

## **ATTACHMENT C**

### **Water Quantity Model Information**

#### **Existing Conditions**

- DRAINS Information - Input & Output 100 year

#### **Proposed Conditions**

- DRAINS Information - Input & Output 100 year

#### **Flow Comparison**

**Existing Conditions**

- DRAINS Information - Input & Output 100 year

# Calculation Sheet

Job MOOREBANK INTERMODAL  
LPMW South OSD3A - Existing

Design VN  
Date Mar-17  
Checked   
Date

Office Sydney  
Job No AA009335

# MOOREBANK INTERMODAL

Existing Condition Model





		11.6	558															
		11.7	732															
		11.8	913															
		11.9	1103															
		12	1301															
		12.1	1506															
		12.2	1716															
		12.3	1929															
		12.4	2147															
		12.5	2370															
		12.6	2597															
		12.7	2829															
		12.8	3064															
		12.9	3305															
		13	3550															
		13.1	3801															
		13.2	4058															
		13.3	4323															
		13.4	4595															
		13.5	4875															
		13.6	5168															
		13.7	5472															
		13.8	5788															
		13.9	6115															
Store A2		13.24	0	None						306059.64	6240648.2	No						
		13.3	0.015															
		13.4	0.19															
		13.5	4.125															
		13.6	22.806															
		13.7	74.754															
		13.8	171.018															
		13.9	342.16															
		14	630.48															
		14.1	1118.78															
		14.2	1926.27															
		14.3	3160.4															
		14.4	4835.58															
		14.5	6964.12															
		14.6	9563.34															
		14.7	12682.6															
		14.8	16390.2															
		14.9	20816.7															
		15	25941.6															
		15.1	31774.6															
		15.2	38137.8															
		15.3	44975.1															
		15.4	52117.8															
		15.5	59590.3															
		15.6	67356.2															
		15.7	75203.2															
		15.8	83103.9															
		15.9	91063.6															
		16	99109.7															
		16	99109.7															
Store A1		12.65	0	None						306135.26	6241275.5	No						
		12.9	0.03															
		13	0.039															
		13.1	2.114															
		13.2	14.038															
		13.3	39.629															
		13.4	81.294															
		13.5	146.75															
		13.6	248.51															
		13.7	411.632															
		13.8	706.865															
		13.9	1251.34															
		14	2109.65															
		14.1	3230.35															
		14.2	4564.46															
		14.3	6071.14															
		14.4	7765.32															
		14.5	9687.54															
		14.6	11834.3															
		14.7	14174.2															
		14.8	16701.3															
		14.9	19417.7															
		15	22401.9															
Ex Sto C1		11.579	0	None						305953.48	6241715.7	No						
		12	2000															
		12.32	3640.5															
		12.43	4677															
		12.49	5700															
		12.52	5800															
		12.61	6000															
		12.65	7000															
		12.7	7300															
		13.07	10300															
		13.21	12000															
		14.315	16000															
SUB-CATCHMENT DETAILS																		
Name	Pit or Node	Total Area	Paved Area	Grass Area	Supp Area	Paved Time	Grass Time	Supp Time	Paved Length	Grass Length	Supp Length	Paved Slope(%)	Grass Slope	Supp Slope				
		(ha)	%	%	%	(min)	(min)	(min)	(m)	(m)	(m)	%	%	%				
C EX G01	EX G01	2.8	8.9	91.1	0	5	5	0	5	0								
C EX G03	EX SimtaChann	13.31	11.7	88.3	0	5	5	0	5	0								
C EX BAPAUME	Moore HW 2	3.16	16	84	0	5	5	0	5	0								
C EX G02	EX G02	14.93	16.1	83.9	0	11	9	0	0	40	0	0.1	0.4	0				
C EX EXTERNAL	EX EXTERNA	8.05	55	45	0	10	13	0	0									
C EX NTH SIM	EX Combined SIM	12.28	60.7	39.3	0	12	15	0	0									
C EX S1	EX S1	15.851	60.9	39.1	0	15	20	0	0									
C EX WetlandByp	Wetland BP	0.55	26.5	73.5	0	4	6	0	0									
C EX DNSDC	EX DNSDC	5.28	82	18	0	5	5	0	0									
C EX G04	Basin1	4.254	16.2	83.8	0	5	7	0	0									
C EX Bypass G06	EX Bypass G06	16.45	10.4	89.6	0	15	15	0	0	100	0	0.1	0.25	0				
C EX G06	EX G06	14.32	40.1	59.9	0	15	19	0	0									
C EX Carpark	Carpark HW	2.087	61.2	38.8	0	5	5	0	0									
C EX Wetland	EX Wetland	4.12	30.2	69.8	0	5	7	0	0	20	0	1	1	1				
C EX Bridge Pond	Bridge2	1.129	10.3	89.7	0	4	4	0	0									
C Ex Bridge Pond	Bridge1	1.6024	3.1	96.9	0	4	4	0	0									
C EX Dust Bowl	N78290	7.778	3.7	96.3	0	5	9	0	0									
C EX A2	Store A2	27.45	33.4	66.6	0	14.5	24	0	0									
C EX A1	Store A1	20.9	50	50	0	14	15	0	0									
C EX G13	EX G13	11.173	15.7	84.3	0	8	2	0	0	100	0	0.1	0.5	0				
C EX G12	EX G12	2.809	23.5	76.5	0	7	3	0	0	20	0	0.1	0.5	0				
C EX G11	EX G11	3.092	23.3	76.7	0	6	2	0	0	60	0	0.1	0.25	0				
C EX G10	EX G10	4.7735	29.9	70.1	0	6	3	0	0	60	0	0.1	0.5	0				
C EX G09	EX G09	6.438	23	77	0	11	8	0	0	30	0	0.1	0.7	0				
C EX G08	EX G08	2	6.2	93.8	0	5	5	0	0									
C EX G07	Small	2.522	51.9	48.1	0	6	1	0	0	100	0	0.1	0.4	0				
C EX G05	EX G05	5.441	52.2	47.8	0	11	8	0	0	40	0	0.1	0.3	0				
C EX M5	EX M5	1.1	85	15	0	5	6	0	0									
C E Moore	E Moore	2	80	20	0	5	20	10	0									
C EX E S1	EX E S1	9.76	60.9	39.1	0	15	20	0	0									
C M5 Basin	M5 Bas	2.103	5	95	0	5	5	0	0									
C MBA	N1	0.604	45	55	0	5	7	0	0				</					



DRAINS File Path:	F:\AA009335\1_LPMWCV\CLCA-Stormwater\H - OSD3\160902_OSD3_PreliminaryDesign\OSD 3 Ultimate No MBA Work\MasterPlan_Exg_11A.drn
DRAINS Version:	DRAINS Version 2016.07 - 10 June 2016
Modeller's Name:	Vincent Ng
Description:	LPMW South OSD3A - Existing

DRAINS results prepared from Version 2016.07								100 Year ARI			
PIT / NODE DETAILS								Version 8			
Name	Max HGL	Max Pond	Max Surface	Max Pond	Min	Overflow	Constraint				
	HGL		Flow Arriving	Volume	Freeboard	(cu.m/s)					
			(cu.m/s)	(cu.m)	(m)						
Moore HW 2	13.99		4.752		-0.25	2.091	Headwall height/system capacity				
EX G02	13.05		5.3								
EX DNSDC	11.3		2.904		2.7	0.794	Inlet Capacity				
EX dummy Df	10.48		0								
Ex Mo HW 1	13.41		9.396		0.74	0	None				
Ex Top Chan	13.36		1.768								
EX Bypass G	15		0.802		0	0.583	Outlet System				
EX Bypass G	16.98		2.403		0.02	1.194	Inlet Capacity				
EX G06	14.38		4.478								
Carpark HW	14.81		1.879		-0.11	1.232	Headwall height/system capacity				
EX Carpark	11		0								
EX Bypass A	16.24		0.373		0.76	0.186	Inlet Capacity				
EX A3	16.14		1.971								
SUB-CATCHMENT DETAILS											
Name	Max	Paved	Grassed	Paved	Grassed	Supp.	Due to Storm				
	Flow Q	Max Q	Max Q	Tc	Tc	Tc					
	(cu.m/s)	(cu.m/s)	(cu.m/s)	(min)	(min)	(min)					
C EX G01	1.383	0.141	1.242	5	5	5	0 AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX G03	6.602	0.878	5.724	5	5	5	0 AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX BAPAU	1.501	0.285	1.216	5	6	6	0 AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX G02	3.398	0.928	2.958	11	28.51	0	AR&R 100 year, 1 hour storm, average 69.7 mm/h, Zone 1				
C EX EXTER	3.27	2.107	1.233	10	13	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX NTH Sif	4.647	3.305	1.496	12	15	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX S1	5.237	3.925	1.603	15	20	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX Wetland	0.267	0.082	0.185	4	6	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX DNSDC	2.904	2.441	0.463	5	5	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX G04	1.946	0.389	1.558	5	7	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX Bypass	2.336	0.594	2.189	15	60.94	0	AR&R 100 year, 2 hours storm, average 46.1 mm/h, Zone 1				
C EX G06	4.478	1.97	2.512	15	19	0	AR&R 100 year, 1.5 hours storm, average 54.9 mm/h, Zone 1				
C EX Carpark	1.115	0.72	0.394	5	5	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX Wetland	1.751	0.68	1.085	5	11.18	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX Bridge F	0.56	0.066	0.494	4	4	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C Ex Bridge F	0.786	0.028	0.758	4	4	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX Dust Bo	3.247	0.157	3.09	5	9	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX A2	7.941	3.242	4.7	14.5	24	0	AR&R 100 year, 2 hours storm, average 46.1 mm/h, Zone 1				
C EX A1	7.297	4.391	3.24	14	15	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX G13	2.259	0.866	1.752	8	28.13	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX G12	1.292	0.341	0.951	7	6.66	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX G11	1.033	0.354	0.685	6	19.31	0	AR&R 100 year, 1.5 hours storm, average 54.9 mm/h, Zone 1				
C EX G10	1.736	0.746	1.079	6	14.1	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX G09	2.198	0.678	1.606	11	13.93	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX G08	0.984	0.07	0.914	5	5	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C EX G07	0.955	0.684	0.327	6	18.68	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX G05	1.725	1.301	0.533	11	25.57	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C EX M5	0.603	0.527	0.076	5	6	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C E Moore	0.979	0.943	0.037	5	20	10	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1				
C EX E S1	3.225	2.417	0.987	15	20	0	AR&R 100 year, 25 minutes storm, average 112 mm/h, Zone 1				
C M5 Basin	1.032	0.059	0.973	5	5	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C MBA	0.298	0.153	0.145	5	7	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
C MBA S	0.112	0.084	0.028	5	7	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1				
Name	Max	Due to Storm									
	Flow										
	(cu.m/s)										
C EX RAIL	0.049	AR&R 100 year, 3 hours storm, average 35.9 mm/h, Zone 1									
C EX Bypass	0.802	AR&R 100 year, 2 hours storm, average 46.1 mm/h, Zone 1									
C EX A3	1.971	AR&R 100 year, 9 hours storm, average 18.2 mm/h, Zone 1									
C EX Bypass	0.373	AR&R 100 year, 2 hours storm, average 46.1 mm/h, Zone 1									
Outflow Volumes for Total Catchment (82.2 impervious + 181 pervious = 264 total ha)											
Storm	Total Rainfall	Total Runoff	Impervious R	Pervious Runoff							
	cu.m	cu.m (Runoff %)	cu.m (Runoff %)	cu.m (Runoff %)							
AR&R 100 ye	49241.62	26043.07 (52)	14349.10 (93)	11693.98 (34.5%)							
AR&R 100 ye	94899.11	62942.55 (66)	25578.04 (86)	37364.51 (57.2%)							
AR&R 100 ye	123451.24	85438.78 (69)	32759.06 (85)	52679.72 (62.0%)							
AR&R 100 ye	162410.73	116357.55 (71)	43531.11 (85)	72826.45 (65.2%)							
AR&R 100 ye	183919.91	134113.48 (73)	50232.71 (87)	83880.77 (66.3%)							
AR&R 100 ye	217152.72	161820.26 (74)	61430.06 (90)	100390.20 (67.2%)							
AR&R 100 ye	243072.23	183280.27 (75)	70378.57 (92)	112901.70 (67.5%)							
AR&R 100 ye	283662.28	215838.77 (76)	84389.78 (95)	131448.98 (67.3%)							
AR&R 100 ye	330442.66	249816.08 (75)	99200.16 (96)	150615.92 (66.2%)							
AR&R 100 ye	368626.5	275953.45 (74)	111609.30 (97)	164344.16 (64.8%)							
AR&R 100 ye	431795.84	313292.14 (73)	131743.13 (91)	181549.02 (61.1%)							







**Proposed Conditions**

- DRAINS Information - Input & Output 100 year

# Calculation Sheet

Job MOOREBANK INTERMODAL  
LPMW South - OSD3A with MBA as Existing

Design VN  
Date Mar-17  
Checked   
Date

Office Sydney  
Job No AA009335

# MOOREBANK INTERMODAL

Developed Condition Model



<b>BRAINS File Path:</b>	F:\AA003760\1_LPMW\CV\CLCA-Stormwater\H - OSD3\160902_OSD3_PreliminaryDesign\OSD 3 Ultimate No MBA Work\LPMW South OSD 3_02.DRN
<b>BRAINS Version:</b>	DRAINS Version 2016.07 - 10 June 2016
<b>Modeler's Name:</b>	Vincent Ng
<b>Description:</b>	LPMW South - OSD3A with MBA as Existing

PIT / NODE DETAILS														
Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss
F11	Node					14.579		0		307950.08	6240181.1		149269406	
F13	OnGrade	Surface Inlet Pits	Unlimited		4	16		0	0	307910.95	6240177.9	No	149269408	1 x Ku
F12	Node					14.9		0		307931.87	6240176.3		149269987	
F111	OnGrade	Surface Inlet Pits	Unlimited		4	17.2		0	0	307809.02	6240377.3	No	149269409	1 x Ku
F27	OnGrade	Surface Inlet Pits	Unlimited		2	17.2		0	0	307812.08	6240402.3	No	149269422	1 x Ku
F26	OnGrade	Surface Inlet Pits	Unlimited		0.8	17.142		0	0	307843.74	6240398.2	No	149269421	1 x Ku
F25	OnGrade	Surface Inlet Pits	Unlimited		0.8	17.045		0	0	307857.24	6240380.8	No	149269420	1 x Ku
F24	OnGrade	Surface Inlet Pits	Unlimited		2.5	17.01		0	0	307854.33	6240358	No	149269419	1 x Ku
F23	OnGrade	Surface Inlet Pits	Unlimited		0.5	17.01		0	0	307866.56	6240356.5	No	149269418	1 x Ku
F22	OnGrade	Surface Inlet Pits	Unlimited		0.5	16.847		0	0	307893.41	6240353	No	149269417	1 x Ku
F21	Node					17.092		0		307910.01	6240350.9		149269416	
F121	OnGrade	Surface Inlet Pits	Unlimited		2	16.953		0	0	307864.23	6240124.5	No	149269410	1 x Ku
F42	OnGrade	Surface Inlet Pits	Unlimited		1	16.864		0	0	307871.69	6240182.9	No	149269430	1 x Ku
F41	Node					17.208		0		307888.34	6240180.8		149269429	
F133	OnGrade	Surface Inlet Pits	Unlimited		4	16.913		0	0	307745.62	6240158.8	No	149269413	1 x Ku
F132	OnGrade	Surface Inlet Pits	Unlimited		0.5	17.144		0	0	307785.62	6240153.7	No	149269412	1 x Ku
F131	OnGrade	Surface Inlet Pits	Unlimited		2.5	16.88		0	0	307812.08	6240150.3	No	149269411	1 x Ku
F45	OnGrade	Surface Inlet Pits	Unlimited		0.8	16.969		0	0	307815.12	6240174.1	No	149269433	1 x Ku
F44	OnGrade	Surface Inlet Pits	Unlimited		0.8	16.787		0	0	307832.54	6240187.9	No	149269432	1 x Ku
F43	OnGrade	Surface Inlet Pits	Unlimited		0.5	16.8		0	0	307844.66	6240186.4	No	149269431	1 x Ku
F141	OnGrade	Surface Inlet Pits	Unlimited		4	16.981		0	0	307854.51	6240046.2	No	149269414	1 x Ku
F52	OnGrade	Surface Inlet Pits	Unlimited		1	16.939		0	0	307859.17	6240083.7	No	149269438	1 x Ku
F51	Node					16.422		0		307876.86	6240081.4		149269437	
F151	OnGrade	Surface Inlet Pits	Unlimited		4	17.2		0	0	307792.34	6240206.4	No	149269415	1 x Ku
F47	OnGrade	Surface Inlet Pits	Unlimited		2	17.17		0	0	307788.69	6240177.8	No	149269435	1 x Ku
F46	OnGrade	Surface Inlet Pits	Unlimited		0.5	17.088		0	0	307806.78	6240175.2	No	149269434	1 x Ku
F28	OnGrade	Surface Inlet Pits	Unlimited		4	17.2		0	0	307777.78	6240406.7	No	149269423	1 x Ku
F35	OnGrade	Surface Inlet Pits	Unlimited		4	17.2		0	0	307819.56	6240276	No	149269428	1 x Ku
F34	OnGrade	Surface Inlet Pits	Unlimited		0.5	16.897		0	0	307843.47	6240273	No	149269427	1 x Ku
F33	OnGrade	Surface Inlet Pits	Unlimited		0.5	16.8		0	0	307855.65	6240271.4	No	149269426	1 x Ku
F32	OnGrade	Surface Inlet Pits	Unlimited		0.5	16.733		0	0	307882.55	6240268	No	149269425	1 x Ku
F31	Node					17.101		0		307899.21	6240265.8		149269424	
F48	OnGrade	Surface Inlet Pits	Unlimited		4	17.044		0	0	307748.98	6240182.6	No	149269436	1 x Ku
F54	OnGrade	Surface Inlet Pits	Unlimited		4	17.019		0	0	307814.14	6240043.3	No	149269440	1 x Ku
F53	OnGrade	Surface Inlet Pits	Unlimited		2.5	16.859		0	0	307819.94	6240088.7	No	149269439	1 x Ku
F64	OnGrade	Surface Inlet Pits	Unlimited		4	17.458		0	0	307765.22	6239904.7	No	149269444	1 x Ku
F63	OnGrade	Surface Inlet Pits	Unlimited		0.8	17.341		0	0	307802.73	6239954	No	149269443	1 x Ku
F62	OnGrade	Surface Inlet Pits	Unlimited		0.1	17.086		0	0	307832.12	6239969.3	No	149269442	1 x Ku
F61	Node					16.593		0		307852.57	6239980.8		149269441	
O F22	Node					16.647		0		307898.41	6240358		149269464	
O F32	Node					16.733		0		307887.55	6240273		149269465	
O F42	Node					16.864		0		307876.69	6240187.9		149269466	
O F52	Node					16.939		0		307864.17	6240088.7		149269467	
O F62	Node					17.086		0		307837.12	6239974.3		149269468	
N MBA1	Node					14.653		0		307929.99	6240194.5		149270001	
N MBA2	Node					14.653		0		307926.61	6240153.6		149270002	

DETENTION BASIN DETAILS														
Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length
OSD 3	15.2	7500		None						307900.11	6240180.2	No		
	15.7	7500												
	16.2	7500												
	16.7	7500												
	17.2	7500												
	17.7	7500												
	18.2	7500												
	18.7	7500												
	19.2	7500												

SUB-CATCHMENT DETAILS														
Name	Pit or Node	Total Area (ha)	Paved Area (%)	Grass Area (%)	Supp Area (%)	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope (%)	Grass Slope (%)	Supp Slope (%)
C F111	F111	0.4818	100	0	0	5		10	0					
C F24	F24	0.1782	100	0	0	5		10	0					
C F22	F22	0.5275	100	0	0	5		10	0					
C F121	F121	0.6413	100	0	0	5		10	0					
C F133	F133	0.3695	100	0	0	5		10	0					
C F44	F44	0.4068	100	0	0	5		10	0					
C F141	F141	0.4139	100	0	0	5		10	0					
C F151	F151	0.4769	100	0	0	5		10	0					
C F28	F28	0.8856	100	0	0	5		10	0					
C F35	F35	0.8408	100	0	0	5		10	0					
C F34	F34	0.3118	100	0	0	5		10	0					
C F32	F32	0.3695	100	0	0	5		10	0					
C F48	F48	0.3995	100	0	0	5		10	0					
C F54	F54	0.6724	100	0	0	5		10	0					
C F64	F64	0.7897	100	0	0	5		10	0					
C F62	F62	0.5302	100	0	0	5		10	0					
C MBA	N MBA1	0.604	45	55	0	5		7	0					
C MBA S	N MBA2	0.2127	70	30	0	5		7	0					
C OSD 3	OSD 3	1.719	80	20	0	5		7	0					

PIPE DETAILS														
Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg
P F13	F13	F15	23	13.89	13.62	1.17	Box Culverts	0.75W x 0.45H			0.3	Existing	2 F13	0
P F111	F111	F27	25.1	16.236	15.985		RCP Class 2		450	450	0.3	New	2 F111	0
P F27	F27	F26	31.9	15.965	15.806	0.5	RCP Class 2		600	600	0.3	New	2 F27	0
P F26	F26	F25	22.1	15.796	15.675	0.5	RCP Class 2		600	600	0.3	New	2 F26	0
P F25	F25	F24	22.9	15.655	15.541	0.5	RCP Class 2		600	600	0.3	New	2 F25	0
P F24	F24	F23	12.3	15.521	15.459	0.5	Box Culverts	1.5W x 0.6H			0.3	New/Fixed	1 F24	0
P F23	F23	F22	27.1	15.439	15.304	0.5	Box Culverts	1.5W x 0.6H			0.3	New/Fixed	1 F23	0
P F22	F22	F21	16.7	15.284	15.2	0.5	Box Culverts	1.5W x 0.6H			0.3	New/Fixed	1 F22	0
P F121	F121	F42	58.9	15.598	15.304	0.5	RCP Class 2		600	600	0.3	New	1 F121	0
P F42	F42	F41	16.8	15.284	15.2	0.5	Box Culverts	1.5W x 0.6H			0.3	New/Fixed	1 F42	0
P F133	F133	F132	40.3	16.167	15.966	0.5	RCP Class 2		450	450	0.3	New	2 F133	0
P F132	F132	F131	26.7	15.946	15.812	0.5	RCP Class 2		450	450	0.3	New	2 F132	0
P F131	F131	F45	24	15.792	15.672	0.5	RCP Class 2		450	450	0.3	New	2 F131	0
P F45	F45	F44	22.2	15.652	15.541	0.5	Box Culverts	0.9W x 0.45H			0.3	New/Fixed	1 F45	0
P F44	F44	F43	12.2	15.521	15.46	0.5	Box Culverts	1.5W x 0.6H			0.3	New/Fixed	1 F44	0
P F43	F43	F42	27.2	15.44	15.304	0.5	Box Culverts	1.5W x 0.6H			0.3	New/Fixed	1 F43	0
P F141	F141	F52	37.8	15.498	15.309	0.5	RCP Class 2		600	600	0.3	New	1 F141	0
P F52	F52	F51	17.8	15.289	15.2	0.5	Box Culverts	1.2W x 0.6H			0.3	New/Fixed	1 F52	0
P F151	F151	F47	28.9	16.134	15.846		RCP Class 2		450	450	0.3	New	3 F151	0
P F47	F47	F46	18.3	15.826	15.734	0.5	Box Culverts	0.8W x 0.45H			0.3	Existing	2 F47	0
P F46	F46	F45	8.4	15.714	15.672	0.5	Box Culverts	0.8W x 0.45H			0.3	New/Fixed	1 F46	0
P F28	F28	F27	34.8	16.159	15.985	0.5	Box Culverts	0.9W x 0.45H			0.3	Existing	3 F28	0
P F35	F35	F34	24.1	15.661	15.541	0.5	RCP Class 2		600	600	0.3	New	1 F35	0
P F34	F34	F33	12.3	15.521</										



<b>DRAINS File Path:</b>	F:\AA009335\1_LPMWCV\CLC\A-StormwaterH - OSD3\160902_OSD3_PreliminaryDesign\OSD 3 Ultimate No MBA Work\LPMW South OSD 3_02.DRN
<b>DRAINS Version:</b>	DRAINS Version 2016.07 - 10 June 2016
<b>Modeller's Name:</b>	Vincent Ng
<b>Description:</b>	LPMW South - OSD3A with MBA as Existing

DRAINS results prepared from Version 2016.07								100 Year ARI	
PIT / NODE DETAILS									
Name	Max HGL	Max Pond	Max Surface	Version 8 Max Pond	Min	Overflow	Constraint		
		HGL	Flow Arriving (cu.m/s)	Volume (cu.m)	Freeboard (m)	(cu.m/s)			
F1\3	15.98		1.562		0.02	0.073	Inlet Capacity		
F1\2	14.83		0.41						
F1\1\1	16.8		0.284		0.4	0.001	Inlet Capacity		
F2\7	16.6		0.004		0.6	0	None		
F2\6	16.36		0		0.79	0	None		
F2\5	16.24		0		0.81	0	None		
F2\4	16.12		0.105		0.89	0	None		
F2\3	16.01		0		1	0	None		
F2\2	15.97		0.311		0.68	0.001	Inlet Capacity		
F2\1	15.91		0						
F12\1	16.38		0.378		0.57	0.002	Inlet Capacity		
F4\2	16.03		0.002		0.83	0	None		
F4\1	15.91		0						
F13\3	16.57		0.218		0.34	0.001	Inlet Capacity		
F13\2	16.41		0.001		0.74	0	None		
F13\1	16.37		0		0.51	0	None		
F4\5	16.31		0		0.66	0	None		
F4\4	16.13		0.24		0.66	0.001	Inlet Capacity		
F4\3	16.08		0.001		0.72	0	None		
F14\1	16.17		0.244		0.81	0.001	Inlet Capacity		
F5\2	15.96		0.001		0.97	0	None		
F5\1	15.91		0.783						
F15\1	16.69		0.281		0.51	0.001	Inlet Capacity		
F4\7	16.53		0.002		0.64	0	None		
F4\6	16.43		0		0.66	0	None		
F2\8	16.65		0.522		0.55	0.003	Inlet Capacity		
F3\5	16.8		0.495		0.4	0.003	Inlet Capacity		
F3\4	16.07		0.187		0.83	0.001	Inlet Capacity		
F3\3	16.03		0.001		0.77	0	None		
F3\2	15.98		0.227		0.75	0.001	Inlet Capacity		
F3\1	15.91		1.092						
F4\8	16.67		0.229		0.37	0.001	Inlet Capacity		
F5\4	16.99		0.396		0.03	0.002	Inlet Capacity		
F5\3	16.03		0.002		0.83	0	None		
F6\4	17.01		0.465		0.45	0.003	Inlet Capacity		
F6\3	16.05		0.003		1.29	0	None		
F6\2	15.98		0.312		1.11	0.001	Inlet Capacity		
F6\1	15.91		0						
SUB-CATCHMENT DETAILS									
Name	Max	Paved	Grassed	Paved	Grassed	Supp.	Due to Storm		
	Flow Q	Max Q	Max Q	Tc	Tc	Tc			
	(cu.m/s)	(cu.m/s)	(cu.m/s)	(min)	(min)	(min)			
C F1\1\1	0.284	0.284	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F2\4	0.105	0.105	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F2\2	0.311	0.311	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F12\1	0.378	0.378	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F13\3	0.218	0.218	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F4\4	0.24	0.24	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F14\1	0.244	0.244	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F15\1	0.281	0.281	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F2\8	0.522	0.522	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F3\5	0.495	0.495	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F3\4	0.184	0.184	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F3\2	0.227	0.227	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F4\8	0.229	0.229	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F5\4	0.396	0.396	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F6\4	0.465	0.465	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C F6\2	0.312	0.312	0	5	10	0	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1		
C MBA	0.298	0.153	0.145	5	7	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1		
C MBA S	0.112	0.084	0.028	5	7	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1		
C OSD 3	0.926	0.775	0.15	5	7	0	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1		
Outflow Volumes for Total Catchment (10.1 impervious + 0.74 pervious = 10.8 total ha)									
Storm	Total Rainfall	Total Runoff	Impervious R	Pervious Runoff					
	cu.m	cu.m (Runoff %)	cu.m (Runoff %)	cu.m (Runoff %)					
AR&R 100 ye	2023.72	1855.76 (91.7)	1784.60 (94.6)	71.16 (51.5%)					
AR&R 100 ye	3900.15	3703.69 (95.0)	3532.92 (97.2)	170.76 (64.1%)					
AR&R 100 ye	5073.58	4853.95 (95.7)	4626.26 (97.9)	227.69 (65.7%)					
AR&R 100 ye	6674.73	6420.76 (96.2)	6118.09 (98.4)	302.67 (66.4%)					
AR&R 100 ye	7558.71	7285.59 (96.4)	6941.75 (98.6)	343.84 (66.6%)					
AR&R 100 ye	8924.5	8620.88 (96.6)	8214.32 (98.8)	406.56 (66.7%)					
AR&R 100 ye	9989.74	9661.19 (96.7)	9206.69 (98.9)	454.49 (66.6%)					
AR&R 100 ye	11657.9	11285.20 (96.9)	10760.98 (99.9)	524.22 (65.9%)					

AR&R 100 ye	13580.47	13148.70 (96)	12553.10 (99)	595.60 (64.2%)							
AR&R 100 ye	15149.74	14659.05 (96)	14014.94 (99)	644.11 (62.3%)							
AR&R 100 ye	17745.86	17137.83 (96)	16435.31 (99)	702.52 (58.0%)							
AR&R 100 ye	19932.33	19249.92 (96)	18470.55 (99)	779.37 (57.3%)							
PIPE DETAILS											
Name	Max Q	Max V	Max U/S	Max D/S	Due to Storm						
	(cu.m/s)	(m/s)	HGL (m)	HGL (m)							
P F113	1.491	2.21	14.982	14.83	AR&R 100 year, 12 hours storm, average 15.3 mm/h, Zone 1						
P F111	0.28	0.93	16.639	16.603	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F27	0.727	1.42	16.473	16.355	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F26	0.727	1.52	16.257	16.238	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F25	0.731	1.45	16.154	16.118	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F24	0.822	1.12	16.011	16.007	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F23	0.828	1.01	15.985	15.969	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F22	1.092	1.21	15.938	15.91	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F121	0.382	1.35	16.196	16.031	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F42	1.236	1.37	15.939	15.91	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F1313	0.215	1.03	16.447	16.407	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F1312	0.215	0.68	16.399	16.372	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F131	0.216	0.68	16.331	16.308	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F45	0.665	1.64	16.204	16.127	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F44	0.882	1.02	16.096	16.079	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F43	0.883	0.98	16.055	16.031	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F141	0.244	0.87	16.085	15.965	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F52	0.644	0.89	15.926	15.91	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F151	0.27	0.58	16.558	16.534	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F47	0.481	0.89	16.455	16.431	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F46	0.482	1.79	16.35	16.308	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F28	0.48	0.39	16.611	16.603	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1						
P F35	0.493	1.87	16.261	16.069	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F34	0.683	1.09	16.042	16.033	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F33	0.708	1.05	16.003	15.982	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F32	0.927	1.29	15.942	15.91	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F48	0.237	0.75	16.575	16.534	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F54	0.396	1.86	16.307	16.028	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F53	0.406	0.72	15.978	15.965	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F64	0.476	2.24	16.427	16.047	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F63	0.507	1.11	16.011	15.977	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
P F62	0.783	1.45	15.968	15.91	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1						
CHANNEL DETAILS											
Name	Max Q	Max V		Due to Storm							
	(cu.m/s)	(m/s)									
OVERFLOW ROUTE DETAILS											
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm			
F F113	0.073	0.073	0	0.105	0.1	2.15	0.93	AR&R 100 year, 12 hours storm, average 15.3 mm/h, Zone 1			
F F112	1.68	1.68	0	0.261	0.51	6.4	1.95	AR&R 100 year, 12 hours storm, average 15.3 mm/h, Zone 1			
F F111	0.001	0.001	0	0.026	0.01	0.21	0.42	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1			
F F27	0	0	0	0	0	0	0				
F F26	0	0	0	0	0	0	0				
F F25	0	0	0	0	0	0	0				
F F24	0	0	0	0	0	0	0				
F F23	0	0	0	0	0	0	0				
F F22	0.001	0.001	0	0.026	0.01	0.21	0.42	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F21	1.092	1.092	0	0.09	0.09	22.05	0.98	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1			
F F121	0.002	0.002	0	0.032	0.02	0.27	0.49	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F42	0	0	0	0	0	0	0				
F F41	1.236	1.236	0	0.095	0.1	22.95	1.02	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1			
F F1313	0.001	0.001	0	0.026	0.01	0.21	0.42	AR&R 100 year, 2 hours storm, average 46.1 mm/h, Zone 1			
F F1312	0	0	0	0	0	0	0				
F F1311	0	0	0	0	0	0	0				
F F45	0	0	0	0	0	0	0				
F F44	0.001	0.001	0	0.026	0.01	0.21	0.42	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F43	0	0	0	0	0	0	0				
F F141	0.001	0.001	0	0.026	0.01	0.21	0.42	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1			
F F52	0	0	0	0	0	0	0				
F F51	1.408	1.408	0	0.1	0.1	24.03	1.05	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F151	0.001	0.001	0	0.026	0.01	0.21	0.42	AR&R 100 year, 2 hours storm, average 46.1 mm/h, Zone 1			
F F47	0	0	0	0	0	0	0				
F F46	0	0	0	0	0	0	0				
F F28	0.003	0.003	0	0.037	0.02	0.31	0.55	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F35	0.003	0.003	0	0.037	0.02	0.31	0.55	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F34	0.001	0.001	0	0.026	0.01	0.21	0.42	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F33	0	0	0	0	0	0	0				
F F32	0.001	0.001	0	0.026	0.01	0.21	0.42	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F31	1.933	1.933	0	0.115	0.13	26.9	1.13	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1			
F F48	0.001	0.001	0	0.026	0.01	0.21	0.42	AR&R 100 year, 1 hour storm, average 69.7 mm/h, Zone 1			
F F54	0.002	0.002	0	0.032	0.02	0.27	0.49	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1			
F F53	0	0	0	0	0	0	0				
F F64	0.003	0.003	0	0.037	0.02	0.31	0.54	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F63	0	0	0	0	0	0	0				
F F62	0.001	0.001	0	0.026	0.01	0.21	0.43	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F F61	0.783	0.783	0	0.079	0.07	19.72	0.9	AR&R 100 year, 5 minutes storm, average 224 mm/h, Zone 1			
F NMBA1	0.298	0.298	0	0.053	0.04	14.69	0.68	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1			
F NMBA2	0.112	0.112	0	0.036	0.02	11.27	0.51	AR&R 100 year, 15 minutes storm, average 144 mm/h, Zone 1			
F OSD 3	1.562	1.562	0	0.01	0	499.9	0.31	AR&R 100 year, 12 hours storm, average 15.3 mm/h, Zone 1			
DETENTION BASIN DETAILS											
Name	Max WL	MaxVol	Max Q	Max Q	Max Q						





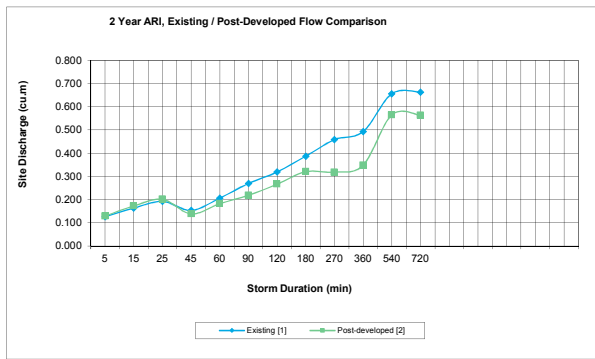
**Flow Comparison**

DRAINS Models (existing and proposed): [MasterPlan\\_Exp\\_11A.drn](#)

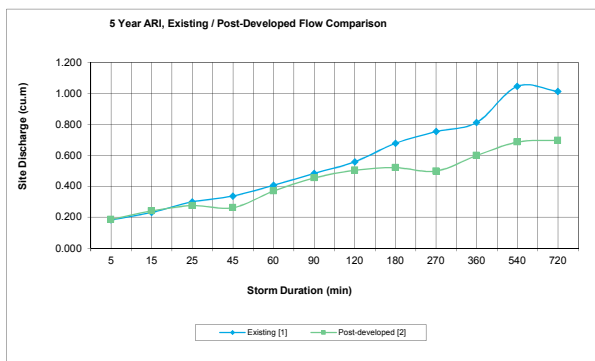
[F:\AA003760\D-Calculations\Civil\A-Stormwater\S - MIC South\Drains\OSD\\_6&8\\_ByAreaRatio\\_Detailed\LPMW South OSD 3\\_02.DRN](#)

DRAINS Version: 2016.07.10June2016

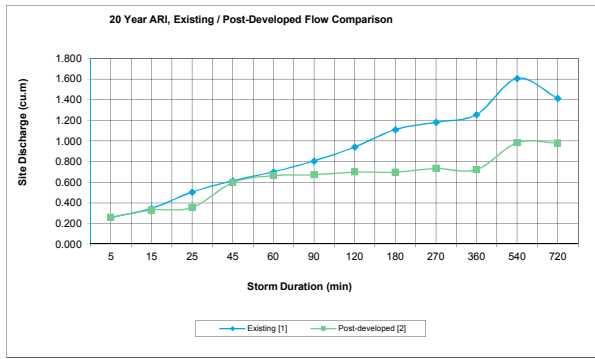
Storm Dur. (min)	2yr ARI Total		
	Existing [1]	Post-developed [2]	[2] - [1]
5	0.126	0.129	0.003
15	0.163	0.172	0.009
25	0.192	0.201	0.009
45	0.153	0.138	-0.015
60	0.206	0.182	-0.024
90	0.269	0.218	-0.051
120	0.319	0.266	-0.053
180	0.387	0.320	-0.067
270	0.458	0.318	-0.140
360	0.493	0.348	-0.145
540	0.656	0.565	-0.091
720	0.663	0.563	-0.100
			0.000
			0.000
			0.000
			0.000
			0.000
Max	0.663	0.565	



Storm Dur. (min)	5yr ARI Total		
	Existing [1]	Post-developed [2]	[2] - [1]
5	0.182	0.185	0.003
15	0.231	0.240	0.009
25	0.299	0.275	-0.024
45	0.337	0.261	-0.076
60	0.406	0.369	-0.037
90	0.483	0.453	-0.030
120	0.558	0.503	-0.055
180	0.677	0.520	-0.157
270	0.753	0.498	-0.255
360	0.812	0.598	-0.214
540	1.046	0.685	-0.361
720	1.013	0.697	-0.316
			0.000
			0.000
			0.000
			0.000
			0.000
Max	1.046	0.697	



Storm Dur. (min)	20yr ARI Total		
	Existing [1]	Post-developed [2]	[2] - [1]
5	0.258	0.260	0.002
15	0.346	0.330	-0.016
25	0.504	0.355	-0.149
45	0.614	0.596	-0.018
60	0.700	0.664	-0.036
90	0.806	0.673	-0.133
120	0.941	0.698	-0.243
180	1.110	0.697	-0.413
270	1.182	0.733	-0.449
360	1.256	0.721	-0.535
540	1.606	0.983	-0.623
720	1.413	0.980	-0.433
			0.000
			0.000
			0.000
			0.000
			0.000
Max	1.606	0.983	



Storm Dur. (min)	100yr ARI Total		
	Existing [1]	Post-developed [2]	[2] - [1]
5	0.354	0.360	0.006
15	0.530	0.419	-0.111
25	0.711	0.684	-0.027
45	0.929	0.861	-0.068
60	1.097	1.055	-0.042
90	1.308	1.150	-0.158
120	1.510	1.325	-0.185
180	1.709	1.228	-0.481
270	1.752	1.515	-0.237
360	1.810	1.280	-0.530
540	2.223	1.484	-0.739
720	1.906	1.680	-0.226
			0.000
			0.000
			0.000
			0.000
			0.000
Max	2.223	1.680	

