS4324	12.16		0.222		0.34	0.121	Inlet Capacity
SPS4321	25.20		0.148		0.80	0.072	Inlet Capacity

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Max Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Tc (min)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Catch1	0.561	0.368	0.223	3.00	20.00	0.00	0.00	ARAR 5 year, 1.5 hours storm, average 43.8 mm/hr, Zone 1
Cat1	0.200	0.066	0.134	2.00	6.00	0.00	0.00	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1
Cat3	0.028	0.022	0.005	1.00	5.00	0.00	0.00	ARAR 5 year, 20 minutes storm, average 97 mm/hr, Zone 1
Cat5	0.020	0.016	0.004	1.00	5.00	0.00	0.00	ARAR 5 year, 20 minutes storm, average 97 mm/hr, Zone 1
Cat6	0.020	0.016	0.004	1.00	5.00	0.00	0.00	ARAR 5 year, 20 minutes storm, average 97 mm/hr, Zone 1
Cat7	0.222	0.130	0.092	3.00	15.00	0.00	0.00	ARAR 5 year, 1 hour storm, average 56 mm/hr, Zone 1
Cat2	0.148	0.079	0.069	2.00	8.00	0.00	0.00	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1
CatUpStream	0.110	0.092	0.018	2.00	8.00	0.00	0.00	ARAR 5 year, 1.5 hours storm, average 43.8 mm/hr, Zone 1

Outflow Volumes for Total Catchment (1.75 impervious + 1.71 pervious = 3.46 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
ARAR 5 year, 5 minutes storm, average 168 mm/hr, Zone 1	483.70	358.40 (74.1%)	226.98 (92.9%)	131.42 (54.9%)
ARAR 5 year, 10 minutes storm, average 131 mm/hr, Zone 1	754.34	629.18 (82.2%)	363.75 (95.4%)	256.44 (68.7%)
ARAR 5 year, 20 minutes storm, average 97 mm/hr, Zone 1	1117.12	966.94 (86.6%)	547.08 (96.9%)	419.86 (76.0%)
ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1	1382.00	1214.27 (87.9%)	680.94 (97.9%)	533.32 (79.0%)
ARAR 5 year, 45 minutes storm, average 65 mm/hr, Zone 1	1684.91	1491.57 (88.6%)	833.71 (97.9%)	657.86 (79.0%)
ARAR 5 year, 1 hour storm, average 56 mm/hr, Zone 1	1934.80	1717.86 (88.8%)	960.30 (98.2%)	757.56 (79.2%)
ARAR 5 year, 1.5 hours storm, average 43.8 mm/hr, Zone 1		2269.84	2002.77 (88.2%)	1129.66 (98.5%)	873.11 (77.8%)
ARAR 5 year, 2 hours storm, average 36.8 mm/hr, Zone 1	2542.88	2257.02 (88.8%)	1267.58 (98.6%)	989.92 (78.0%)	
ARAR 5 year, 3 hours storm, average 28.7 mm/hr, Zone 1	2974.76	2561.28 (86.1%)	1485.85 (98.0%)	1075.43 (73.1%)	

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max Q/S (m/s)	Max D/S (m)	Due to Storm
5	0.204	6.10	32.118	24.984	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1
4	0.356	6.31	24.191	17.541	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1
3	0.315	6.12	16.918	12.118	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1
2	0.398	3.69	11.073	10.302	ARAR 5 year, 5 minutes storm, average 168 mm/hr, Zone 1
1	0.526	8.07	9.969	1.169	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1
2A	0.105	0.95	12.064	12.018	ARAR 5 year, 5 minutes storm, average 168 mm/hr, Zone 1
4A	0.076	4.12	25.084	24.984	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q (cu.m/s)	Max Q D/S (m)	Safe Q (cu.m/s)	Max D (m)	Max DeV (m)	Max Width (m)	Max V (m/s)	Due to Storm
O1	0.180	0.180	0.000	0.035	0.02	7.40	0.56	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1
O3	0.126	0.126	0.000	0.028	0.02	7.40	0.60	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1
OutPit	0.183	0.183	0.000	0.035	0.02	7.40	0.71	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1
OverPit	0.335	0.335	0.000	0.051	0.05	7.41	0.89	ARAR 5 year, 1.5 hours storm, average 43.8 mm/hr, Zone 1
Over1778	0.187	0.187	0.000	0.037	0.03	7.40	0.73	ARAR 5 year, 1.5 hours storm, average 43.8 mm/hr, Zone 1
O5	0.121	0.121	0.000	0.027	0.02	7.40	0.60	ARAR 5 year, 1 hour storm, average 56 mm/hr, Zone 1
O2	0.072	0.072	0.000	0.020	0.01	7.40	0.49	ARAR 5 year, 30 minutes storm, average 80 mm/hr, Zone 1

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q (cu.m/s)	Max Q Low Level	Max Q High Level
		Total			

CONTINUITY CHECK for ARAR 5 year, 1.5 hours storm, average 43.8 mm/hr, Zone 1

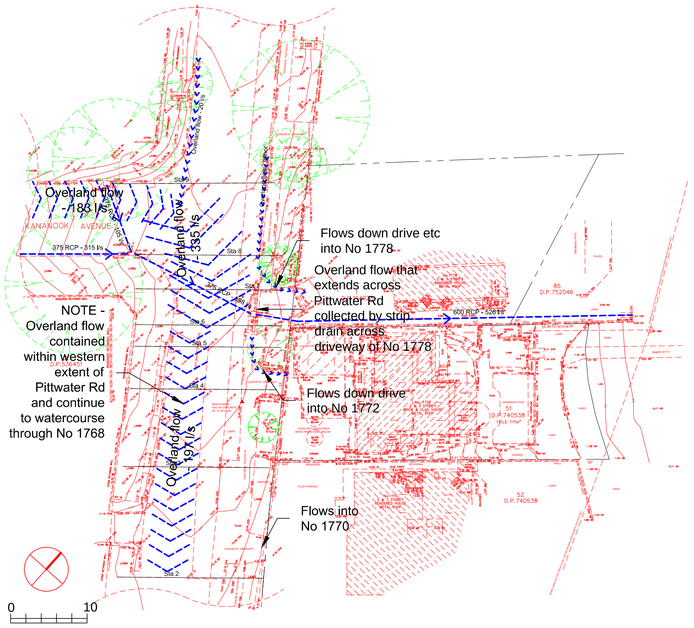
Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Test 1	925.36	925.36	0.00	0.0
SPS4319	1216.90	1216.88	0.00	0.0
SPS4320	1462.84	1463.26	0.00	-0.0
SPS4326	1489.62	1490.17	0.00	-0.0
SPS4325	1864.02	1864.93	0.00	-0.0
SPS4327	1864.93	1865.03	0.00	-0.0
Pittwater	1865.03	1865.03	0.00	0.0
SPS4324	347.36	347.50	0.00	-0.0
SPS4321	208.70	208.73	0.00	-0.0
UpstreamPipe0	155.02	155.02	0.00	0.0

Run Log for DRAINS.drn run at 10:03:47 on 22/3/2020
Upwelling occurred at: SPS4325, SPS4326
Freeboard was less than 0.15m at SPS4320
Flows were safe in all overflow routes.

20% AEP EVENT DRAINS ANALYSIS SUMMARY

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	9	PF 2	0.33	11.95	12.09	12.09	12.13	0.004178	0.88	0.43	6.08	0.92
1	8	PF 2	0.33	11.73	11.88	11.86	11.90	0.005250	0.92	0.39	6.08	1.02
1	7	PF 2	0.33	11.60	11.75	11.75	11.80	0.004163	0.94	0.39	5.01	0.94
1	6	PF 2	0.20	11.50	11.62	11.62	11.6	0.002798	0.70	0.33	5.58	0.75
1	5	PF 2	0.20	11.27	11.39	11.39	11.43	0.005553	0.78	0.25	4.05	1.00
1	4	PF 2	0.20	11.15	11.26	11.26	11.28	0.004492	0.77	0.28	5.23	0.92
1	3	PF 2	0.20	10.75	10.86	10.86	10.91	0.007676	0.93	0.22	3.82	1.17

20% AEP EVENT HECRAS ANALYSIS SUMMARY



20% AEP EVENT EXISTING OVERLAND FLOW EXTENTS

~ 1:400

Flowrates shown as per DRAINS analysis

Overland flow extent as per HECRAS analysis

DRAINS results prepared from Version 2018.01

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arrivng (cu.m/s)	Max Pond Volume (cu.m)	Version 8 Min Freeboard (cu.m/s) (m)	Overflow (cu.m/s)	Constraint
SPS4319	32.38		0.313		0.62	0.180	Inlet Capacity
SPS4320	25.00		0.355		0.00	0.337	Outlet System
SPS4326	17.55		0.367		0.00	0.408	Outlet System
SPS4325	12.12		0.651		0.00	0.717	Outlet System
SPS4327	10.32		0.717		1.11	0.567	Inlet Capacity
Pittwater	1.17		0.567				
SPS4324	12.34		0.355		0.16	0.213	Inlet Capacity
SPS4321	25.24		0.236		0.76	0.131	Inlet Capacity

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Max Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Tc (min)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Catch1	0.956	0.585	0.371	3.00	20.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat1	0.313	0.110	0.203	2.00	8.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat3	0.044	0.035	0.009	1.00	5.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat5	0.031	0.025	0.006	1.00	5.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat6	0.031	0.025	0.006	1.00	5.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat7	0.355	0.219	0.135	3.00	15.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat2	0.236	0.132	0.104	2.00	8.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
CatUpStream	0.175	0.146	0.029	2.00	8.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1

Outflow Volumes for Total Catchment (1.75 impervious + 1.71 pervious = 3.46 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
ARAR 100 year, 10 minutes storm, average 210 mm/hr, Zone 1	1209.25	1074.79 (88.9%)	591.64 (97.1%)	481.15 (80.4%)
ARAR 100 year, 20 minutes storm, average 153 mm/hr, Zone 1	1831.15	1679.61 (91.7%)	907.92 (98.1%)	771.69 (85.2%)
ARAR 100 year, 30 minutes storm, average 132 mm/hr, Zone 1	2280.30	2111.04 (92.6%)	1134.90 (98.5%)	976.14 (86.1%)
ARAR 100 year, 45 minutes storm, average 109 mm/hr, Zone 1	2824.46	2629.75 (93.1%)	1397.90 (98.8%)	1231.86 (87.3%)
ARAR 100 year, 1 hour storm, average 94 mm/hr, Zone 1 32477.70		3027.92 (93.2%)	1623.77 (98.9%)	1404.14 (87.4%)
ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1	3888.87	3616.28 (93.0%)	1946.81 (99.1%)	1669.47 (86.8%)
ARAR 100 year, 2 hours storm, average 64 mm/hr, Zone 1	4422.40	4100.12 (92.7%)	2217.39 (99.2%)	1882.73 (86.1%)
ARAR 100 year, 3 hours storm, average 50 mm/hr, Zone 1	5182.50	4760.72 (91.9%)	2601.53 (99.2%)	2159.19 (84.2%)
ARAR 100 year, 5 minutes storm, average 265 mm/hr, Zone 1	762.98	637.49 (83.6%)	368.12 (95.5%)	269.38 (71.4%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max Q/S (m/s)	Max D/S (m)	Due to Storm
5	0.245	6.44	32.130	25.000	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
4	0.359	6.32	24.192	17.545	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
3	0.316	6.12	16.918	12.117	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
2	0.401	3.64	11.162	10.323	ARAR 100 year, 5 minutes storm, average 265 mm/hr, Zone 1
1	0.545	8.16	9.972	1.172	ARAR 100 year, 1 hour storm, average 94 mm/hr, Zone 1
2A	0.142	1.29	12.210	12.117	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
4A	0.105	4.51	25.099	25.000	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q (cu.m/s)	Max Q D/S (m)	Safe Q (cu.m/s)	Max D (m)	Max DeV (m)	Max Width (m)	Max V (m/s)	Due to Storm
O1	0.180	0.180	0.000	0.035	0.02	7.40	0.70	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
O3	0.337	0.337	0.000	0.051	0.05	7.41	0.90	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
OutPit	0.408	0.408	0.000	0.057	0.06	7.41	0.97	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
OverPit	0.717	0.717	0.000	0.079	0.10	7.41	1.22	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Over1778	0.567	0.567	0.000	0.069	0.08	7.41	1.11	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
O5	0.213	0.213	0.000	0.038	0.03	7.40	0.75	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
O2	0.131	0.131	0.000	0.028	0.02	7.40	0.63	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q (cu.m/s)	Max Q Low Level	Max Q High Level
		Total			

CONTINUITY CHECK for ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Test 1	1672.03	1672.03	0.00	0.0
SPS4319	1450.49	1450.47	0.00	0.0
SPS4320	1892.72	1893.26	0.00	-0.0
SPS4326	1939.52	1940.13	0.00	-0.0
SPS4325	2614.18	2615.63	0.00	-0.1
SPS4327	2615.63	2615.77	0.00	-0.0
Pittwater	2615.77	2615.77	0.00	0.0
SPS4324	627.54	627.80	0.00	-0.0
SPS4321	376.97	377.01	0.00	-0.0
UpstreamPipe0	271.96	271.96	0.00	0.0

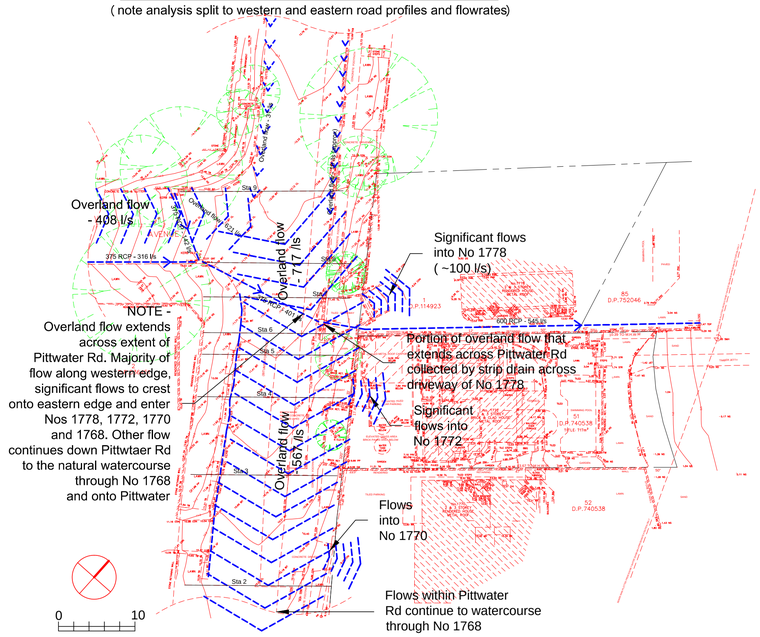
Run Log for DRAINS.drn run at 11:08:23 on 22/3/2020
Upwelling occurred at: SPS4325, SPS4326, SPS4320
Flows were safe in all overflow routes.

1% AEP EVENT DRAINS ANALYSIS SUMMARY

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	9	PF 2	0.72	11.95	12.15	12.15	12.19	0.003132	0.98	0.82	7.67	0.85
1	8	PF 2	0.72	11.73	11.91	11.91	11.96	0.003346	1.03	0.80	8.29	0.89
1	7	PF 2	0.72	11.60	11.81	11.81	11.87	0.003109	1.11	0.75	6.58	0.88
1	6	PF 2	0.57	11.50	11.66	11.66	11.71	0.003820	1.09	0.60	5.82	0.94
1	5	PF 2	0.57	11.27	11.45	11.45	11.51	0.004458	1.09	0.55	5.87	1.00
1	4	PF 2	0.57	11.15	11.31	11.31	11.36	0.004650	1.09	0.56	5.58	1.01
1	3	PF 2	0.57	10.75	10.94	10.94	10.99	0.003802	1.06	0.58	5.50	0.93

1% AEP EVENT HECRAS ANALYSIS SUMMARY

(note analysis split to western and eastern road profiles and flowrates)



1% AEP EVENT EXISTING OVERLAND FLOW EXTENTS

~ 1:400

Flowrates shown as per DRAINS analysis

Overland flow extent as per HECRAS analysis

DRAINS results prepared from Version 2018.01

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arrivng (cu.m/s)	Max Pond Volume (cu.m)	Version 8 Min Freeboard (cu.m/s) (m)	Overflow (cu.m/s)	Constraint
SPS4319	32.38		0.113		0.62	0.180	Inlet Capacity
SPS4320	25.00		0.355		0.00	0.337	Outlet System
SPS4326	17.55		0.367		0.00	0.408	Outlet System
SPS4325	12.12		0.651		0.00	0.717	Outlet System
SPS4327	10.32		0.717		1.11	0.567	Inlet Capacity
Pittwater	1.17		0.567				
SPS4324	12.34		0.355		0.16	0.213	Inlet Capacity
SPS4321	25.24		0.236		0.76	0.131	Inlet Capacity

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Max Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Tc (min)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Catch1	0.956	0.585	0.371	3.00	20.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat1	0.313	0.110	0.203	2.00	8.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat3	0.044	0.035	0.009	1.00	5.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat5	0.031	0.025	0.006	1.00	5.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat6	0.031	0.025	0.006	1.00	5.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat7	0.355	0.219	0.135	3.00	15.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Cat2	0.236	0.132	0.104	2.00	8.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
CatUpStream	0.175	0.146	0.029	2.00	8.00	0.00	0.00	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1

Outflow Volumes for Total Catchment (1.75 impervious + 1.71 pervious = 3.46 total ha)

Storm	Total Rainfall cu.m	Total Runoff cu.m (Runoff %)	Impervious Runoff cu.m (Runoff %)	Pervious Runoff cu.m (Runoff %)
ARAR 100 year, 10 minutes storm, average 210 mm/hr, Zone 1	1209.25	1074.79 (88.9%)	591.64 (97.1%)	481.15 (80.4%)
ARAR 100 year, 20 minutes storm, average 153 mm/hr, Zone 1	1831.15	1679.61 (91.7%)	907.92 (98.1%)	771.69 (85.2%)
ARAR 100 year, 30 minutes storm, average 132 mm/hr, Zone 1	2280.30	2111.04 (92.6%)	1134.90 (98.5%)	976.14 (86.1%)
ARAR 100 year, 45 minutes storm, average 109 mm/hr, Zone 1	2824.46	2629.75 (93.1%)	1397.90 (98.8%)	1231.86 (87.3%)
ARAR 100 year, 1 hour storm, average 94 mm/hr, Zone 1 32477.70		3027.92 (93.2%)	1623.77 (98.9%)	1404.14 (87.4%)
ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1	3888.87	3616.28 (93.0%)	1946.81 (99.1%)	1669.47 (86.8%)
ARAR 100 year, 2 hours storm, average 64 mm/hr, Zone 1	4422.40	4100.12 (92.7%)	2217.39 (99.2%)	1882.73 (86.1%)
ARAR 100 year, 3 hours storm, average 50 mm/hr, Zone 1	5182.50	4760.72 (91.9%)	2601.53 (99.2%)	2159.19 (84.2%)
ARAR 100 year, 5 minutes storm, average 265 mm/hr, Zone 1	762.98	637.49 (83.6%)	368.12 (95.5%)	269.38 (71.4%)

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max Q/S (m/s)	Max D/S (m)	Due to Storm
5	0.245	6.44	32.130	25.000	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
4	0.359	6.32	24.192	17.545	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
3	0.316	6.12	16.918	12.117	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
2	0.401	3.64	11.162	10.323	ARAR 100 year, 5 minutes storm, average 265 mm/hr, Zone 1
1	0.545	8.16	9.972	1.172	ARAR 100 year, 1 hour storm, average 94 mm/hr, Zone 1
2A	0.142	1.29	12.210	12.117	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
4A	0.105	4.51	25.099	25.000	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q (cu.m/s)	Max Q D/S (m)	Safe Q (cu.m/s)	Max D (m)	Max DeV (m)	Max Width (m)	Max V (m/s)	Due to Storm
O1	0.180	0.180	0.000	0.035	0.02	7.40	0.70	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
O3	0.337	0.337	0.000	0.051	0.05	7.41	0.90	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
OutPit	0.408	0.408	0.000	0.057	0.06	7.41	0.97	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
OverPit	0.717	0.717	0.000	0.079	0.10	7.41	1.22	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
Over1778	0.567	0.567	0.000	0.069	0.08	7.41	1.11	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
O5	0.213	0.213	0.000	0.038	0.03	7.40	0.75	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1
O2	0.131	0.131	0.000	0.028	0.02	7.40	0.63	ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q (cu.m/s)	Max Q Low Level	Max Q High Level
		Total			

CONTINUITY CHECK for ARAR 100 year, 1.5 hours storm, average 75 mm/hr, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %
Test 1	1672.03	1672.03	0.00	0.0
SPS4319	1450.49	1450.47	0.00	0.0
SPS4320	1892.72	1893.26	0.00	-0.0
SPS4326	1939.52	1940.13	0.00	-0.0
SPS4325	2614.18	2615.63	0.00	-0.1
SPS4327	2615.63	2615.77	0.00	-0.0
Pittwater	2615.77	2615.77	0.00	0.0
SPS4324	627.54	627.80	0.00	-0.0
SPS4321	376.97	377.01	0.00	-0.0
UpstreamPipe0	271.96	271.96	0.00	0.0

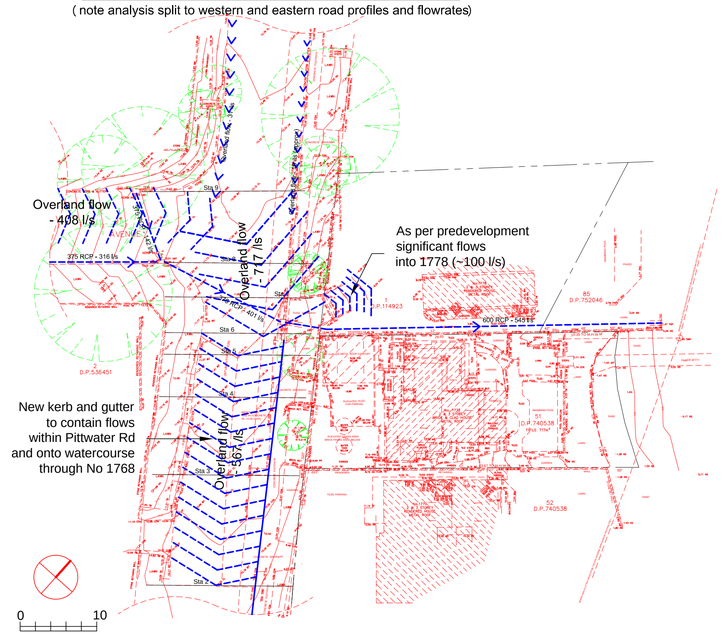
Run Log for DRAINS.drn run at 11:08:23 on 22/3/2020
Upwelling occurred at: SPS4325, SPS4326, SPS4320
Flows were safe in all overflow routes.

1% AEP EVENT DRAINS ANALYSIS SUMMARY

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
1	9	PF 2	0.72	11.95	12.15	12.15	12.19	0.003132	0.98	0.82	7.67	0.85
1	8	PF 2	0.72	11.73	11.91	11.91	11.96	0.003346	1.03	0.80	8.29	0.89
1	7	PF 2	0.72	11.60	11.81	11.81	11.87	0.003109	1.11	0.75	6.58	0.88
1	6	PF 2	0.57	11.50	11.66	11.66	11.71	0.003820	1.09	0.60	5.82	0.94
1	5	PF 2	0.27	11.27	11.40	11.40	11.45	0.002704	1.29	0.21	4.42	1.90
1	4	PF 2	0.27	11.05	11.22	11.22	11.26	0.005273	0.91	0.30	3.52	1.00
1	3	PF 2	0.27	10.75	10.85	10.98	10.98	0.032502	1.62	0.17	3.30	2.29
1	2	PF 2	0.27	10.10	10.24	10.24	10.27	0.005502	0.83	0.33	4.68	1.00

1% AEP EVENT POST DEVELOPMENT HECRAS ANALYSIS SUMMARY

(note analysis split to western and eastern road profiles and flowrates)



1% AEP EVENT POST DEVELPOMENT OVERLAND FLOW EXTENTS

~ 1:400

Flowrates shown as per DRAINS analysis

Overland flow extent as per HECRAS analysis

A1

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Prelim	23. 03. 2020	Issued for comment

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PROJECT:

PITTWATER ROAD
CIVIL WORKS

DRAWING :

CATCHMENT ANALYSIS

Job No : 200303

Drawing No SW2 PreLim

Document Certification
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