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AUSTRALIA

A.B.N. 48 470 231 954

P.O. BOX 510, FORSTER
FIRST FLOOR
3 WHARF STREET

FORSTER NSW 2428

Phone: (02) 6554 7988

Fax: (02) 6554 9378

consult@lswsurveyors.com.au

www.lswsurveyors.com.au

Your Ref.:

Our Ref.: 7539

17th July 2008

ADDENDUM TO STORMWATER STRATEGY FOR



PROPOSED DEVELOPMENT OF LOTS 3 & 4 DP260256

BLACKHEAD ROAD HALLIDAYS POINT

17th July 2008
Issue 2



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Prepared for:

Coastplan Consulting
PO Box 568
FORSTER NSW 2428

Prepared by:

Michael J. Summers

LIDBURY, SUMMERS & WHITEMAN

Consulting Surveyors, Planners & Engineers

ABN: 48 470 231 954

P.O. BOX 510, FORSTER
First Floor
3 Wharf Street
FORSTER NSW 2428

Email: consult@lswsurveyors.com.au

Phone: (02) 6554 7988

Fax: (02) 6554 9378



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1.0 Introduction:

This Statement has been prepared with reference to the Land and Environment Court Practice Note *Class 1 Development Appeals*. This firm has been provided with a copy of this practice note and agrees to be bound by it.

The document will address further issues raised by Greater Taree City Council for the proposed tourist development and associated infrastructure at Lots 3 & 4 DP260256 Blackhead Road, Hallidays Point.

The addendum will address effects on stormwater proposals as a result of the site layout being amended together with stormwater flooding effects on the proposed development by the adjacent SEPP 14 Wetland.



Locality Plan

2.0 Amended Site Layout:

The site layout as amended (5th June 2008) shows the originally proposed aged care facility and car parking has been removed and replaced with tourist sites and access roads. Additionally, the equestrian uses have been re-located from the south-eastern precinct of the site (C9) to the south-western area of the site in catchment C8. These amended catchment characteristics have been entered into the model and a re-analysis of the stormwater modelling software has been undertaken.

Results of this analysis are included in this document and show that the proposed strategy will achieve objectives from the original Stormwater Strategy. That is, runoff from the developed site will be less than or equal to the undeveloped flow from the catchment for the minor and major storm events.

3.0 Flooding:

3.1 1% Stormwater Discharge:

As demonstrated in the previously submitted Stormwater Strategy (31st July 2007), hydrological investigations have been undertaken to assess the 1% ARI event.

The calculations in the strategy show that current undeveloped discharge to the SEPP 14 Wetland from the site for the 1% ARI event is 15.92m³/s. Modelling on the latest amended site layout shows



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that with the incorporation of detention measures, the discharge to the wetland from the site after development will be 15.88m³/s. This successfully shows that there is no net increase in discharge from the site for the 1% ARI event as a result of the development.

3.2 SEPP 14 Wetland & Frogalla Swamp:

The SEPP 14 wetland within the site discharges into the adjacent Frogalla Swamp. This water body and wetland is approximately 1,000ha in area and discharges into the Wallamba River at Darawank, which is some 5km north of Tuncurry.

At this point the swamp outlet crosses underneath The Lakes Way (which runs parallel to the Wallamba River). This road is a major arterial road and is generally RL 2.4m AHD in this vicinity

A hydraulic analysis has been undertaken where the SEPP 14 wetland within the site discharges into Frogalla Swamp via 2x600Ø RCP culverts running under an existing track.

The summary of this analysis is included in this document and shows that the headwater depth at this constriction point is approximately RL 3.3m AHD. As the natural surface levels within the proposed development precincts are all generally above RL 5.0m AHD, it is considered that any proposed habitable dwellings will not be subject to flooding from the SEPP 14 Wetland.

4.0 Summary:

This addendum to the previously submitted Stormwater Strategy and subsequent report (21st January 2008) successfully addresses the effect of the 1% ARI storm event and the adjacent SEPP 14 Wetland on the proposed development.

The report has modified post development discharge rates in accordance with the amended site layout so that post developed flows are less than pre-developed flows, as well as addressing flooding issues for the 1% ARI storm event.

The summary below sets out post-developed and pre-developed flows for the subject development based on the updated site layout (5th June 2008).

Node	Q ₅	Q ₅	Q ₅	Q ₁₀₀	Q ₁₀₀	Q ₁₀₀
	Natural	Developed	Detention	Natural	Developed	Detention
		No controls	With Controls		No controls	With Controls
	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)
Overall Catchment	8.09	9.85	7.89	15.92	18.67	15.88



MICHAEL J. SUMMERS
LIDBURY, SUMMERS & WHITEMAN
 Director



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5.0 Hydraulic Tables:**5.1 Rafts Output Summary**

Node	Q ₅	Q ₅	Q ₅	Q ₁₀₀	Q ₁₀₀	Q ₁₀₀
	Natural	Developed	Detention	Natural	Developed	Detention
	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³ /s)
	270mins	90mins	120mins	120mins	90mins	120mins
Catch 1	2.70	2.55	2.68	5.36	5.19	5.36
Catch 2	2.30	3.05	2.24	4.62	5.53	4.53
Catch 3	0.70	1.26	0.60	1.44	2.21	1.20
Catch 4	0.14	0.13	0.14	0.29	0.26	0.29
Catch 5	0.14	0.43	0.16	0.29	0.69	0.28
Catch 6	0.28	0.81	0.47	0.63	1.33	1.26
Catch 7	0.39	0.92	0.44	0.87	1.52	1.30
Catch 8	1.32	1.35	1.23	2.88	2.88	2.85
Catch 9	0.29	0.31	0.27	0.59	0.58	0.58
TOTAL	8.09	9.85	7.89	15.92	18.67	15.88

5.2 Pond Summary

Node	C2	C3	C5	C6	C7	C8	C9
Pond Depth (m)	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Total Volume (m ³)	2,500	1,600	600	500	650	1,000	500
Spillway length (m)	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Spillway Depth (m)	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Pipe Slope (%)	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Pipe Length (m)	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Pipe Outlet Ø (mm)	750	525	375	375	375	600	250
No. of Pipes	3	2	1	1	1	2	1

ARI	Q ₅	Q ₁₀₀	Q ₅	Q ₁₀₀	Q ₅	Q ₁₀₀	Q ₅	Q ₁₀₀	Q ₅	Q ₁₀₀	Q ₅	Q ₁₀₀	Q ₅	Q ₁₀₀
Peak Water Depth	0.95	1.19	0.65	1.04	0.54	0.96	1.05	1.15	1.04	1.15	0.99	1.19	1.04	1.09
Total Pond Outflow (m ³ /s)	2.25	4.53	0.60	1.21	0.16	0.28	0.47	1.26	0.44	1.30	1.23	2.85	0.27	0.58
Pipe Discharge (m ³ /s)	2.25	3.13	0.60	1.06	0.16	0.28	0.30	0.32	0.30	0.32	1.23	1.49	0.13	0.13
Weir Flow (m ³ /s)	0.00	1.40	0.00	0.15	0.00	0.00	0.17	0.94	0.14	0.99	0.00	1.36	0.14	0.45
Weir Flow Depth (m)	0.00	0.19	0.00	0.04	0.00	0.00	0.05	0.15	0.04	0.15	0.00	0.19	0.04	0.09
Weir Velocity (m/s)	-	0.74	-	0.35	-	-	0.37	0.65	0.34	0.66	-	0.73	0.35	0.51
Vy Product (m ² /s)	-	0.14	-	0.01	-	-	0.02	0.10	0.01	0.10	-	0.14	0.01	0.04



5.3 Wetland Outlet Summary

Headwater[Untitled1]

Design Case **1** Flow in Culvert is 1.953m³/s
Flow over Weir is 13.937m³/s at depth of 0.379m

Approach Flow (m³/s) **15.890** Length = 5.000 m Set Tailwater

RL_in= 1.680 m Slope= 0.010 % RL_out= 1.770 m

Number of Pipes	= 2	Tailwater Depth	= 0.000m (RL 1.770m if Fixed)
Culvert description	600 cl 2 RCP	Critical Depth	= 0.584m (RL 2.354m)
Pipe Diameter	= 0.610 m	Effective tailwater	= 0.597m (RL 2.367m)
		Head Loss in Culvert	= 0.793 m
Using Mannings 'n'	= 0.013	Outlet depth adopted	
Entrance - Socket end headwall		to Calc. outlet velocity=	0.610m (RL 2.380m)
Entrance Loss Coeff (K _e)	= 0.200	Outlet velocity	= 3.328 m/s
Weir Coefficient	= 0.577	Headwater Depth	= 1.509m (RL 3.279m)
Weir Length	= 35.000 m		
Weir RL	= 2.900 m	INLET Control	

Solve
Save Results
Close



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6.0 Rafts Output Files**6.1 Q₅ Existing:**Run started at: 31st July 2007 15:08:58

#####

7539 Drake, Hallidays Point - Q5 Natural

#####

ROUTING INCREMENT (MINS) = 2.00
 STORM DURATION (MINS) = 270.
 RETURN PERIOD (YRS) = 5.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (km2) = 58.06
 TOTAL OF SECOND SUB-AREAS (km2) = 23.73
 TOTAL OF ALL SUB-AREAS (km2) = 81.79

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link	Catch. Area		Slope		% Impervious		Pern		B		Link
Label	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	No.
	(ha)		(%)		(%)						
Catch 1	0.3000	23.730	3.000	6.000	100.0	0.000	.015	.060	.0005	.1067	1.000
Catch 4	2.320	0.000	.5000	0.000	0.000	0.000	.060	0.00	.1100	0.000	2.000
Catch 2	24.250	0.000	4.000	0.000	0.000	0.000	.060	0.00	.1321	0.000	3.000
Catch 3	5.740	0.000	4.000	0.000	0.000	0.000	.060	0.00	.0624	0.000	4.000
Catch 5	2.330	0.000	.5000	0.000	0.000	0.000	.060	0.00	.1103	0.000	5.000
Catch 6	4.150	0.000	1.000	0.000	0.000	0.000	.060	0.00	.1053	0.000	6.000
Catch 7	6.180	0.000	1.000	0.000	0.000	0.000	.060	0.00	.1296	0.000	7.000
Catch 8	10.010	0.000	7.000	0.000	0.000	0.000	.060	0.00	.0630	0.000	8.000
Catch 9	2.780	0.000	2.000	0.000	0.000	0.000	.060	0.00	.0605	0.000	9.000
Wetland	.00001	0.000	5.000	0.000	0.000	0.000	.025	0.00	0.000	0.000	1.001

Link	Average	Init. Loss		Cont. Loss		Excess Rain		Peak	Time	Link
Label	Intensity	#1	#2	#1	#2	#1	#2	Inflow	to	Lag
	(mm/h)	(mm)		(mm/h)		(mm)		(m^3/s)	Peak	mins
Catch 1	19.339	2.000	10.00	0.000	2.500	85.024	67.274	2.697	92.00	0.000
Catch 4	19.339	10.00	0.000	2.500	0.000	67.274	0.000	0.1350	136.0	0.000
Catch 2	19.339	10.00	0.000	2.500	0.000	67.274	0.000	2.295	94.00	0.000
Catch 3	19.339	10.00	0.000	2.500	0.000	67.274	0.000	0.7033	90.00	0.000
Catch 5	19.339	10.00	0.000	2.500	0.000	67.274	0.000	0.1356	136.0	0.000
Catch 6	19.339	10.00	0.000	2.500	0.000	67.274	0.000	0.2748	110.0	0.000
Catch 7	19.339	10.00	0.000	2.500	0.000	67.274	0.000	0.3902	136.0	0.000
Catch 8	19.339	10.00	0.000	2.500	0.000	67.274	0.000	1.323	90.00	0.000
Catch 9	19.339	10.00	0.000	2.500	0.000	67.274	0.000	0.2875	92.00	0.000
Wetland	19.339	2.000	0.000	0.000	0.000	85.024	0.000	8.094	92.00	0.000

Run completed at: 31st July 2007 15:08:58

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6.2 Q₅ Developed:

Run started at: 17th July 2008 8:49:52

#####

7539 Drake, Hallidays Point - Q5 Developed

#####

ROUTING INCREMENT (MINS) = 2.00
 STORM DURATION (MINS) = 90.
 RETURN PERIOD (YRS) = 5.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 14.13
 TOTAL OF SECOND SUB-AREAS (ha) = 67.66
 TOTAL OF ALL SUB-AREAS (ha) = 81.79

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link	Catch. Area		Slope		% Impervious		Pern		B		Link
Label	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	No.
	(ha)		(%)		(%)						
Catch1Nat	0.3000	23.730	3.000	6.000	100.0	0.000	.015	.060	.0005	.1067	1.000
Catch 2	5.040	19.210	4.000	4.000	100.0	0.000	.015	.060	.0017	.1170	2.000
C2 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	2.001
Catch 3	2.420	3.320	4.000	4.000	100.0	0.000	.015	.060	.0012	.0470	3.000
C3 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	3.001
Catch 4	0.0400	2.280	.5000	.5000	100.0	0.000	.015	.060	.0004	.1090	4.000
Catch 5	0.9700	1.360	.5000	.5000	100.0	0.000	.015	.060	.0021	.0833	5.000
C5 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	5.001
Catch 6	1.790	2.360	1.000	1.000	100.0	0.000	.015	.060	.0020	.0785	6.000
C6 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	6.001
Catch 7	1.920	4.260	1.000	1.000	100.0	0.000	.015	.060	.0021	.1068	7.000
C7 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	7.001
Catch 9	0.3900	2.390	2.000	2.000	100.0	0.000	.015	.060	.0006	.0559	8.000
C9 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	8.001
Catch 8	1.260	8.750	7.000	7.000	100.0	0.000	.015	.060	.0006	.0588	9.000
C8 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	9.001
Wetland	.00001	0.000	5.000	0.000	0.000	0.000	.025	0.00	0.000	0.000	1.001

Link	Average	Init. Loss	Cont. Loss	Excess Rain	Peak	Time	Link
Label	Intensity	#1	#2	#1	#2	Inflow	to
	(mm/h)	(mm)		(mm/h)		(m^3/s)	Peak
							mins
Catch1Nat	37.896	2.000	10.00	0.000	2.500	54.844 43.594	2.547
Catch 2	37.896	2.000	10.00	0.000	2.500	54.844 43.594	3.053
C2 Pond	37.896	2.000	0.000	0.000	0.000	54.844 0.000	3.053
Catch 3	37.896	2.000	10.00	0.000	2.500	54.844 43.594	1.264
C3 Pond	37.896	5.000	0.000	2.500	0.000	48.427 0.000	1.264
Catch 4	37.896	2.000	10.00	0.000	2.500	54.844 43.594	0.1247
Catch 5	37.896	2.000	10.00	0.000	2.500	54.844 43.594	0.4282
C5 Pond	37.896	5.000	0.000	2.500	0.000	48.427 0.000	0.4282
Catch 6	37.896	2.000	10.00	0.000	2.500	54.844 43.594	0.8139
C6 Pond	37.896	5.000	0.000	2.500	0.000	48.427 0.000	0.8139
Catch 7	37.896	2.000	10.00	0.000	2.500	54.844 43.594	0.9210
C7 Pond	37.896	5.000	0.000	2.500	0.000	48.427 0.000	0.9210
Catch 9	37.896	2.000	10.00	0.000	2.500	54.844 43.594	0.3106
C9 Pond	37.896	5.000	0.000	2.500	0.000	48.427 0.000	0.3106
Catch 8	37.896	2.000	10.00	0.000	2.500	54.844 43.594	1.352
C8 Pond	37.896	5.000	0.000	2.500	0.000	48.427 0.000	1.352
Wetland	37.896	2.000	0.000	0.000	0.000	54.844 0.000	9.851

Run completed at: 17th July 2008 8:49:53



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6.3 Q₅ Detention:

Run started at: 17th July 2008 8:44:46

#####

7539 Drake, Hallidays Point - Q5 Detention

#####

ROUTING INCREMENT (MINS) = 2.00
 STORM DURATION (MINS) = 120.
 RETURN PERIOD (YRS) = 5.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 14.13
 TOTAL OF SECOND SUB-AREAS (ha) = 67.66
 TOTAL OF ALL SUB-AREAS (ha) = 81.79

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link	Catch. Area		Slope		% Impervious		Pern		B		Link
Label	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	No.
	(ha)		(%)		(%)						
Catch1Nat	0.3000	23.730	3.000	6.000	100.0	0.000	.015	.060	.0005	.1067	1.000
Catch 2	5.040	19.210	4.000	4.000	100.0	0.000	.015	.060	.0017	.1170	2.000
C2 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	2.001
Catch 3	2.420	3.320	4.000	4.000	100.0	0.000	.015	.060	.0012	.0470	3.000
C3 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	3.001
Catch 4	0.0400	2.280	.5000	.5000	100.0	0.000	.015	.060	.0004	.1090	4.000
Catch 5	0.9700	1.360	.5000	.5000	100.0	0.000	.015	.060	.0021	.0833	5.000
C5 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	5.001
Catch 6	1.790	2.360	1.000	1.000	100.0	0.000	.015	.060	.0020	.0785	6.000
C6 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	6.001
Catch 7	1.920	4.260	1.000	1.000	100.0	0.000	.015	.060	.0021	.1068	7.000
C7 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	7.001
Catch 9	0.3900	2.390	2.000	2.000	100.0	0.000	.015	.060	.0006	.0559	8.000
C9 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	8.001
Catch 8	1.260	8.750	7.000	7.000	100.0	0.000	.015	.060	.0006	.0588	9.000
C8 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	9.001
Wetland	.00001	0.000	5.000	0.000	0.000	0.000	.025	0.00	0.000	0.000	1.001

Link	Average	Init. Loss		Cont. Loss		Excess Rain		Peak	Time	Link
Label	Intensity	#1	#2	#1	#2	#1	#2	Inflow	to	Lag
	(mm/h)	(mm)		(mm/h)		(mm)		(m^3/s)	Peak	mins
Catch1Nat	31.831	2.000	10.00	0.000	2.500	61.663	49.496	2.684	62.00	0.000
Catch 2	31.831	2.000	10.00	0.000	2.500	61.663	49.496	2.755	34.00	0.000
C2 Pond	31.831	2.000	0.000	0.000	0.000	61.663	0.000	2.755	34.00	0.000
Catch 3	31.831	2.000	10.00	0.000	2.500	61.663	49.496	1.216	34.00	0.000
C3 Pond	31.831	5.000	0.000	2.500	0.000	54.079	0.000	1.216	34.00	0.000
Catch 4	31.831	2.000	10.00	0.000	2.500	61.663	49.496	0.1350	86.00	0.000
Catch 5	31.831	2.000	10.00	0.000	2.500	61.663	49.496	0.4101	34.00	0.000
C5 Pond	31.831	5.000	0.000	2.500	0.000	54.079	0.000	0.4101	34.00	0.000
Catch 6	31.831	2.000	10.00	0.000	2.500	61.663	49.496	0.8010	34.00	0.000
C6 Pond	31.831	5.000	0.000	2.500	0.000	54.079	0.000	0.8010	34.00	0.000
Catch 7	31.831	2.000	10.00	0.000	2.500	61.663	49.496	0.8723	34.00	0.000
C7 Pond	31.831	5.000	0.000	2.500	0.000	54.079	0.000	0.8723	34.00	0.000
Catch 9	31.831	2.000	10.00	0.000	2.500	61.663	49.496	0.2970	64.00	0.000
C9 Pond	31.831	5.000	0.000	2.500	0.000	54.079	0.000	0.2970	64.00	0.000
Catch 8	31.831	2.000	10.00	0.000	2.500	61.663	49.496	1.403	46.00	0.000
C8 Pond	31.831	5.000	0.000	2.500	0.000	54.079	0.000	1.403	46.00	0.000
Wetland	31.831	2.000	0.000	0.000	0.000	61.663	0.000	7.891	66.00	0.000



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SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m ³ /s)	Time to Peak	Peak Outflow (m ³ /s)	Total Inflow (m ³)	----- Vol. Avail	Basin Vol. Used	----- Stage Used
C2 Pond	34.00	2.755	68.00	2.244	12621.2	0.0000	1982.0	4.9514
C3 Pond	34.00	1.215	64.00	.5949	3147.3	0.0000	871.38	4.6535
C5 Pond	34.00	.4101	44.00	.1602	1268.6	0.0000	269.07	4.5381
C6 Pond	34.00	.8010	42.00	.4652	2276.6	0.0000	435.86	5.0461
C7 Pond	34.00	.8723	66.00	.4366	3304.5	0.0000	563.81	5.0409
C9 Pond	64.00	.2970	70.00	.2709	1431.1	0.0000	433.95	5.0415
C8 Pond	46.00	1.403	58.00	1.233	5091.6	0.0000	821.31	4.9856

SUMMARY OF BASIN OUTLET RESULTS

Link Label	No. of	S/D Factor (m)	Dia (m)	Width (m)	Pipe Length (m)	Pipe Slope (%)
C2 Pond	3.0		.7500	0.000	10.000	0.5000
C3 Pond	2.0		.5250	0.000	10.000	0.5000
C5 Pond	1.0		.3800	0.000	10.000	0.5000
C6 Pond	1.0		.3800	0.000	10.000	0.5000
C7 Pond	1.0		.3800	0.000	10.000	0.5000
C9 Pond	1.0		.2500	0.000	10.000	0.5000
C8 Pond	2.0		.6000	0.000	10.000	0.5000

Run completed at: 17th July 2008 8:44:47



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6.4 Q₁₀₀ Existing:Run started at: 31st July 2007 15:11:09

#####

7539 Drake, Hallidays Point - Q100 Natural

#####

ROUTING INCREMENT (MINS) = 2.00
 STORM DURATION (MINS) = 120.
 RETURN PERIOD (YRS) = 100.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (km2) = 58.06
 TOTAL OF SECOND SUB-AREAS (km2) = 23.73
 TOTAL OF ALL SUB-AREAS (km2) = 81.79

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link	Catch. Area		Slope		% Impervious		Pern		B		Link
Label	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	No.
	(ha)		(%)		(%)						
Catch 1	0.3000	23.730	3.000	6.000	100.0	0.000	.015	.060	.0005	.1067	1.000
Catch 4	2.320	0.000	.5000	0.000	0.000	0.000	.060	0.00	.1100	0.000	2.000
Catch 2	24.250	0.000	4.000	0.000	0.000	0.000	.060	0.00	.1321	0.000	3.000
Catch 3	5.740	0.000	4.000	0.000	0.000	0.000	.060	0.00	.0624	0.000	4.000
Catch 5	2.330	0.000	.5000	0.000	0.000	0.000	.060	0.00	.1103	0.000	5.000
Catch 6	4.150	0.000	1.000	0.000	0.000	0.000	.060	0.00	.1053	0.000	6.000
Catch 7	6.180	0.000	1.000	0.000	0.000	0.000	.060	0.00	.1296	0.000	7.000
Catch 8	10.010	0.000	7.000	0.000	0.000	0.000	.060	0.00	.0630	0.000	8.000
Catch 9	2.780	0.000	2.000	0.000	0.000	0.000	.060	0.00	.0605	0.000	9.000
Wetland	.00001	0.000	5.000	0.000	0.000	0.000	.025	0.00	0.000	0.000	1.001

Link	Average	Init. Loss		Cont. Loss		Excess Rain		Peak	Time	Link
Label	Intensity	#1	#2	#1	#2	#1	#2	Inflow	to	Lag
	(mm/h)	(mm)		(mm/h)		(mm)		(m ³ /s)	Peak	mins
Catch 1	52.826	2.000	10.00	0.000	2.500	103.65	91.151	5.359	50.00	0.000
Catch 4	52.826	10.00	0.000	2.500	0.000	91.151	0.000	0.2915	86.00	0.000
Catch 2	52.826	10.00	0.000	2.500	0.000	91.151	0.000	4.619	62.00	0.000
Catch 3	52.826	10.00	0.000	2.500	0.000	91.151	0.000	1.442	48.00	0.000
Catch 5	52.826	10.00	0.000	2.500	0.000	91.151	0.000	0.2924	86.00	0.000
Catch 6	52.826	10.00	0.000	2.500	0.000	91.151	0.000	0.6286	70.00	0.000
Catch 7	52.826	10.00	0.000	2.500	0.000	91.151	0.000	0.8693	80.00	0.000
Catch 8	52.826	10.00	0.000	2.500	0.000	91.151	0.000	2.875	46.00	0.000
Catch 9	52.826	10.00	0.000	2.500	0.000	91.151	0.000	0.5919	52.00	0.000
Wetland	52.826	2.000	0.000	0.000	0.000	103.65	0.000	15.918	50.00	0.000

Run completed at: 31st July 2007 15:11:09

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6.5 Q₁₀₀ Developed:

Run started at: 17th July 2008 8:51:32

7539 Drake, Hallidays Point - Q100 Developed

#####

ROUTING INCREMENT (MINS) = 2.00
 STORM DURATION (MINS) = 90.
 RETURN PERIOD (YRS) = 100.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 14.13
 TOTAL OF SECOND SUB-AREAS (ha) = 67.66
 TOTAL OF ALL SUB-AREAS (ha) = 81.79

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link	Catch.	Area	Slope	% Impervious	Pern	B	Link
Label	#1	#2	#1	#2	#1	#2	No.
	(ha)		(%)	(%)			
Catch1Nat	0.3000	23.730	3.000	6.000	100.0	0.000	1.000
Catch 2	5.040	19.210	4.000	4.000	100.0	0.000	2.000
C2 Pond	.00001	0.000	.0010	0.000	0.000	0.000	2.001
Catch 3	2.420	3.320	4.000	4.000	100.0	0.000	3.000
C3 Pond	.00001	0.000	.0010	0.000	0.000	0.000	3.001
Catch 4	0.0400	2.280	.5000	.5000	100.0	0.000	4.000
Catch 5	0.9700	1.360	.5000	.5000	100.0	0.000	5.000
C5 Pond	.00001	0.000	.0010	0.000	0.000	0.000	5.001
Catch 6	1.790	2.360	1.000	1.000	100.0	0.000	6.000
C6 Pond	.00001	0.000	.0010	0.000	0.000	0.000	6.001
Catch 7	1.920	4.260	1.000	1.000	100.0	0.000	7.000
C7 Pond	.00001	0.000	.0010	0.000	0.000	0.000	7.001
Catch 9	0.3900	2.390	2.000	2.000	100.0	0.000	8.000
C9 Pond	.00001	0.000	.0010	0.000	0.000	0.000	8.001
Catch 8	1.260	8.750	7.000	7.000	100.0	0.000	9.000
C8 Pond	.00001	0.000	.0010	0.000	0.000	0.000	9.001
Wetland	.00001	0.000	5.000	0.000	0.000	0.000	1.001

Link	Average	Init. Loss	Cont. Loss	Excess Rain	Peak	Time	Link
Label	Intensity	#1	#2	#1	#2	Inflow	Lag
	(mm/h)	(mm)	(mm/h)	(mm)	(mm)	(m ³ /s)	mins
Catch1Nat	62.499	2.000	10.00	0.000	2.500	91.749	0.000
Catch 2	62.499	2.000	10.00	0.000	2.500	91.749	0.000
C2 Pond	62.499	2.000	0.000	0.000	0.000	91.749	0.000
Catch 3	62.499	2.000	10.00	0.000	2.500	91.749	0.000
C3 Pond	62.499	5.000	0.000	2.500	0.000	85.249	0.000
Catch 4	62.499	2.000	10.00	0.000	2.500	91.749	0.000
Catch 5	62.499	2.000	10.00	0.000	2.500	91.749	0.000
C5 Pond	62.499	5.000	0.000	2.500	0.000	85.249	0.000
Catch 6	62.499	2.000	10.00	0.000	2.500	91.749	0.000
C6 Pond	62.499	5.000	0.000	2.500	0.000	85.249	0.000
Catch 7	62.499	2.000	10.00	0.000	2.500	91.749	0.000
C7 Pond	62.499	5.000	0.000	2.500	0.000	85.249	0.000
Catch 9	62.499	2.000	10.00	0.000	2.500	91.749	0.000
C9 Pond	62.499	5.000	0.000	2.500	0.000	85.249	0.000
Catch 8	62.499	2.000	10.00	0.000	2.500	91.749	0.000
C8 Pond	62.499	5.000	0.000	2.500	0.000	85.249	0.000
Wetland	62.499	2.000	0.000	0.000	0.000	91.749	0.000

Run completed at: 17th July 2008 8:51:33



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6.6 Q₁₀₀ Detention:

Run started at: 16th July 2008 17:56:24

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7539 Drake, Hallidays Point - Q100 Detention

#####

ROUTING INCREMENT (MINS) = 2.00
 STORM DURATION (MINS) = 120.
 RETURN PERIOD (YRS) = 100.
 BX = 1.0000
 TOTAL OF FIRST SUB-AREAS (ha) = 14.13
 TOTAL OF SECOND SUB-AREAS (ha) = 67.66
 TOTAL OF ALL SUB-AREAS (ha) = 81.79

SUMMARY OF CATCHMENT AND RAINFALL DATA

Link	Catch. Area		Slope		% Impervious		Pern		B		Link
Label	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	No.
	(ha)		(%)		(%)						
Catch1Nat	0.3000	23.730	3.000	6.000	100.0	0.000	.015	.060	.0005	.1067	1.000
Catch 2	5.040	19.210	4.000	4.000	100.0	0.000	.015	.060	.0017	.1170	2.000
C2 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	2.001
Catch 3	2.420	3.320	4.000	4.000	100.0	0.000	.015	.060	.0012	.0470	3.000
C3 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	3.001
Catch 4	0.0400	2.280	.5000	.5000	100.0	0.000	.015	.060	.0004	.1090	4.000
Catch 5	0.9700	1.360	.5000	.5000	100.0	0.000	.015	.060	.0021	.0833	5.000
C5 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	5.001
Catch 6	1.790	2.360	1.000	1.000	100.0	0.000	.015	.060	.0020	.0785	6.000
C6 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	6.001
Catch 7	1.920	4.260	1.000	1.000	100.0	0.000	.015	.060	.0021	.1068	7.000
C7 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	7.001
Catch 9	0.3900	2.390	2.000	2.000	100.0	0.000	.015	.060	.0006	.0559	8.000
C9 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	8.001
Catch 8	1.260	8.750	7.000	7.000	100.0	0.000	.015	.060	.0006	.0588	9.000
C8 Pond	.00001	0.000	.0010	0.000	0.000	0.000	.025	0.00	.0021	0.000	9.001
Wetland	.00001	0.000	5.000	0.000	0.000	0.000	.025	0.00	0.000	0.000	1.001

Link	Average	Init. Loss	Cont. Loss	Excess Rain	Peak	Time	Link
Label	Intensity	#1	#2	#1	#2	Inflow to	Lag
	(mm/h)	(mm)		(mm/h)		(m^3/s)	Peak mins
Catch1Nat	52.826	2.000	10.00	0.000	2.500	103.65 91.151	5.359 50.00 0.000
Catch 2	52.826	2.000	10.00	0.000	2.500	103.65 91.151	4.926 40.00 0.000
C2 Pond	52.826	2.000	0.000	0.000	0.000	103.65 0.000	4.926 40.00 0.000
Catch 3	52.826	2.000	10.00	0.000	2.500	103.65 91.151	2.067 34.00 0.000
C3 Pond	52.826	5.000	0.000	2.500	0.000	95.901 0.000	2.067 34.00 0.000
Catch 4	52.826	2.000	10.00	0.000	2.500	103.65 91.151	0.2908 84.00 0.000
Catch 5	52.826	2.000	10.00	0.000	2.500	103.65 91.151	0.6790 34.00 0.000
C5 Pond	52.826	5.000	0.000	2.500	0.000	95.901 0.000	0.6790 34.00 0.000
Catch 6	52.826	2.000	10.00	0.000	2.500	103.65 91.151	1.305 34.00 0.000
C6 Pond	52.826	5.000	0.000	2.500	0.000	95.901 0.000	1.305 34.00 0.000
Catch 7	52.826	2.000	10.00	0.000	2.500	103.65 91.151	1.448 34.00 0.000
C7 Pond	52.826	5.000	0.000	2.500	0.000	95.901 0.000	1.448 34.00 0.000
Catch 9	52.826	2.000	10.00	0.000	2.500	103.65 91.151	0.5855 46.00 0.000
C9 Pond	52.826	5.000	0.000	2.500	0.000	95.901 0.000	0.5855 46.00 0.000
Catch 8	52.826	2.000	10.00	0.000	2.500	103.65 91.151	2.897 40.00 0.000
C8 Pond	52.826	5.000	0.000	2.500	0.000	95.901 0.000	2.897 40.00 0.000
Wetland	52.826	2.000	0.000	0.000	0.000	103.65 0.000	15.877 48.00 0.000



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SUMMARY OF BASIN RESULTS

Link Label	Time to Peak	Peak Inflow (m ³ /s)	Time to Peak	Peak Outflow (m ³ /s)	Total Inflow (m ³)	----- Vol. Avail	Basin Vol. Used	----- Stage Used
C2 Pond	40.00	4.926	64.00	4.531	22768.4	0.0000	2477.8	5.1894
C3 Pond	34.00	2.067	48.00	1.198	5542.5	0.0000	1387.6	5.0407
C5 Pond	34.00	.6790	84.00	.2784	2245.1	0.0000	479.41	4.9588
C6 Pond	34.00	1.304	36.00	1.256	4002.7	0.0000	477.13	5.1451
C7 Pond	34.00	1.447	36.00	1.300	5861.0	0.0000	622.62	5.1494
C9 Pond	46.00	.5855	48.00	.5766	2586.0	0.0000	453.45	5.0883
C8 Pond	40.00	2.897	42.00	2.853	9291.3	0.0000	988.33	5.1860

SUMMARY OF BASIN OUTLET RESULTS

Link Label	No. of	S/D Factor (m)	Dia (m)	Width (m)	Pipe Length (m)	Pipe Slope (%)
C2 Pond	3.0		.7500	0.000	10.000	0.5000
C3 Pond	2.0		.5250	0.000	10.000	0.5000
C5 Pond	1.0		.3800	0.000	10.000	0.5000
C6 Pond	1.0		.3800	0.000	10.000	0.5000
C7 Pond	1.0		.3800	0.000	10.000	0.5000
C9 Pond	1.0		.2500	0.000	10.000	0.5000
C8 Pond	2.0		.6000	0.000	10.000	0.5000

Run completed at: 16th July 2008 17:56:24



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7.0 Stormwater Strategy Plans



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