

STORMWATER MANAGEMENT PLAN

PROPOSED RESIDENTIAL DEVELOPMENT

LOT 5A (NO. 83A) PRINCES CHARLES RD, FRENCHS FOREST

GENERAL
1. THIS PLAN IS TO BE USED IN CONJUNCTION WITH ARCHITECTURAL, STRUCTURAL, & LANDSCAPING PLANS. ANY DISCREPANCIES OR OMISSIONS ARE TO BE REFERRED TO THE ENGINEER FOR RESOLUTION PRIOR TO COMMENCING WORK.
2. ALL MATERIALS AND WORKMANSHIP IS TO MEET AS 3500.3:2015 STORMWATER DRAINAGE, BCA AND LOCAL COUNCIL DEVELOPMENT POLICIES, CONSENTS AND REQUIREMENTS.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL DIMENSIONS AND DRAINAGE LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORKS. THIS INCLUDES EXISTING SERVICES AND/OR OTHER STRUCTURES THAT MAY AFFECT/BE AFFECTED BY THIS DESIGN PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS NOT TO BE USED FOR SET-OUT PURPOSES. .ALL SURVEY INFORMATION, PROPOSED BUILDING LEVELS, FINISHED SURFACE LEVELS AND SITE DETAILS SHOWN IN THESE DRAWINGS ARE ESTABLISHED UPON LEVELS/DETAILS SUPPLIED BY OTHERS.
5. FLOOR WASTE & DOWNPIPE LOCATIONS ARE INDICATIVE ONLY. ULTIMATE FLOOR WASTE & DOWNPIPE LOCATION, SIZE, & QUANTITY ARE TO BE DETERMINED BY BUILDER IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.
6. IT IS THE BUILDERS RESPONSIBILITY TO LOCATE AND LEVEL ALL EXISTING SERVICES OR OTHER STRUCTURES WHICH MAY AFFECT/BE AFFECTED BY THIS DESIGN PRIOR TO COMMENCEMENT OF WORKS.
7. ANY SUBSTITUTION OF MATERIALS SHALL BE APPROVED BY THE ENGINEER AND INCLUDED IN THE DEVELOPMENT APPLICATION.
8. CONTRACTORS ARE TO INVESTIGATE ALL EXISTING SERVICES AND APPLY FOR "DIAL BEFORE YOU DIG" PRIOR TO COMMENCEMENT OF CONSTRUCTION.

COMPLIANCE
1. THESE PLANS WERE PREPARED IN ACCORDANCE WITH COUNCIL'S POLICIES AND REQUIREMENTS, BASIX REQUIREMENTS, AS 3500:2013, ARR (2016), ARQ (2006), BCA (2015), RELEVANT LEGISLATION, AND NSW MUSIC MODELLING GUIDELINES.

SCOPE OF WORKS
1. DETAILED DESIGN, MODELLING AND DOCUMENTATION FOR THE FOLLOWING (WHERE APPLICABLE): ROOFED, IMPERVIOUS AND PERVIOUS AREAS; RAINWATER REUSE SYSTEM; OSD; AND STORMWATER DISPOSAL.

RAINWATER RE-USE SYSTEM
1. ALL GUTTERS TO BE FITTED WITH LEAF GUARDS AND SUBJECT TO REGULAR INSPECTION / CLEAN OUT.
2. MIN. TANK SIZE TO BE THAT SPECIFIED WITHIN DETAIL AND PLAN.
3. TANKS ARE TO BE INSTALLED BY A LICENSED PLUMBER IN ACCORDANCE WITH MANUFACTURES SPECIFICATIONS, AS3500 AND COUNCIL REQUIREMENTS.
4. RAINWATER RETENTION FOR RE-USE AS SPECIFIED BY BASIX CERTIFICATE.

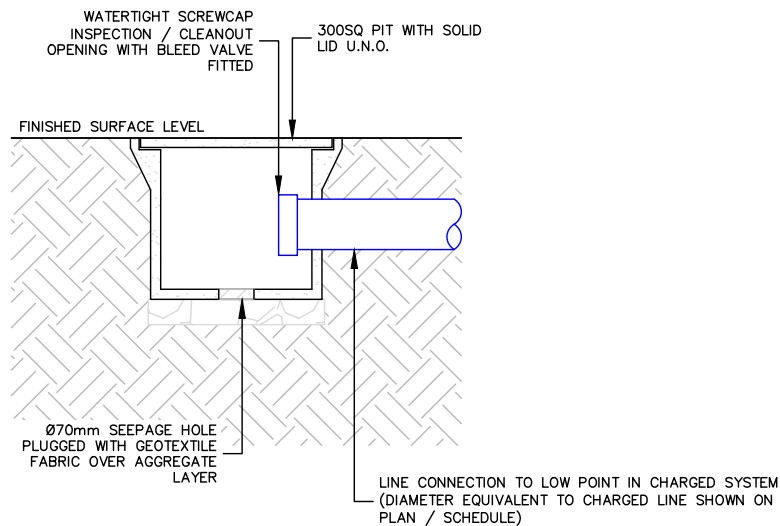
MINIMUM PIPE COVER		
O.L OF PIPE TO F.S.L		
LOCATION	MIN. COVER (mm)	
	CAST IRON, DUCTILE IRON, GALV. STEEL	OTHER AUTHORISED PRODUCTS ⁽¹⁾
1. NOT SUBJECT TO VEHICULAR LOADING:		
a. WITHOUT PAVEMENT-		
i. FOR SINGLE DWELLINGS	0	100
ii. FOR ITEMS OTHER THAN i.	0	300
b. WITH PAVEMENT OF BRICK OR UNREINFORCED CONCRETE	0 ⁽²⁾	50 ⁽²⁾
2. SUBJECT TO VEHICULAR LOADING:		
a. OTHER THAN ROADS-		
i. WITHOUT PAVEMENT	300	450
ii. WITH PAVEMENT OF:		
- REINFORCED CONCRETE FOR HEAVY VEHICULAR LOADINGS	0 ^(2X3)	100 ^(2X3)
- BRICK/UNREINFORCED CONCRETE FOR LIGHT VEHICULAR LOADING	0 ^(2X3)	75 ^(2X3)
b. ROADS-		
i. SEALED	300	500 ⁽³⁾
ii. UNSEALED	300	500 ⁽³⁾
3. SUBJECT TO CONSTRUCTION EQUIPMENT OR IN EMBANKMENT CONDITIONS	300	500 ⁽³⁾
⁽¹⁾ INCLUDES OVERLAY ABOVE TOP OF THE PIPE NOT LESS THAN 50mm THICK		
⁽²⁾ BELOW THE UNDERSIDE OF THE PAVEMENT		
⁽³⁾ SUBJECT TO COMPLIANCE WITH AS 1762, AS 2033, AS 2566.1, AS 3725, AS 4060		

DRAINAGE LINES
1. MINIMUM PIPE GRADE AS SPECIFIED IN TABLE BELOW. MINIMUM DIAMETER IS TO BE (U.N.O): a. Ø100mm WHERE LINE RECEIVES ROOF WATER. b. Ø150mm WHERE LINE RECEIVES RUN-ON FROM PAVED/UNPAVED EXTERNAL SURFACES
2. PIPE EMBEDMENT IS TO BE IN ACCORDANCE WITH LOCAL AUTHORITY SPEC., AS 3500.3, AS 2032 FOR PVC, & AS 3725 FOR FCR/RCP PIPEWORK.
3. SUBSOIL DRAINAGE SHALL BE PROVIDED TO ALL RETAINING WALLS AND EMBANKMENTS WITH THE LINES FEEDING INTO THE STORMWATER DRAINAGE SYSTEM.

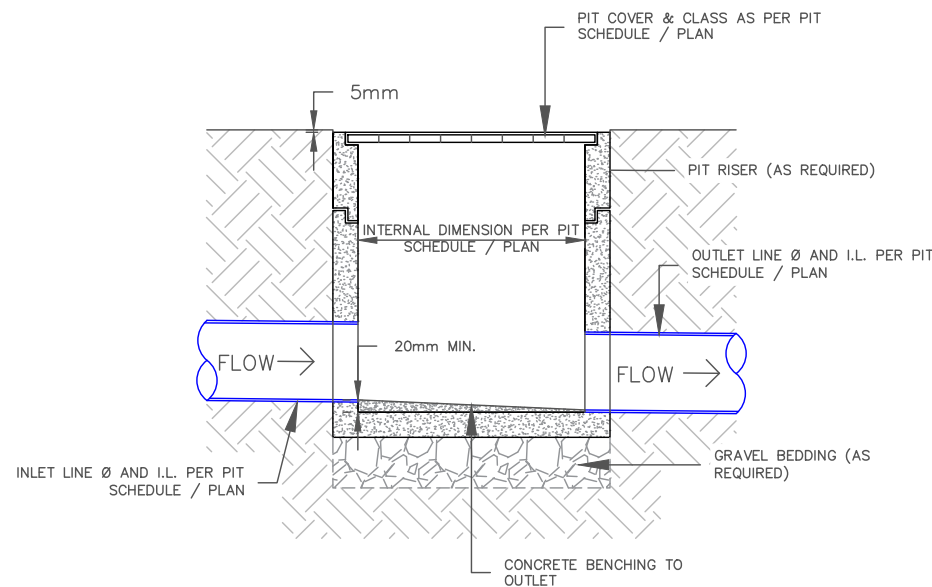
MINIMUM SITE PIPE GRADIENT (U.N.O)			MINIMUM INTERNAL DIMENSIONS FOR STORMWATER PITS		
DIAMETER Ø (mm)	MIN. GRADE	MIN. % SLOPE	DEPTH TO I.L. OF OUTLET (mm)	MIN. INTERNAL DIMENSIONS (mm)	
				WIDTH	LENGTH
≤ Ø150	1:100	1%	≤ 600	450	450
225	1:200	0.5%	> 600 TO ≤ 900	600	600
300	1:250	0.4%	> 600 TO ≤ 900	600	900
375	1:300	0.33%	> 1200	900	900

PITS
1. ALL PITS TO BE FITTED WITH APPROVED GALVANISED STEEL GRATES AND TO BE SUITABLE FOR THE FOLLOWING LOAD RATING (U.N.O): a. CLASS-B MIN. FOR LANDSCAPED AREAS b. CLASS-C WHERE SUBJECT TO VEHICULAR TRAFFIC
2. ALL PITS FITTED WITH CHILDPROOF SPRING LOCKING J-BOLTS.
3. GRATED COVERS OF PITS > 600SQ mm ARE TO BE HINGED & OFFSET FROM OBSTRUCTIONS TO ALLOW FOR FULL OPENING.
4. PROVIDE STEP IRONS TO STORMWATER PITS > 1200mm IN DEPTH.
5. PIT BASES ARE TO BE BENCHD LEVEL TO THE I.L OF THE OUTLET PIPE (NO SUMP U.N.O), WITH A MIN. FALL OF 20mm BETWEEN THE INLET AND OUTLET PIPE I.Ls. ALL PIPES SHOULD BE CUT FLUSH WITH THE WALL OF THE PITS.
6. PRECAST PITS ARE TO BE SET ON A 75mm CONCRETE BASE AND BACKFILLED WITH CONCRETE TO HALF THE PIT'S HEIGHT.
7. WATER SHOULD NOT BE PERMITTED TO POND WITHIN THE DRAINAGE SYSTEM.

ABBREVIATIONS			
A.H.D	AUSTRALIAN HEIGHT DATUM	N.T.S	NOT TO SCALE
A.R.I	AVERAGE RECURRENCE INTERVAL	O.F	OVERFLOW
C.O	CLEAN-OUT PIT	O.L	OBVERT LEVEL
DP	DOWNPIPE	O.S.D	ON-SITE DETENTION
D/S	DOWNSTREAM	R.C.P	REINFORCED CONCRETE PIPE
FF	FIRST FLUSH DEVICE	R.H.S	RECTANGULAR HOLLOW SECTION
F.F.L	FINISHED FLOOR LEVEL	R.L	REDUCED LEVEL
F.G.L	FINISHED GARAGE LEVEL	R.W.T	RAIN-WATER TANK
F.W	FLOOR WASTE	S.L	SURFACE LEVEL
G.S.I.P	GRATED SURFACE INLET PIT	SQ	SQUARE
H.G.L	HYDRAULIC GRADE LINE	TYP.	TYPICAL
I.L	INVERT LEVEL	T.W.L	TOP WATER LEVEL
I.P	INSPECTION POINT	U/S	UPSTREAM
N.S.L	NATURAL SURFACE LEVEL	U.N.O	UNLESS NOTED OTHERWISE



CHARGED LINE CLEAN-OUT PIT (CO) – TYPICAL SECTION DETAIL
SCALE: N.T.S.



GRATED SURFACE INLET PIT (GSIP) – TYPICAL SECTION DETAIL
SCALE: N.T.S.

ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
A-01	01/02/22	LS	LS	RS	ISSUE FOR REVIEW



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ENVIRONMENTAL FLOOD STORMWATER GEOTECHNICAL ACOUSTICS WASTEWATER

BROADCAST CONSULTING PTY LTD | ACN 622 508 187

PROJECT DESCRIPTION	SHEET
PROPOSED RESIDENTIAL DEVELOPMENT	TITLE PAGE & GENERAL NOTES
PROJECT SITE	PLAN
LOT 5A (NO. 83A) PRINCES CHARLES RD, FRENCHS FOREST	STORMWATER MANAGEMENT PLAN
LGA	CLIENT
NORTHERN BEACHES COUNCIL	ALLWORTH CONSTRUCTIONS PTY LTD

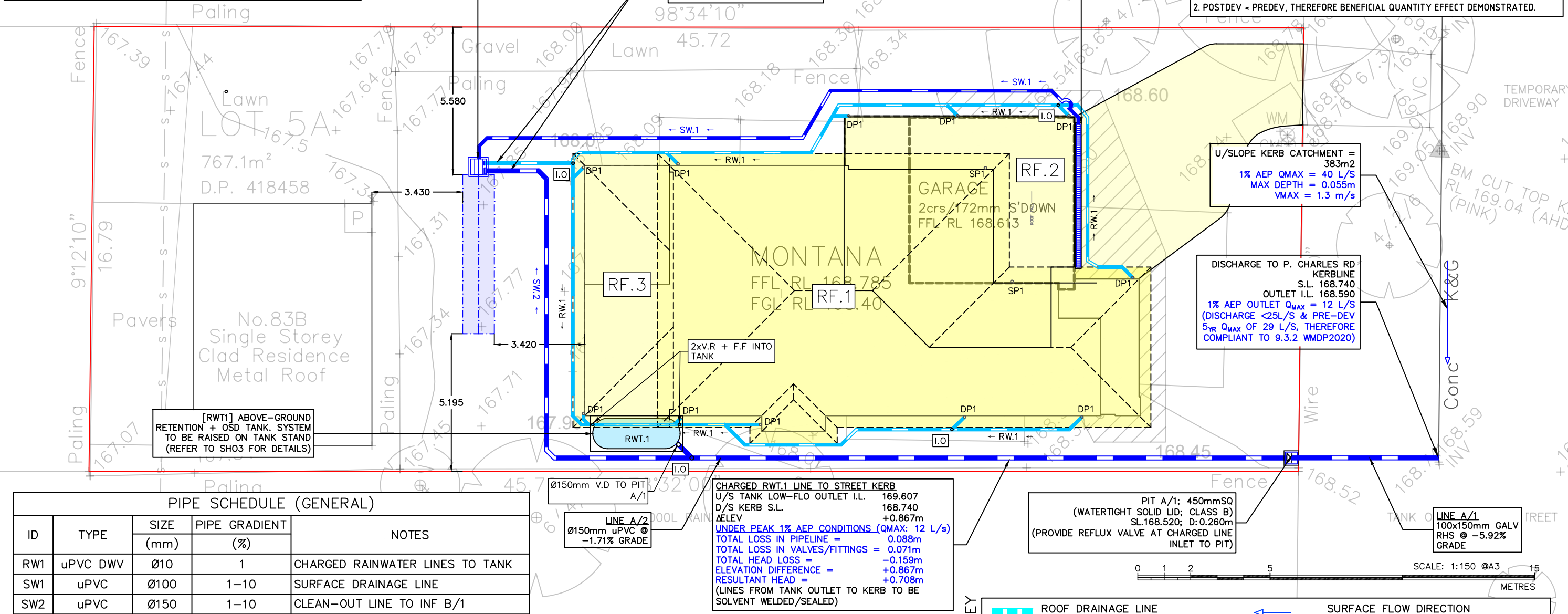
PROJECT ID	
1697-SW	
SCALE	
NTS @ A3	
NTS @ A1	
SHEET NO.	
1 of 3	

CATCHMENT AREA CALCULATIONS [M ²]			
I.D	DEVELOPMENT CONDITION		CHANGE IN IMPERVIOUS AREA 'ΔMP'
	PRE-DEV.	POST-DEV.	
LOT	767.1		278.360
IMPERVIOUS	278.721 (36.33%)	557.08 (72.62%)	

[PIT B/1] INFILTRATION SYSTEM
POLYMER ARCH TRENCH SYSTEM
SL:167.750m; D_{INF}:0.760m; D_{SUMP}:1.01m; L:5.6m; W:1.2m
V_{EFFECTIVE}:2.77m²; A:6.72m²
[TWO ROWS]
(SIZED TO 2% AEP, REFER TO SH03 & DRAINS MODEL FOR FURTHER DETAILS)
(PROVIDE CAPPED CLEAN-OUT POINTS FOR CHARGED ROOF AND STREET LINES)

[PIT B/2] ACO 's150k' GRATED
CHANNEL (OR EQUIV.)(CLASS C)
Ø100mm OUTLET
SL:168.593; L:5.5m
OUTLET I.L. 168.333

TOTAL SITE DISCHARGE 'Q' [L/s] ¹								
(Refer to DRAINS model for further information)								
DESIGN STORM [A.R.I.]	1YR	2YR	5YR	10YR	20YR	50YR	100YR	
DEVELOPMENT CONDITION	PRE-DEV.	12	21	29	33	39	44	50
	POST-DEV.	12	20	27	31	36	40	46
NOTES								
1. MAXIMUM DISCHARGE FOR ALL STORM DURATIONS SIMULATED (5min TO 6hr)								
2. POSTDEV < PREDEV, THEREFORE BENEFICIAL QUANTITY EFFECT DEMONSTRATED.								



PIPE SCHEDULE (GENERAL)				
ID	TYPE	SIZE	PIPE GRADIENT	NOTES
		(mm)	(%)	
RW1	uPVC DWV	Ø10	1	CHARGED RAINWATER LINES TO TANK
SW1	uPVC	Ø100	1-10	SURFACE DRAINAGE LINE
SW2	uPVC	Ø150	1-10	CLEAN-OUT LINE TO INF B/1

- GENERAL NOTES – LGA CONTROLS & OSD WARRANT
- DEVELOPMENT: RESIDENTIAL, REGION 2, NET IMPERVIOUS AREA POST-DEV.: >40% IMPERVIOUS. PER NBC (2020) WMDP OSD IS REQUIRED.
 - REAR FALLING SITE. PER NBC (2020) WMDP 9.3.2.3 TABLE 8, SSR & PSD TO 'LOW LEVEL PROPERTIES' GUIDELINE.
 - LEEWARD LOT FROM ROAD WITHOUT EXISTING ACCESS TO INTERALLOTMENT DRAINAGE. SITE UNABLE TO OBTAIN NEW D/SLOPE EASEMENT (SEE ANCILLARY DOCUMENTS). CHARGED-LINE TO KERB SYSTEM PROPOSED PER 'LOW LEVEL' GUIDELINE 2.2 STEP 3.
 - U/SLOPE WESTERN KERBLINE OF P/CHARLES RD LIDAR + STRAHLER DELINEATED TO 383m2. KERBLINE SHARES CATCHMENT WITH SITES' LEEWARD CATCHMENT (MT PLEASANT AVE TO BLACKBUTTS RD). HYDRAULIC CAPACITY OF KERBLINE 1% AEP CONFIRMED HEREIN.
 - FULL COMPUTATIONAL METHOD APPLIED PER NBC2020 WMDP 9.3.2.6. POST-DEV RUN-OFF PRE-DEV FOR ALL STORM EVENTS (SEE 'TOTAL SITE DISCHARGE' & DRAINS MODEL). DISCHARGE TO KERBLINE LIMITED TO PRE-DEV 20% AEP PER 9.3.2.6.

ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.						
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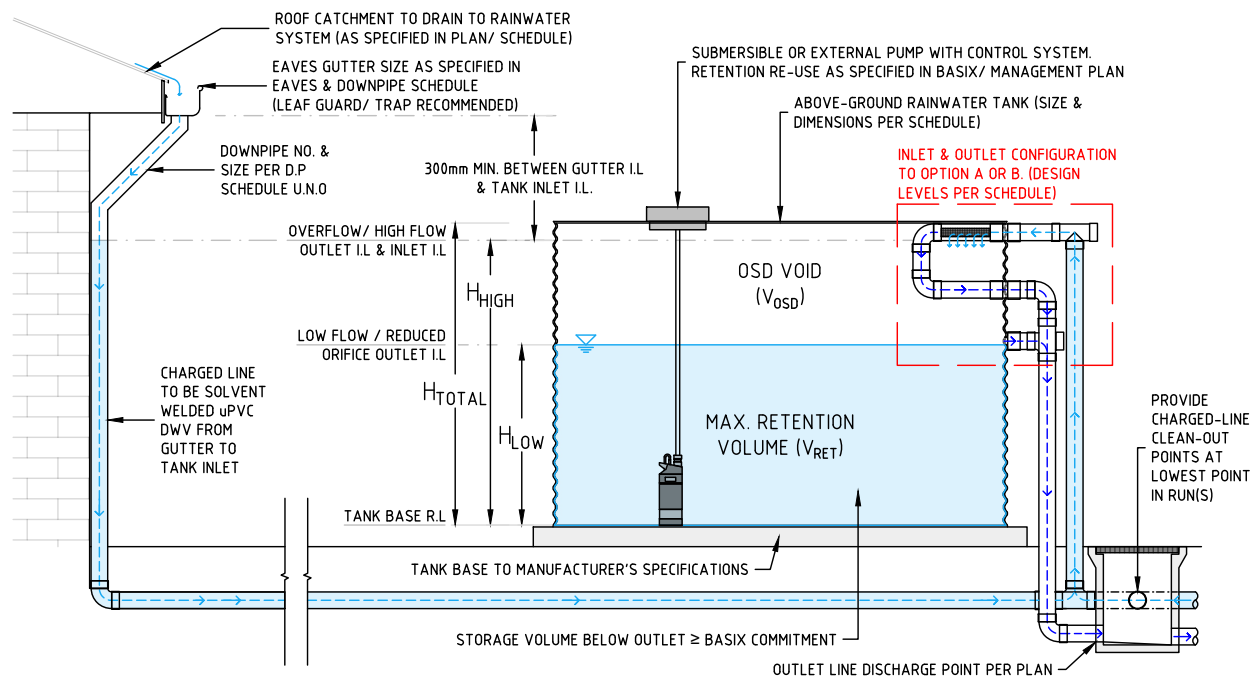
PROJECT DESCRIPTION		SHEET	
PROPOSED RESIDENTIAL DEVELOPMENT		DRAINAGE PLAN	
PROJECT SITE		PLAN	
LOT 5A (NO. 83A) PRINCES CHARLES RD, FRENCHS FOREST		STORMWATER MANAGEMENT PLAN	
LGA		CLIENT	
NORTHERN BEACHES COUNCIL		ALLWORTH CONSTRUCTIONS PTY LTD	

PROJECT ID
1697-SW

SCALE
1:150 @ A3
1:75 @ A1

SHEET NO.
2 OF 3





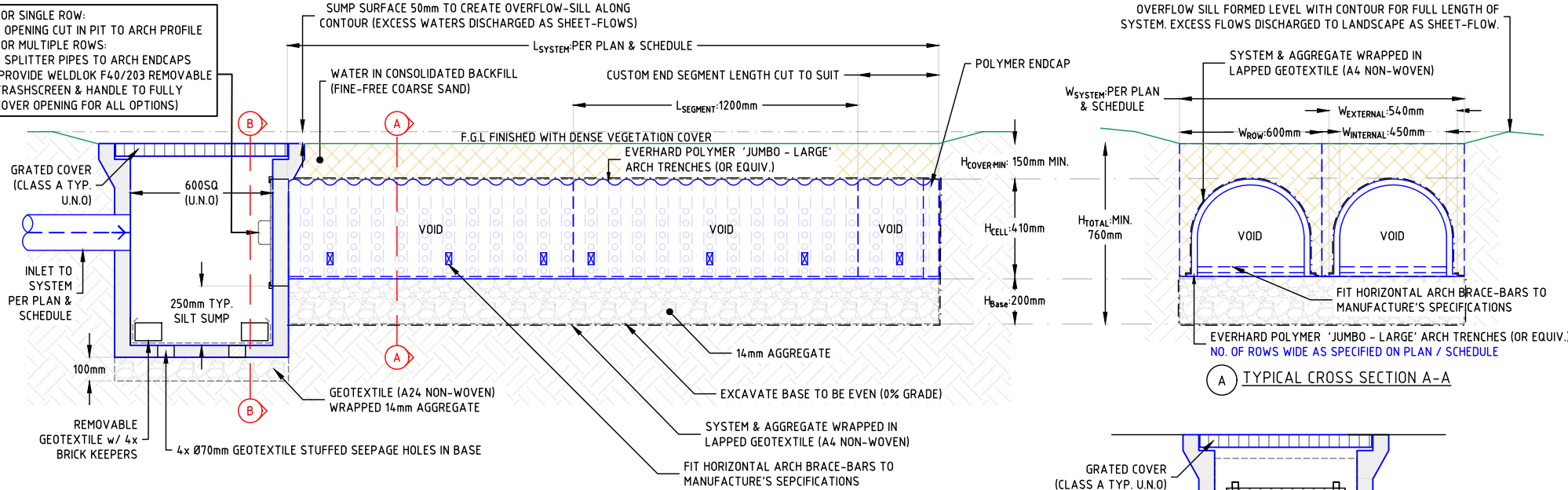
TYPICAL DETAIL - CHARGED LINE TO ABOVE GROUND RAINWATER TANK (RWT)

SCALE: N.T.S.

NOTES FOR CHARGED SYSTEM:

1. PLAN, DETAILS, & DIAGRAM ARE TO BE READ IN CONJUNCTION WITH MANUFACTURER SPECIFICATIONS FOR ALL PRODUCTS.
2. INLET/OUTLET CONFIGURATION CAN BE PROVIDED AT EITHER OR BOTH SIDES OF THE TANK(S).
3. AN OUTLET MUST BE PROVIDED WITH EACH INLET PIPE U.N.O.

FOR SINGLE ROW:
- OPENING CUT IN PIT TO ARCH PROFILE
FOR MULTIPLE ROWS:
- SPLITTER PIPES TO ARCH ENDCAPS
(PROVIDE WELDLOK F40/203 REMOVABLE TRASHSCREEN & HANDLE TO FULLY COVER OPENING FOR ALL OPTIONS)



POLYMER-ARCH TRENCH ABSORPTION SYSTEM - TYPICAL LONGITUDINAL SECTION

SCALE: 1:25 @ A3

NOTES FOR ABSORPTION SYSTEM:

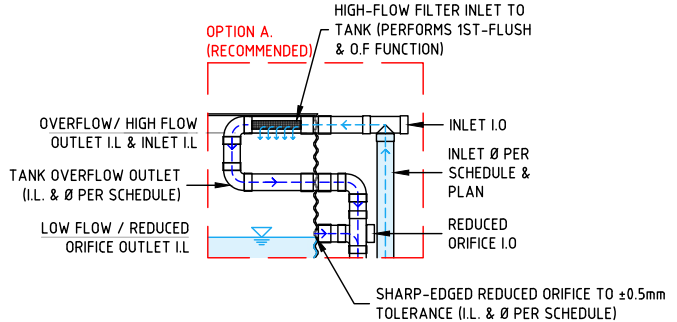
1. SYSTEM DETAILED IN STANDARD DRAWING IS FOR REPRESENTATIONAL PURPOSES. REFER TO SCHEDULE AND PLAN FOR SITE SPECIFIC SYSTEM DIMENSIONS.
2. SYSTEM TO BE ORIENTATED LEVEL WITH CONTOUR, PERPENDICULAR TO LAND FALL.
3. DETAIL AND SCHEDULE TO BE READ IN CONJUNCTION WITH PRODUCT MANUFACTURE'S SPECIFICATIONS FOR ALL PRODUCTS.

ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

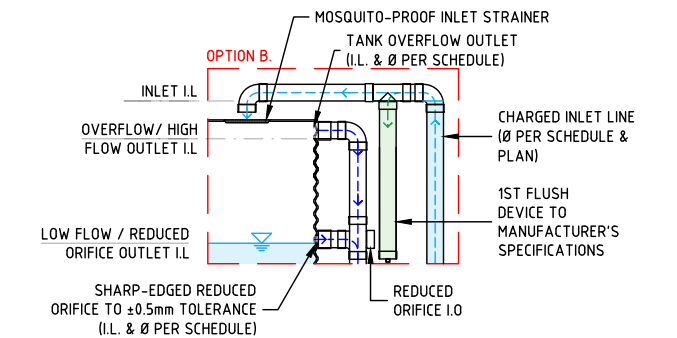
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Ⓐ HIGH FLOW TANK INLET WITH FILTER & INBUILT HIGH FLOW BYPASS



Ⓑ CONVENTIONAL TANK INLET & OUTLET WITH EXTERNAL 1ST-FLUSH

RAINWATER TANK SCHEDULE		
SYSTEM ID		R.W.T 1
TYPE		KINGSPAN SLIMLINE ABOVE ROUND RAINWATER TANK ON STAND
TANK VOLUME (kL)		7.093
TANK DIMENSIONS (m)		H:2.02, W:1.15. L: 3.3
TANK BASE R.L. (m, AHD)		168.753
LOW FLOW OUTLET HEIGHT 'H _{Low} '	(m)	0.854
	I.L. (m, AHD)	169.607
LOW FLOW OUTLET DIAMETER (mm)		Ø75mm REDUCED ORIFICE
HIGH FLOW OUTLET HEIGHT 'H _{HIGH} '	(m)	1.86
	I.L. (m, AHD)	170.613
HIGH FLOW OUTLET DIAMETER (mm)		Ø150
RETENTION VOLUME BELOW OUTLET (kL)		3.0
OSD AIR VOID VOLUME (kL)		4.093
COMMENTS		2xØ100mm INLET TO TANK VIA FIRST-FLUSH DEVICES. RE-USE PER BASIX. Ø150mm OUTLET TO PIT A/1. TANK RAISED ON 700mm STAND ABOVE NGL.

INFILTRATION TRENCH SIZING (DESIGN STORM METHOD)

Absorption Trench Sizing [Design Storm Method]

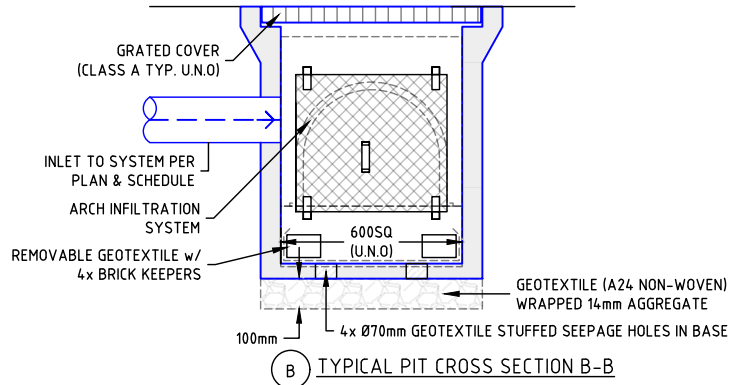
Desktop Variables				Measured Infiltration Values	
Design AEP/VEY	1%or APL Thr	Runoff Coefficient	Area to Trench	Percentage Impermeable	Soil Type
	[m ² /hr]	[C _r]	[A]	[%IMP]	
	[mm/hr]		[m ²]	[%]	
2%: AEP	0	1.035	50.675	100	Sandy Clay

JUMBO 410 Trench		Gravel Bedding		Top Cover		Bed Void	
Arch Dimensions	Trench	Storage	Base Bed	Thickness	Thickness	Ratio	
Width	Height	Void	Thickness				
[W]	[H]	[V]	[D _b]	[D _t]			
[m]	[m]	[m]	[m]	[m]			
0.54	0.41	0.6	171.653	0.2	0.15	0.35	

Arch Trench - Total Infiltration System									
No. of Systems	No. Tunnels	System Dimensions	Height	Absorption Area	Effective Perimeter	Effective Volume	System Void Ratio	Emptying time of system	Required emptying time
[#]	Wide	Length	[H]	[A _u]	[P]	[V]	[e _v]	[T] [days]	[T] [days]
1	2	6	1.2	0.76	7.2	2.970	0.543	0.19	3

Arch Trench - System performance under Design Storm events											
Storm Duration [D]	Rainfall Intensity	Inflow [Q]	Inflow Volume	Outflow Absorption	Infiltration [Q _u]	Inflow - Infiltration	Available Storage	Volume Detained	Volume	Overflow	Rate
[Typical]	[mm/hr]	[L/s]	[L]	[L]	[L/s]	[L]	[L]	[L]	[L]	[L/s]	
5 min	244	3.55	1.068	138	0.361	958	2.970	958	-	-	
10 min	197	2.87	1.722	198	0.330	1.534	2.970	1.534	-	-	
20 min	141	2.05	2.465	377	0.314	2.088	2.970	2.088	-	-	
30 min	111	1.62	2.911	556	0.309	2.355	2.970	2.355	-	-	
1 hour	60	1.03	3.713	1.092	0.303	2.621	2.970	2.621	-	-	
2 hour	45	0.86	4.729	2.855	0.301	2.555	2.970	2.555	-	-	
3 hour	35	0.51	5.507	3.238	0.300	2.289	2.970	2.289	-	-	
6 hour	360	23.6	0.34	7.427	6.458	0.293	969	2.970	969	-	
12 hour	720	16.5	0.24	10.385	12.896	0.293	2.511	2.970	-	-	
24 hour	1440	11.6	0.17	14.602	25.773	0.298	11.171	2.970	-	-	
48 hour	2880	7.73	0.11	19.461	51.527	0.298	32.067	2.970	-	-	
72 hour	4320	5.84	0.09	22.054	77.261	0.298	55.228	2.970	-	-	

Annual Exceedance Probability (AEP) of Storm Event											
Storm Duration [D]	63.2% AEP	50% AEP	20% AEP	10% AEP	10% AEP	2% AEP	1% AEP				
5 min	-	-	-	-	-	-	-				
10 min	-	-	-	-	-	-	-				
20 min	-	-	-	-	-	-	-				
30 min	-	-	-	-	-	-	-				
1 hour	-	-	-	-	-	-	-	322			
2 hour	-	-	-	-	-	-	-	447			
3 hour	-	-	-	-	-	-	-	310			
6 hour	-	-	-	-	-	-	-	-			
12 hour	-	-	-	-	-	-	-	-			
24 hour	-	-	-	-	-	-	-	-			
48 hour	-	-	-	-	-	-	-	-			
72 hour	-	-	-	-	-	-	-	-			



Ⓑ TYPICAL PIT CROSS SECTION B-B

PROJECT DESCRIPTION	PROPOSED RESIDENTIAL DEVELOPMENT	SHEET	INFILTRATION + RWT DETAILS
PROJECT SITE	LOT 5A (NO. 83A) PRINCES CHARLES RD, FRENCHS FOREST	PLAN	STORMWATER MANAGEMENT PLAN
LGA	NORTHERN BEACHES COUNCIL	CLIENT	ALLWORTH CONSTRUCTIONS PTY LTD

PROJECT ID	1697-SW	
SCALE	NTS @ A3	
	NTS @ A1	
SHEET NO.	3 of 3	