marline
BUILDING SERVICES ENGINEERS

About Marline Engineering Newcastle

At Marline, we take a comprehensive approach when designing your new development.

With in-house electrical, mechanical and hydraulic engineers, Marline Engineering makes your engineering design needs a breeze. We are able to adjust, implement and create designs on AutoCAD and REVIT which makes it easy for contractors and builders to build our designs.

We advise you on the most affordable, practical and effective solutions and systems based on the site and legal factors.

As consulting engineers, Marline has also expanded the range of services to provide a wide range of building services disciplines including Air-conditioning, Electrical, Hydraulics, Fire Protection and Lift Services.

Marline has seen a huge amount of growth in the Energy sector. We provide services that go above and beyond the standard regulatory requirements and offer unique solutions to your Section J or JV3 Alternative solution reports. We also offer a fast NABERS and BEEC certification that ensures advertising for commercial properties are fully compliant with the CBD advertising rules and regulations.

With engineering consulting experience that dates back as far as 1975, we're one of the best engineering companies in Australia, and have developed the kind of projects that residential and commercial property developers benefit from.

Our Newcastle engineering firm continues to grow, however our team prides itself on every customer receiving the kind of high quality workmanship and personalised service that our company is known for.

To accommodate the expansion and demand for engineering services within Newcastle and throughout New South Wales, Marline Engineering has almost doubled the number of highly trained employees in the last five years.

Our engineering firm currently employs ten engineers, eight technical assistants and an office administrator. As a result, we continue to be leaders amongst engineering companies in Australia, with a large portfolio and a positive attitude.

PROJECT No:
MN13816

CLIENT:
WILLIAMS RIVER STEEL PTY LTD

MECHANICAL - ELECTRICAL - HYDRAULIC - FIRE - ENERGY - NABERS - STORMWATER - SECTION J - BEEC

Stormwater Services

MONA VALE TOYOTA

61 DARLEY STREET, NSW 2103

DRAWING SCHEDULE

DA ISSUE

STORMWATER SERVICES

LINETYPES - EXISTING

- eCW — COLD WATER
- eHW — HOT WATER
- eWW — WARM WATER
- eFH — FIRE HYDRANT
- eSP — FIRE SPRINKLER
- eG — GAS
- eNP — NON POTABLE
- eRW — RAINWATER REUSE
- eS — SANITARY
- eVP — VENT PIPE OFFSET
- eTW — TRADE WASTE
- eSW — STORMWATER
- eDP — STORMWATER TO RWT
- eOF — STORMWATER OVERFLOW
- eSS — SUBSOIL DRAIN

LINETYPES - NEW

- COLD WATER
- HOT WATER
- HWF — HOT WATER FLOW
- HWR — HOT WATER RETURN
- WARM WATER
- T — TEMPERED WATER
- HEAT TRACE
- FIRE HYDRANT
- SP — FIRE SPRINKLER
- GAS
- NP — NON POTABLE
- RW — RAINWATER REUSE
- SANITARY
- VENT PIPE OFFSET
- TW — TRADE WASTE
- PD — PUMP DISCHARGE
- SW — STORMWATER
- DP — STORMWATER TO RWT
- BD — BALCONY DRAIN TO STORMWATER
- RC — RECYCLED/RECLAIMED WATER
- OF — STORMWATER OVERFLOW
- SS — SUBSOIL DRAIN

SYMBOLS - OTHER

- PIPEWORK CAP
- EXPANSION LOOP
- PIPEWORK PENETRATION TEE
- PIPEWORK PENETRATION RISER
- PIPEWORK PENETRATION DROPPER
- PIPEWORK DROP DOWN
- xxx FU — FIXTURE UNITS
- xxx LU — LOADING UNITS
- xxx MJ — MEGA JOULES
- xxx L/s — LITRES/SECOND
- FLOW ARROW
- VP 20 — PIPEWORK RISES
- VP 20 — PIPEWORK DROPS
- VP 20 — PIPEWORK RISES & DROPS
- × 0.00 — SURFACE LEVEL
- PIPEWORK REDUCER

SYMBOLS - WATER

- ISOLATION VALVE
- BALANCING VALVE
- CHECK VALVE
- REFLUX VALVE IN SHAFT WITH INSPECTION OPENING
- WATER VALVE IN PATH BOX
- CIRCULATING PUMP
- DUAL CHECK VALVES
- REDUCES PRESSURE ZONE DEVICE
- T — THERMOSTATIC MIXING VALVE
- TEMPERING VALVE
- TMV — THERMOSTATIC MIXING VALVE IN WALL BOX
- TMV — TEMPERING VALVE IN WALL BOX
- MAIN WATER METER
- PRIVATE WATER METER
- MICRON FILTER
- HOT WATER STORAGE UNIT

SYMBOLS - GAS

- GAS VALVE
- GAS VALVE IN PATH BOX
- GAS METER
- R — GAS REGULATOR
- GAS SOLENOID
- GAS MARKER PLATE
- GAS CONVECTION HEATER
- GAS HOT WATER UNIT

SYMBOLS - FIRE

- BOOSTER ASSEMBLY
- PUMP SET
- VALVE SET
- TEST POINT
- ALARM STROBE
- SINGLE PILLAR HYDRANT (INTERNAL)
- DOUBLE PILLAR HYDRANT (EXTERNAL)
- STREET HYDRANT
- FIRE HOSE REEL
- THRUST BLOCK
- FIP — FIRE INDICATOR PANEL

SYMBOLS - SANITARY

- AIR ADMITTANCE VALVE
- FLOOR WASTE
- BASKET FLOOR WASTE
- CHROME PLATED BRASS SCREWED CAP
- SEALED FLOOR WASTE
- OVERFLOW GULLY
- CLEAR OUT/INSPECTION OPENING
- SANITARY FIXTURE
- INSPECTION SHAFT
- INSPECTION SHAFT WITH BOUNDARY TRAP
- INDUCT PIPE MICA FLAP
- TUNDISH ON WALL
- TUNDISH INWALL
- SEWER ACCESS CHAMBER
- SEWER MAINTENANCE SHAFT
- PLASTER TRAP
- PIPEWORK CAST IN BEAM
- BUNDED AREA

SYMBOLS - TRADEWASTE

- GREASE ARRESTOR
- GREASE ARRESTOR
- COOLING PIT/DILUTION PIT

SYMBOLS - STORMWATER

- GRATED DRAIN
- GRATED PIT
- SEALED PIT
- DOWNPIPE WITH SPREADER

ABBREVIATIONS

AT	ART TROUGH.
ACU	AIR CONDITIONING UNIT.
AAV	AIR ADMITTANCE VALVE.
B	BATH.
BFW	BUCKET FLOOR WASTE.
BKS	BUCKET SINK.
BS	BAR SINK.
BID	BIDETTE.
BT	BOUNDARY TRAP.
BWU	BOILING WATER UNIT.
CD	CONDENSATE DRAIN.
CO	CLEAROUT.
CPC	CHROME PLATED BRASS SCREWED CLEAROUT.
CS	CLEANERS SINK.
DCV	DOUBLE CHECK VALVE (TESTABLE).
DE	DIESEL EXHAUST.
DF	DRINKING FOUNTAIN.
DN	DIAMETER NOMINAL.
DG	DISCONNECTOR GULLY.
DP	DOWNPIPE.
DPH	DOUBLE PILLAR HYDRANT.
DT	DRINKING TROUGH.
DUCV	DUAL CHECK VALVE.
DW	DISHWASHER.
e	EXISTING.
ED	ELEVATED DRAINAGE.
eSAC	EXISTING SEWER ACCESS CHAMBER.
eSWP	EXISTING STORMWATER PIT.
EW	EYE WASH.
FC	FUME CUPBOARD.
FH	FIRE HYDRANT.
FL	FLOOR LEVEL.
FS	FLUSHER SANITIZER.
FSL	FINISHED SURFACE LEVEL.
FU	FIXTURE UNITS.
FW	FLOOR WASTE.
GB	GAS BAYONET.
GCH	GAS CONVECTION HEATER.
GCT	GAS COOK TOP.
GD	GRATED DRAIN.
GW	GLASS WASHER.
Hb	HANDBASIN.
HT	HOSE TAP.
HWC	HUNTER WATER CORPORATION.
HWU	HOT WATER UNIT.
IL	INVERT LEVEL.
IM	ICE MACHINE.
IO	INSPECTION OPENING.
IS	INSPECTION SHAFT.
IPMF	INDUCT PIPE MICA FLAP.
KIP	KERB INLET PIT.
LPG	LIQUID PETROLEUM GAS.
LS	LABORATORY SINK.
NG	NATURAL GAS.
OG	OVERFLOW GULLY.
PA	PLASTER ARRESTOR.
PAT	PRACTICAL ACTIVITIES TROUGH.
PLD	PLANTER DRAIN.
RL	RELATIVE LEVEL.
RPZD	REDUCED PRESSURE ZONE DEVICE.
RWO	RAIN WATER OUTLET.
RV	REFLUX VALVE.
SAC	SEWER ACCESS CHAMBER.
Shr	SHOWER.
SH	SLOP HOPPER.
SFW	SEALED FLOOR WASTE.
SL	SURFACE LEVEL.
SMS	SEWER MAINTENANCE SHAFT.
Snk	KITCHEN SINK.
SPH	SINGLE PILLAR HYDRANT.
SPR	RAINWATER SPREADER.
SShr	SAFETY SHOWER.
SS	SOIL STACK.
ST	STERILIZER.
SVS	SPRINKLER VALVE SET.
T	TUBS.
TD	TUNDISH.
TMV	THERMOSTATIC MIXING VALVE.
TWV	TRADE WASTE VENT.
UR	URINAL.
Vb	VANITY BASIN.
VP	VENT PIPE.
Wc	WATER CLOSET.
WD	WINDOW DRENCHER.
WM	WASHING MACHINE.
WS	WASTE STACK.
WT	WASH TROUGH.

GENERAL NOTES

1. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN A 'DIAL BEFORE YOU DIG' TO ASCERTAIN THE FULL EXTENT OF EXISTING SERVICES SURROUNDING THE SUBJECT PROPERTY. PRIOR TO ANY EXCAVATION THE RELEVANT AUTHORITIES eg TELSTRA OPTUS, AGILITY etc. ARE TO BE NOTIFIED OF ALL WORKS.
2. ALLOW TO PAY ALL FEES & CHARGES FOR ALL AUTHORITIES RELATING TO ALL WORKS DESIGNED & SPECIFIED.
3. IT IS THE HYDRAULIC CONTRACTORS RESPONSIBILITY TO ENGAGE A SUITABLE QUALIFIED CONTRACTOR TO CARRY OUT A THOROUGH GROUND SEARCH FOR EXISTING SERVICES AROUND AND IN THE PROPOSED BUILDING FOOTPRINT. NOTIFY THE SUPERINTENDENT IMMEDIATELY IF ADDITIONAL SERVICES TO THAT DOCUMENTED ARE LOCATED. THIS IS TO BE CARRIED OUT PRIOR TO ANY WORKS BEING COMMENCED.
4. ALL HOT, WARM & COLD WATER ISOLATION VALVES SHOWN ARE TO BE LOCATED IN THE CEILING VOID COMPLETE WITH ACCESS PANEL OTHERWISE 300mm DOWN FROM CEILING IN ROOM USING ENWARE VP356 ISOLATION VALVE WITH CHROME COVERPLATE.
5. ALL EXPOSED PIPEWORK TO BE CHROME PLATED OR PAINTED AS PER SPECIFICATION.
6. ALLOW TO PREPARE & SUPPLY DETAILED "AS INSTALLED" DRAWINGS & MAINTENANCE MANUALS FOR ALL ASSOCIATED WORKS AS DETAILED IN THE SPECIFICATION.
7. SUPPLY & INSTALL FIRE STOP COLLARS etc. TO COMPLY WITH AS4072.1 TO MAINTAIN THE FIRE RATING INTEGRITY OF THE BUILDING ELEMENT BEING PENETRATED. THE COLLARS MUST COMPLY WITH ALL CLAUSES / PARTS OF AS4072.
8. ALL HYDRAULIC SERVICES PIPEWORK, EQUIPMENT & VALVES SHOULD BE LABELED TO ENABLE THEM TO BE CLEARLY IDENTIFIED. LOCATIONS OF LABELS TO BE APPROVED BY ARCHITECT.
9. ALL HOT/WARM WATER PIPEWORK TO BE INSULATED WITH THERMOTEC INSULATION OR EQUIVALENT WITH R-VALVE = 1.0 IN ACCORDANCE WITH AS/NZS 3500.4. REFER TO SPECIFICATION FOR EXACT REQUIREMENTS.
10. ALL DISRUPTIONS TO EXISTING SERVICES FOR NEW CONNECTIONS ARE TO BE COORDINATED ON SITE WITH THE PROJECT SUPERINTENDENT.
11. ALL INWALL TUNDISH ARE TO BE MODTEC OR EQUIVALENT. REFER TO DETAILS.
12. ALL EXTERNAL HOSE TAPS TO BE ENWARE KEY OPERATED HOSE TAPS FITTED WITH VACUUM BREAKERS.
13. ALL LEVELS & LOCATIONS SHOWN ON DRAWINGS FOR EXISTING PITS, SERVICES, SEWER ACCESS CHAMBERS & KERB INLET PITS ARE TO BE CONFIRMED ON SITE PRIOR TO ANY WORKS BEING CARRIED OUT.
14. ISOLATION VALVE AT WATER METER ASSEMBLY TO BE SECURED IN THE OPEN POSITION BY A PADLOCKED METAL STRAP AND AN ENGRAVED NON FERROUS METAL LABEL ATTACHED. LABEL TO BE ENGRAVED WITH 8mm UPPER CASE WORDING: "FIRE SERVICE VALVE - CLOSE ONLY TO SERVICE FIRE HOSE REELS".
15. ALL SERVICES INSTALLED ADJACENT THE BUILDING ARE TO BE LOCATED OUTSIDE THE ZONE OF INFLUENCE AS PER AS3500.
16. ALL HYDRANT PIPEWORK TO BE BLUE BRUTE CLASS 16 INGROUND OR GALVANIZED STEEL ABOVE GROUND TO COMPLY WITH AUSTRALIAN STANDARDS. ALL BLUE BRUTE PIPEWORK TO BE SUPPORTED BY THRUST BLOCKS.
17. ALL TRADEWASTE BASKET TRAPS ARE TO BE FITTED WITH AN INSPECTION OPENING DOWNSTREAM OF TRAP.
18. ALL BALCONY DRAINS ARE TO BE SPECIALTY PLUMBING SUPPLIES SPS 100mm ROUND R100S/C90 BALCONY DRAIN & PIPEWORK IS TO BE CAST IN SLAB. REFER TO DETAIL. ALSO REFER TO ARCHITECTURAL & STRUCTURAL DRAWINGS FOR EXACT CONFIGURATION.
19. ALL LOCATIONS OF WATER POINTS FOR INTERNAL FITOUT SHOWN ON THESE PLANS ARE FOR CLARITY ONLY. FINAL LOCATIONS ARE TO BE DETERMINED USING ARCHITECTURAL 1:50 INTERNAL LAYOUTS & ELEVATIONS.
20. EXISTING WATER METERS SERVING THE EXISTING SITE TO BE REMOVED & RETURNED TO HUNTER WATER.
21. EXCAVATE, LOCATE & CONNECT TO EXISTING SEWER JUNCTION SERVING THE SITE.
22. ENSURE ALL FIXTURES, FITTINGS, BRACKETS, FASTENERS, ANGLES, MATERIAL SELECTION ETC, ARE SUITABLE TO THE COASTAL ENVIRONMENT.
23. SANITARY DRAINAGE OVERFLOW GULLIES TO BE PROVIDED TO ALL GROUND FLOOR UNITS IN ACCORDANCE WITH AS3500.2 REQUIREMENTS. IF HEIGHTS IN ACCORDANCE WITH AS3500.2.4.6.6.6 CANNOT BE ACHIEVED REFLUX VALVES MUST BE INSTALLED.
24. WHERE PIPEWORK IS LIKELY TO BE EXPOSED TO FIRE IN AN AREA WITHIN A BUILDING THAT IS NOT PROTECTED BY SPRINKLERS, PIPE-SUPPORTS SHALL BE INSTALLED WITH A MINIMUM FRL NOT LESS THAN 60/-/-. THE PIPE-SUPPORTS ARE REQUIRED TO HAVE A TEMPERATURE RESISTANCE OF NOT LESS THAN 500°C WHEN TESTED IN ACCORDANCE WITH AS1530.4.

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0 25mm 50mm 100mm ON A1 ORIGINAL

Rev	Date	Reason for Issue	Drawn	Design	Verify
2	09.02.23	DA ISSUE	JC	JA	BM
1	23.01.20	80% ISSUE FOR REVIEW	JC	JA	BM

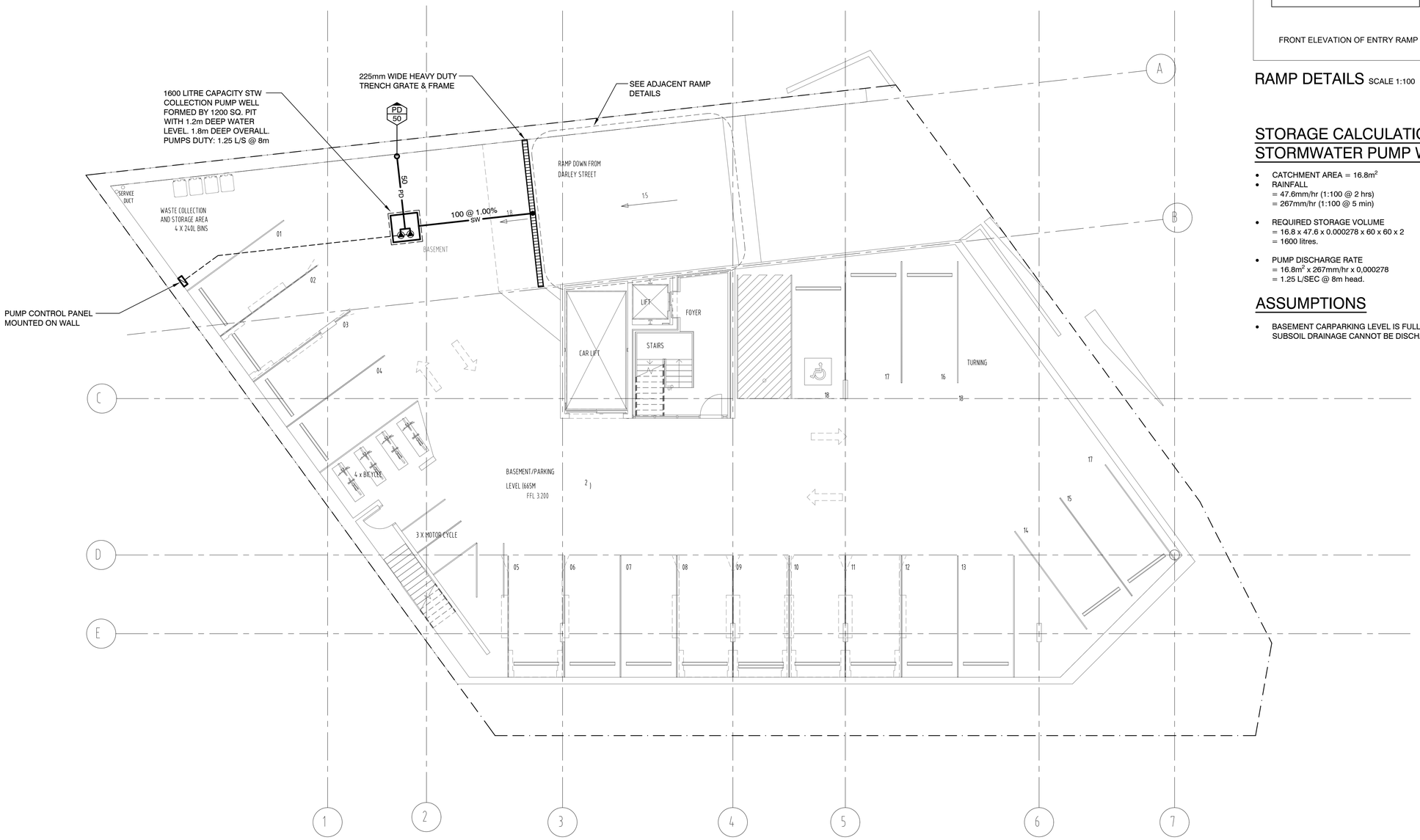
Project
MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

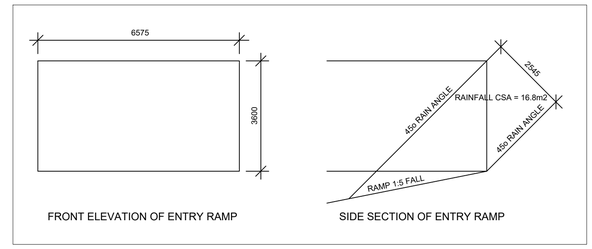
Drawing Title
LEGEND & NOTES

Discipline
STORMWATER SERVICES

Scale N.T.S @ A1

Job No. 13816
Drawing No. SW-00-001
Rev 2





RAMP DETAILS SCALE 1:100

STORAGE CALCULATION FOR STORMWATER PUMP WELL

- CATCHMENT AREA = 16.8m^2
- RAINFALL
  = 47.6mm/hr (1:100 @ 2 hrs)
  = 267mm/hr (1:100 @ 5 min)
- REQUIRED STORAGE VOLUME
  = 16.8 x 47.6 x 0.000278 x 60 x 60 x 2
  = 1600 litres.
- PUMP DISCHARGE RATE
  = 16.8m^2 x 267mm/hr x 0,000278
  = 1.25 L/SEC @ 8m head.

ASSUMPTIONS

- BASEMENT CARPARKING LEVEL IS FULLY TANKED TO REMOVE NEED FOR SUBSOIL DRAINAGE. SUBSOIL DRAINAGE CANNOT BE DISCHARGED TO STREET KERB.

MECHANICAL — ELECTRICAL — HYDRAULIC — FIRE — ENERGY — NABERS — STORMWATER — SECTION J — BEEC

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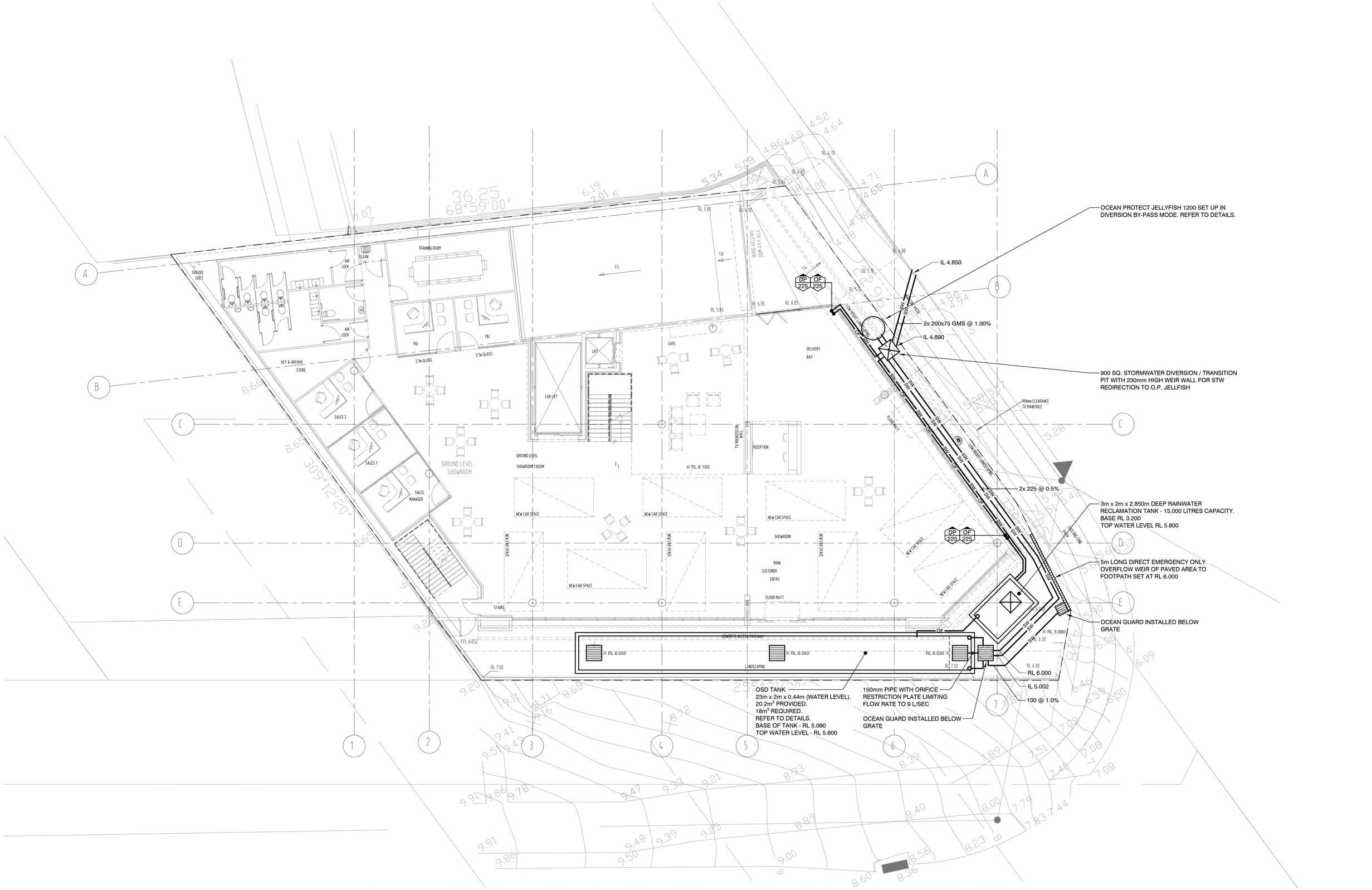
Project
MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

Drawing Title
BASEMENT
STORMWATER LAYOUT

Discipline
STORMWATER SERVICES

Scale 1:100 @ A1

Job No. 13816
Drawing No. SW-10-001
Rev 2



MECHANICAL — ELECTRICAL — HYDRAULIC — FIRE — ENERGY — NABERS — STORMWATER — SECTION J — BEEC

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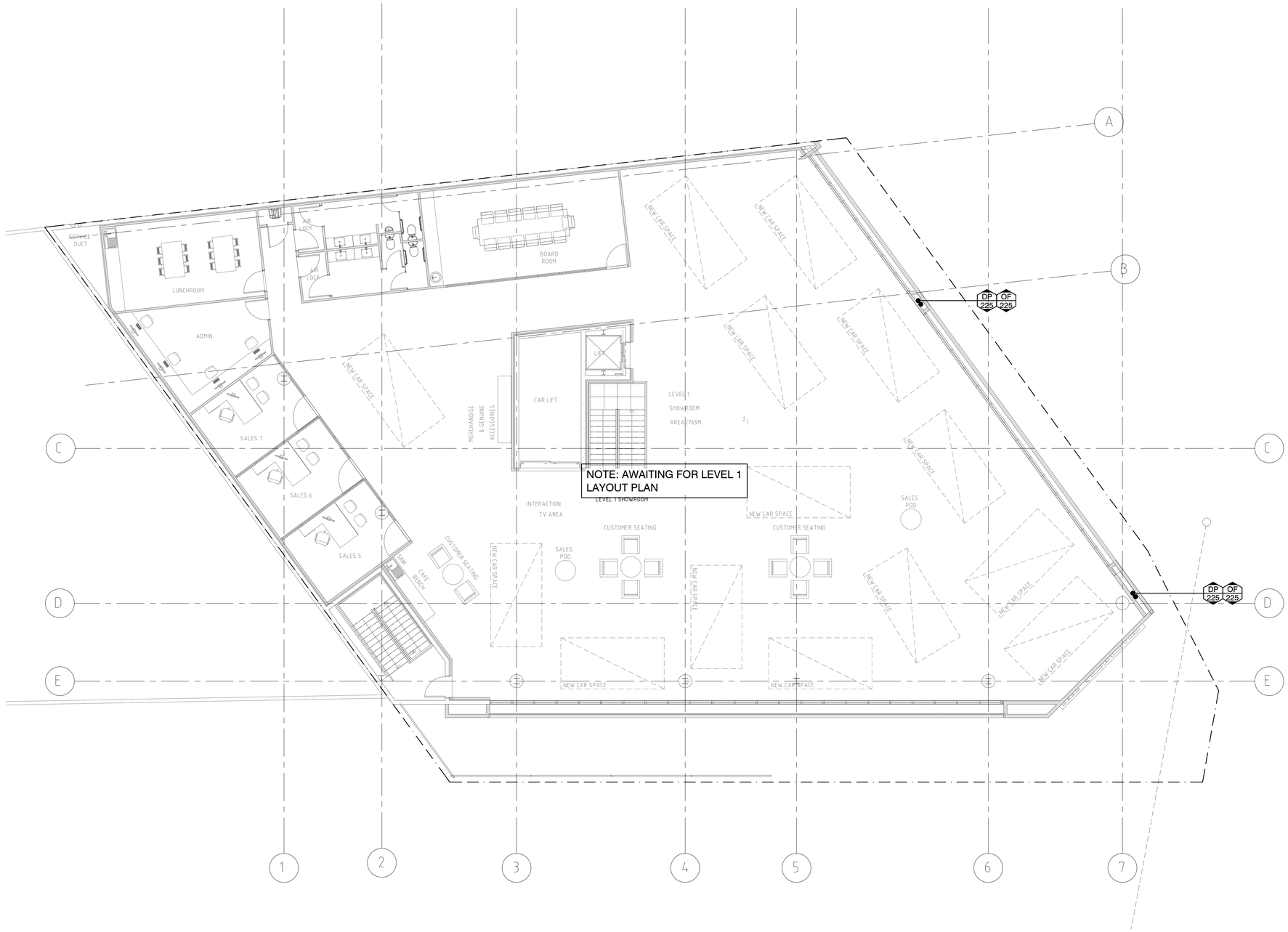
Project
MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

Drawing Title
GROUND FLOOR
STORMWATER LAYOUT

Discipline
STORMWATER SERVICES

Scale 1:100 @ A1

Job No. 13816
Drawing No. SW-10-002
Rev **2**



MECHANICAL — ELECTRICAL — HYDRAULIC — FIRE — ENERGY — NABERS — STORMWATER — SECTION J — BEEC

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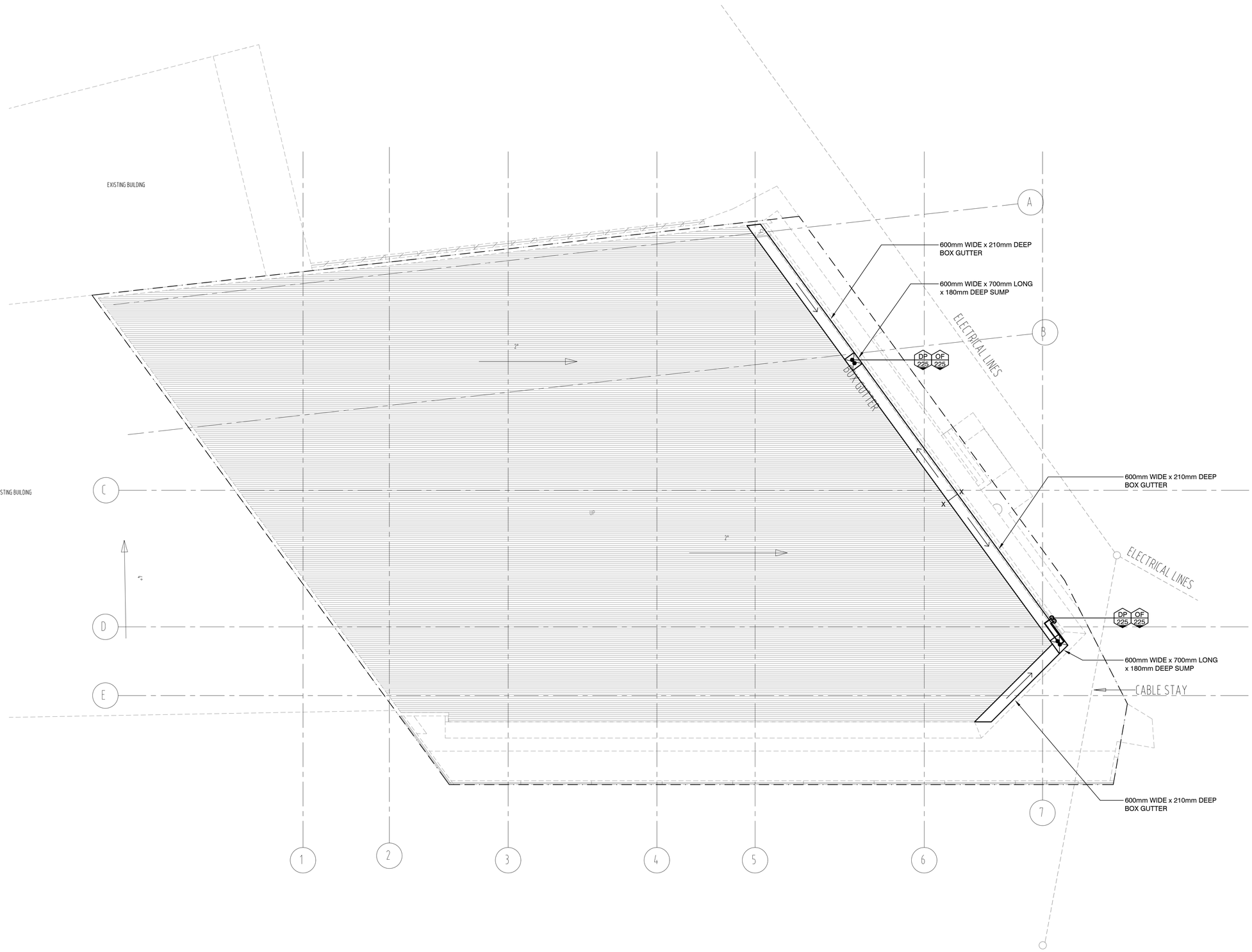
Project
MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

Drawing Title
FIRST FLOOR
STORMWATER LAYOUT

Discipline
STORMWATER SERVICES

Scale 1:100 @ A1

Job No. 13816
Drawing No. SW-10-003
Rev 2



MECHANICAL — ELECTRICAL — HYDRAULIC — FIRE — ENERGY — NABERS — STORMWATER — SECTION J — BEEC

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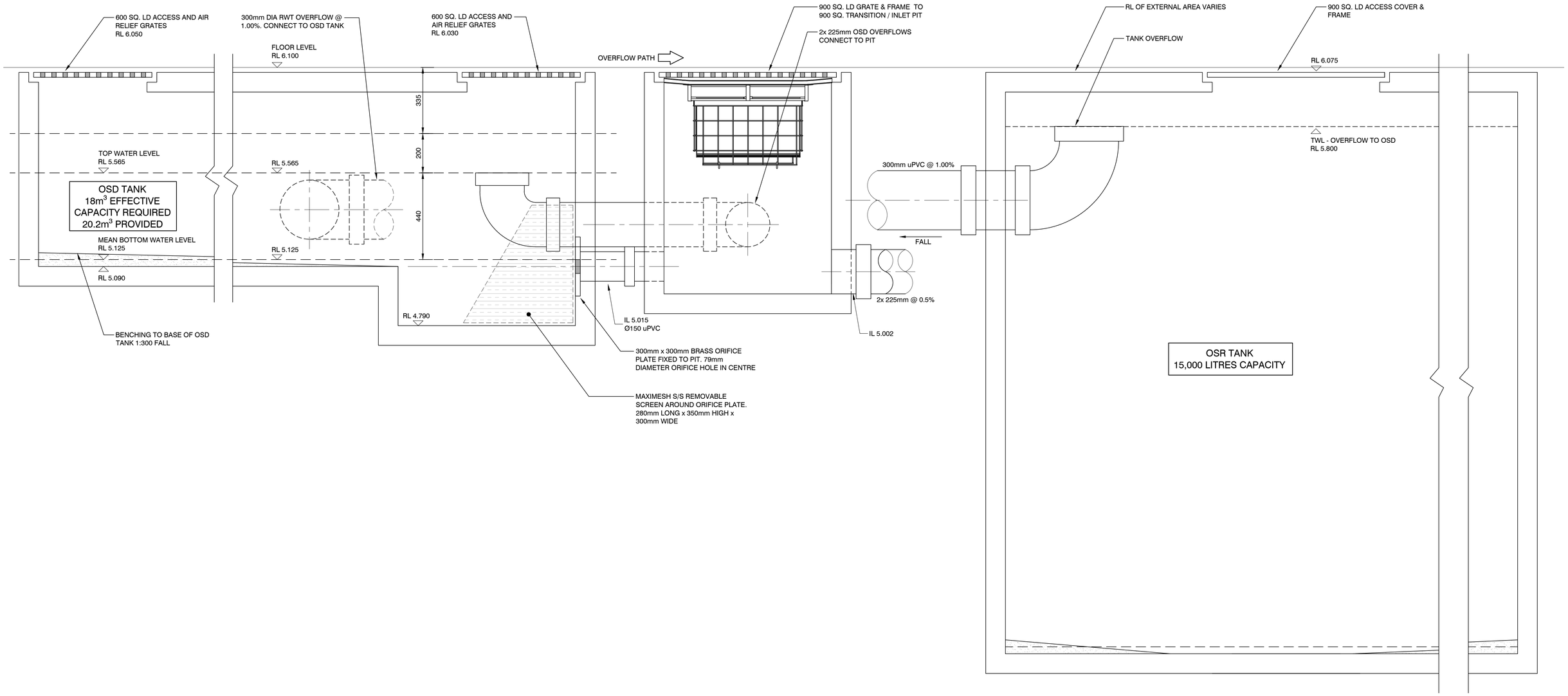
Project
MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

Drawing Title
ROOF
STORMWATER LAYOUT

Discipline
STORMWATER SERVICES

Scale 1:100 @ A1

Job No. 13816
Drawing No. SW-10-004
Rev **2**



MECHANICAL — ELECTRICAL — HYDRAULIC — FIRE — ENERGY — NABERS — STORMWATER — SECTION J — BEEC

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Project
MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

Drawing Title
DETAILS - SHEET 1

Discipline
STORMWATER SERVICES

Scale N.T.S @ A1

Job No. 13816

Drawing No. SW-30-001

Rev **2**

Location

Label: 61 Darley Street Mona Vale - Site Specific

Latitude: -33.6759 [Nearest grid cell: 33.6875 (S)]

Longitude: 151.3073 [Nearest grid cell: 151.3125 (E)]

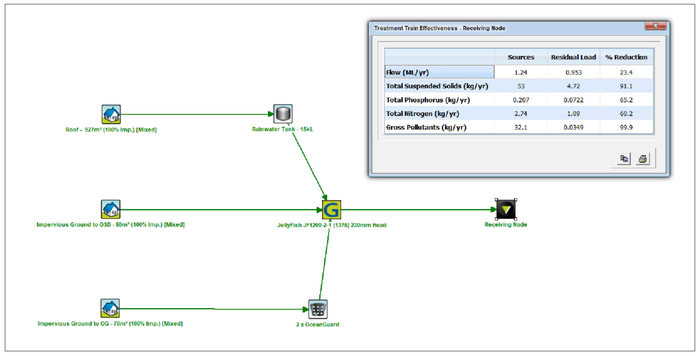
IFD Design Rainfall Intensity (mm/h)

Issued: 18 January 2023

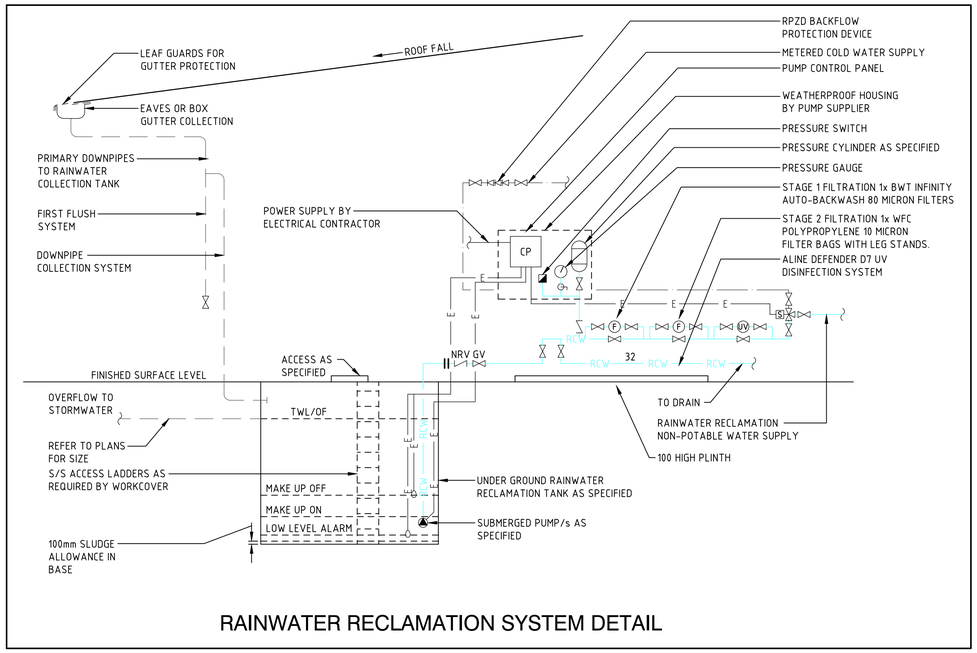
Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
FAQ for New ARR probability terminology

	Annual Exceedance Probability (AEP)						
Duration	**63.2%**	**50%#**	**20%***	**10%**	**5%**	**2%**	**1%**
1 min	144	161	218	258	299	355	400
2 min	120	134	177	207	237	277	309
3 min	111	124	164	192	221	259	290
4 min	104	116	155	183	210	248	278
5 min	98.2	110	147	174	201	238	267
10 min	77.6	87.1	118	141	163	195	220
15 min	64.7	72.8	99.1	118	137	163	184
20 min	55.9	62.8	85.5	102	118	141	159
25 min	49.4	55,5	75,4	89,5	104	124	139
30 min	44.4	49.9	67.6	80.2	92.9	110	124
45 min	34.6	38.8	52.2	61.7	71.3	84.4	94.9
1 hour	28.8	32.1	43.0	50.7	58.5	69.1	77.6
1.5 hour	22.0	24.5	32.5	38.2	43.9	51.9	58.2
2 hour	18.1	20.1	26.6	31.2	35.9	42.4	47.6
3 hour	13.8	15.3	20.1	23.6	27.2	32.1	36.1
4.5 hour	10.6	11.7	15.4	18.1	20.8	24.7	27.9
6 hour	8.80	9.73	12.8	15.1	17.4	20.8	23.4
9 hour	6.81	7.55	10.0	11.8	13.8	16.4	18.6
12 hour	5.70	6.33	8.46	10.0	11.7	14.1	16.0
18 hour	4.44	4.96	6.72	8.03	9.42	11.3	12.9
24 hour	3.71	4.17	5.71	6.86	8.08	9.74	11.1
30 hour	3.23	3.64	5.03	6.06	7.15	8.62	9.79
36 hour	2.88	3.25	4.52	5.46	6.46	7.78	8.82
48 hour	2.38	2.71	3.80	4.60	5.44	6.54	7.40
72 hour	1.80	2.06	2.90	3.52	4.16	4.98	5.60
96 hour	1.46	1.67	2.35	2.84	3.35	3.99	4.47
120 hour	1.23	1.40	1.96	2.36	2.77	3.29	3.69
144 hour	1.06	1.20	1.67	2.01	2.34	2.78	3.11
168 hour	0.929	1.05	1.45	1.73	2.01	2.38	2.67

Note:
The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.
* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.



OSD ORIFICE SIZING CALCULATOR					
WATER DEPTH ABOVE CENTRE LINE IN METRES	0.475	m	A=	0.004902	m2 - area of orifice
			G=	9.80665	accelleration due to gravity
SELECTED ORIFICE DIAMETER IN mm	0.079	m	C=	0.61	coefficient
			H=	0.664	metres - height above orifice
RESULTANT FLOW RATE IN m3/SEC	0.00912635	m3/SEC			
CONVERSION TO L/SEC	9.126	L/SEC			
INPUT DESIRED L/SEC TARGET HERE	9	L/SEC			
LEGEND:		Input Data Required			
		Automatic Answer			



RAINWATER RECLAMATION SYSTEM DETAIL

Commercial Buildings Cold Water Sizing Guide											
Fixture Type	No Off	LU's Each	Total LU's	Full Flow l/sec	Total Full Flow l/sec	Diversity %	LU PSD l/sec	Full Flow PSD l/sec	Average Flow l/sec	Selected Flow l/sec	Comments
NON-POTABLE											
Water closets	10	2.0	20.0	0.11	1.10	33.0	0.38	0.36			
Urinals	3	2.0	6.0	0.08	0.24	33.0	0.23	0.08			
External HT's	2	4.0	8.0	0.30	0.60	50.0	0.25	0.30			
Subtotal			**34.0**		**1.94**	**33.0**	**0.45**	**0.64**	**0.55**	**0.55**	**NPCW**
POTABLE											
Handbasins	9	1.0	9.0	0.12	1.08	33.0	0.26	0.36			
Cleaners sinks	2	3.0	6.0	0.22	0.44	50.0	0.23	0.22			
Kitchen sinks	4	3.0	12.0	0.22	0.88	25.0	0.29	0.22			
Dishwashers	4	3.0	12.0	0.10	0.40	25.0	0.29	0.10			
Hose taps int'	2	8.0	16.0	0.22	0.44	50.0	0.33	0.22			
Subtotal			**55.0**		**3.24**	**33.0**	**1.40**	**1.07**	**1.23**	**1.23**	**PCW**
Subtotals			**89**		**5.18**	**25.0**	**0.92**	**1.30**	**1.11**	**1.11**	**Totals**

Cold Water Summary		**Hours Of Operation Generally**			
Peak flow rate	Monday to Friday	8:00am to 7:00pm	9	1.11	litres per second
Minimum flow rate	Saturday and Sunday	8:00am to 7:00pm	12	0.92	litres per second
Average flow rate	Min Coeff 60	Length of Peak	0.3	1.03	litres per second
Peak Daily usage	Hours Coeff 60	No of Peaks	3	3.59	KL
Minimum Daily usage				1.49	KL
Average Daily usage				**2.54**	KL
Sewer Outflow Summary					
Peak flow rate	Monday to Friday	8:00am to 7:00pm	9		
Minimum flow rate	Saturday and Sunday	8:00am to 7:00pm	12	1.00	litres per second
Average flow rate	Min Coeff 60	Length of Peak	0.3	0.83	litres per second
Peak Daily usage	Hours Coeff 60	No of Peaks	3	0.93	litres per second
Minimum Daily usage				3.23	KL
Average Daily usage				1.34	KL
Non-Potable Water Use Summary				**2.29**	KL

Estimated total water usage	Per Day		Per Year	
	2539.4	Litres	792277.2	Litres
	2.5	KL	792.3	KL
Estimated non-potable water usage	Per Day		Per Year	
	1249.8	Litres	389950.6	Litres
	1.2	KL	390.0	KL

WATER BALANCE MODEL													
CONTRIBUTING ROOF AREA	842	m2											
ANNUAL DECILE 9 MEDIAN RAINFALL	1151.7	mm											
MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	**RESULTS**
MONTHLY DECILE 9 MEDIAN RAINFALL	83.2	79.7	98.6	99.1	107.8	81.9	88.2	74.6	49.3	62.6	63.4	65.3	
AVERAGE LITRES RAINWATER / MONTH ACHIEVED	52540.80	50330.55	62265.90	62581.65	68075.70	51719.85	55698.30	47109.90	31132.95	39531.90	40037.10	41236.95	**602261.55**
AVERAGE LITRES RAINWATER / DAY	1694.86	1623.57	2008.58	2018.76	2195.99	1668.38	1796.72	1519.67	1004.29	1275.22	1291.52	1330.22	**19427.79**
AVERAGE USAGE LITRES / DAY	2539.35	2539.35	2539.35	2539.35	2539.35	2539.35	2539.35	2539.35	2539.35	2539.35	2539.35	2539.35	**30472.20**
AVERAGE POTABLE WATER USED / DAY	844.49	915.78	530.77	520.59	343.36	870.97	742.63	1019.68	1535.06	1264.13	1247.83	1209.13	**11044.41**
MEAN NUMBER OF DAYS OF RAIN >1mm	8.3	8.4	9.3	10.1	9.1	9.4	7.5	8.1	7.9	8.5	8.4	8.2	**103.20**
AVERAGE RAINWATER TANK SIZE REQUIRED	6330.217	5991.732	6695.258	6196.203	7480.846	5502.112	7426.44	5816.037	3940.88	4650.812	4766.321	5028.896	5835.868
OPERATIONAL TANK SIZE INCLUDING OVERFLOW	7174.70	6907.52	7226.03	6716.79	7824.21	6373.08	8169.07	6835.71	5475.94	5914.94	6014.15	6238.02	**16880.28**
TANK SIZE SELECTED FOR DEVELOPMENT	15000	LITRES											

View: Main statistics / All available — Period: Use all years of data — Text size: Normal / Large

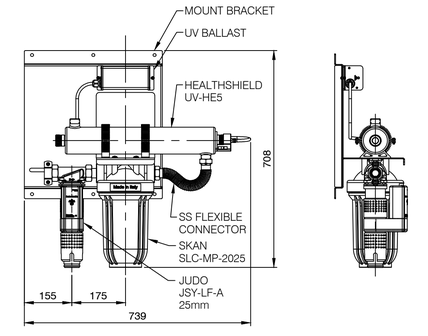
Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	Plot	Map
Temperature																
Mean maximum temperature (°C)	26.6	26.5	25.4	22.9	20.3	17.9	17.4	18.7	21.1	22.9	24.6	25.6	22.5	41 1915 1956		
Mean minimum temperature (°C)	18.1	18.4	16.9	14.0	11.3	9.0	7.9	8.7	10.7	13.1	15.0	16.9	13.3	41 1915 1956		
Rainfall																
Mean rainfall (mm)	101.6	105.1	117.4	132.4	132.9	125.6	101.2	84.2	69.3	81.6	83.4	85.4	1191.6	47 1914 1963		
Decile 5 (median) rainfall (mm)	83.2	79.7	98.6	99.1	107.8	81.9	88.2	74.6	49.3	62.6	63.4	65.3	1151.7	49 1914 1963		
Mean number of days of rain ≥ 1 mm	8.3	8.4	9.3	10.1	9.1	9.4	7.5	8.1	7.9	8.5	8.4	8.2	103.2	49 1914 1963		

Features & Benefits

- Timer controlled automatic backwash filter complete with 100 micron stainless steel screen
- Durable reinforced polypropylene housing , complete with 5 micron washable sediment filter element
- High output UV disinfection to ensure maximum bacteria kill
- Supplied fitted to backboard, ready to install on site

Specifications

Max flow rate	70L/m (4.2m3/h)
Max temperature	45°C
Max pressure	830 kPa
Inlet	1"BSP (25mm)
Outlet	1"BSP (25mm)
Power supply	2 x 10 Amp GPO



FRONT VIEW — RIGHT SIDE VIEW

ALINE DEFENDER D7

MECHANICAL — ELECTRICAL — HYDRAULIC — FIRE — ENERGY — NABERS — STORMWATER — SECTION J — BEEC

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0 25mm 50mm 100mm ON A1 ORIGINAL

Rev	Date	Reason for Issue	Drawn	Design	Verify
2	09.02.23	DA ISSUE	JC	JA	BM
1	23.01.20	80% ISSUE FOR REVIEW	JC	JA	BM

Project: MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

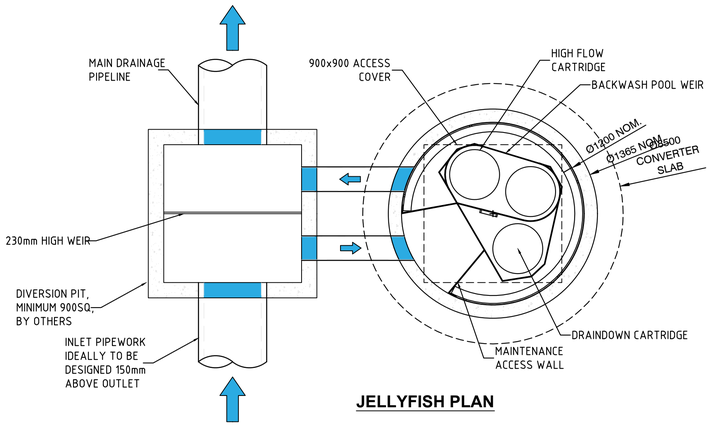
Drawing Title: DETAILS - SHEET 2

Discipline: **STORMWATER SERVICES**

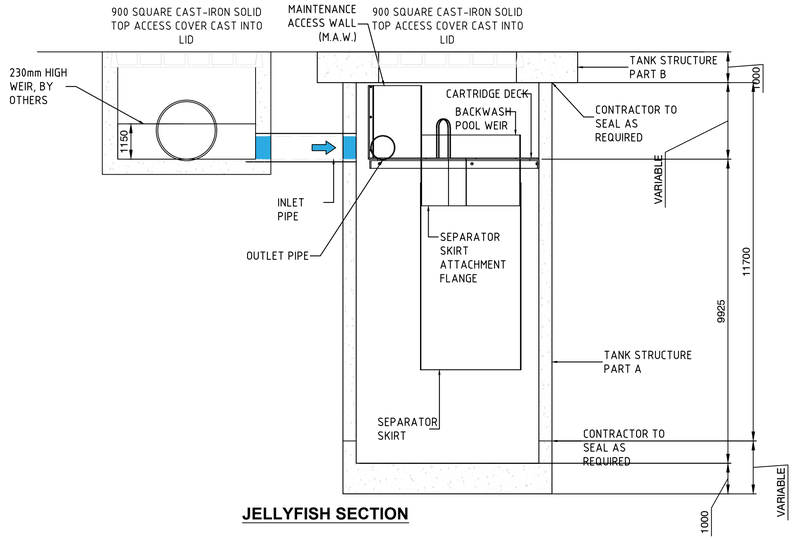
Scale N.T.S @ A1

Job No. 13816 | Drawing No. SW-30-002 | Rev **2**

NOT FOR CONSTRUCTION



JELLYFISH PLAN



JELLYFISH SECTION

LAST MODIFIED: 18-01-23

JELLYFISH DESIGN TABLE

JELLYFISH TREATMENT FLOW IS A FUNCTION OF THE NUMBER OF CARTRIDGES AND THE DEVICE TOTAL HEAD DIFFERENTIAL. IF THE PIPE FLOW EXCEEDS THE TREATMENT FLOW THEN AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

REQUIRED DEVICE TOTAL HEAD DIFFERENTIAL [mm]	460	230
CARTRIDGE FLOW RATE FOR HIGH-FLOW / DRAINDOWN [L/s]	5 / 2.5	2.5 / 1.25
CARTRIDGE LENGTH [mm]	1375	1375
OUTLET INVERT TO STRUCTURE INVERT [mm])	1985	1985

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	[ ]
WATER QUALITY FLOW RATE (L/S)	[ ]
# OF CARTRIDGES REQUIRED (HF [- DD)	-]
CARTRIDGE SIZE	1375

PIPE DATA:	I.L.	MATERIAL	DIAMETER
INLET PIPE [	[ ]	[ ]	]
OUTLET PIPE [	[ ]	[ ]	]

LID WEIGHT	APPROX. 1,500kg
PART A & B WEIGHT (SEPARATED)	APPROX. 2,500kg

NOTE: TANK SUPPLIED IN TWO PARTS; PARTS A & B TO BE JOINED ON SITE

GENERAL NOTES

1. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF THE PROJECT.
2. PRECAST STRUCTURE SUPPLIED WITH CORE HOLES TO SUIT OUTER DIAMETER OF NOMINATED PIPE SIZE / MATERIAL.
5. STRUCTURE AND ACCESS COVERS TO BE DESIGNED TO MEET AUSTROADS T44 LOAD RATING WITH 0.0m TO 2.0m FILL MAXIMUM (CLASS D) UNLESS OTHERWISE NOTED. THE OUTLET PIPE INVERT ELEVATION. CERTIFYING ENGINEER TO CONFIRM ACTUAL GROUNDWATER ELEVATION.PRECAST STRUCTURE SHALL BE IN ACCORDANCE WITH AS3600.
6. IF THE PEAK FLOW RATE, AS DETERMINED BY THE CERTIFYING ENGINEER, EXCEEDS THE TREATMENT FLOW RATE OF THE SYSTEM, AN UPSTREAM BYPASS STRUCTURE IS REQUIRE.
7. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
8. SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.
9. DRAWING NOT TO SCALE.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE SPECIFIC DESIGN CONSIDERATION AND SHALL BE SPECIFIED BY THE CERTIFYING ENGINEER.
B. CONTRACTOR TO PROVIDE ALL EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING DETAIL PROVIDED SEPARATELY).
C. CONTRACTOR TO INSTALL AND LEVEL THE STRUCTURE, APPLY SEALANT TO ALL JOINTS AND TO PROVIDE, INSTALL AND GROUT INLET AND OUTLET PIPES.
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. CARTRIDGE INSTALLATION, BY OCEANPROTECT, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT OCEAN PROTECT TO COORDINATE CARTRIDGE INSTALLATION WITH SITE COMPLETION.

OCEAN PROTECT
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OCEAN PROTECT
JELLYFISH 1200 - 230mm HEAD
STANDARD OFFLINE ARRANGEMENT

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0 25mm 50mm 100mm ON A1 ORIGINAL

Rev	Date	Reason for Issue	Drawn	Design	Verify
2	09.02.23	DA ISSUE	JC	JA	BM
1	23.01.20	80% ISSUE FOR REVIEW	JC	JA	BM

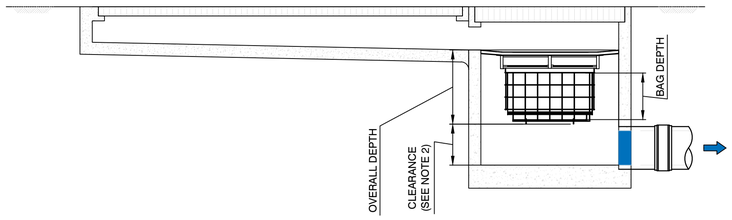
Project: MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

Drawing Title: DETAILS - SHEET 3

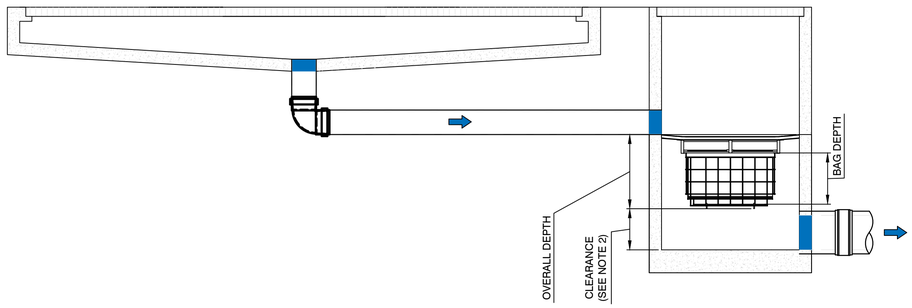
Discipline: STORMWATER SERVICES

Scale N.T.S @ A1

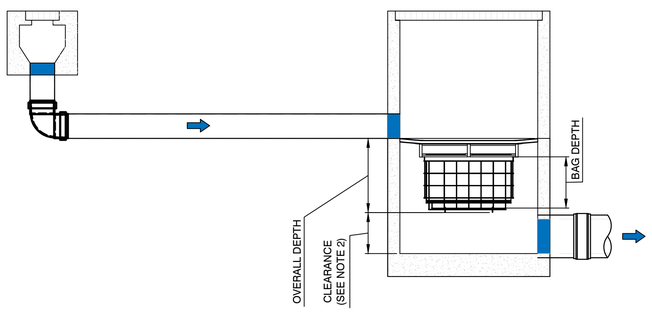
Job No. 13816 | Drawing No. SW-30-003 | Rev 2



GRATED STRIP DRAIN INTERNAL OCEANGUARD CONFIGURATION



GRATED STRIP DRAIN EXTERNAL OCEANGUARD PIT CONFIGURATION



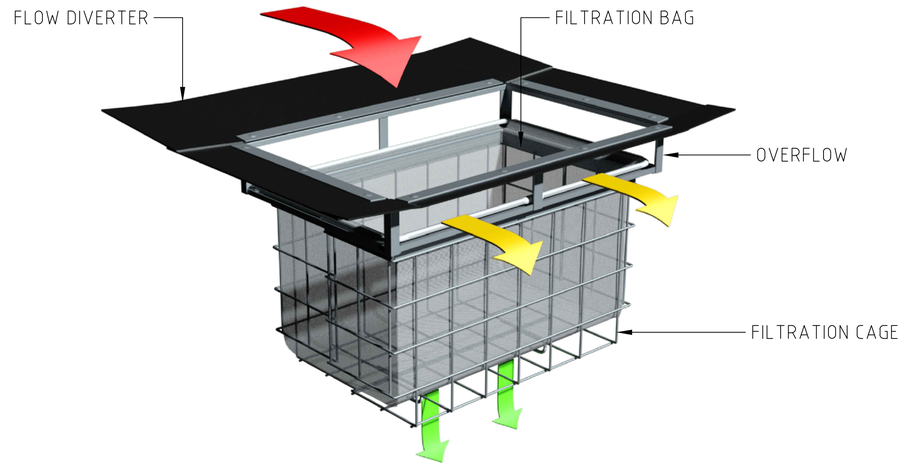
GRATED STRIP DRAIN EXTERNAL OCEANGUARD PIT CONFIGURATION

LAST MODIFIED: 04-12-19

PLAN ID	MAXIMUM PIT PLAN DIMENSIONS
S	450mm x 450mm
M	600mm x 600mm
L	900mm x 900mm
XL	1200mm x 1200mm

DEPTH ID	BAG DEPTH	OVERALL DEPTH
1	170	270
2	300	450
3	600	700

		DEPTH ID		
		1	2	3
PLAN ID	S	■		
	M	■	■	
	L	■	■	■
	XL	■	■	■



GENERAL NOTES

1. THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
2. CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT TO INHIBIT HYDRAULIC CAPACITY.
3. OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES:- 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING AND A COARSE BAG FOR TARGETING GROSS POLLUTANTS.
4. DRAWINGS NOT TO SCALE.

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OCEAN PROTECT
OCEANGUARD
GRATED STRIP DRAIN TYPICAL ARRANGEMENTS
SPECIFICATION DRAWING

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0 25mm 50mm 100mm ON A1 ORIGINAL

Rev	Date	Reason for Issue	Drawn	Design	Verify
2	09.02.23	DA ISSUE	JC	JA	BM
1	23.01.20	80% ISSUE FOR REVIEW	JC	JA	BM

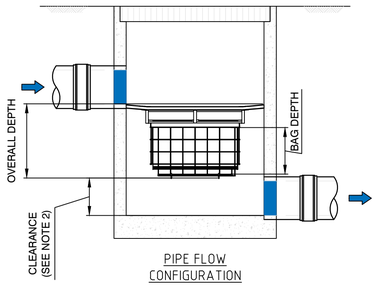
Project
MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

Drawing Title
DETAILS - SHEET 4

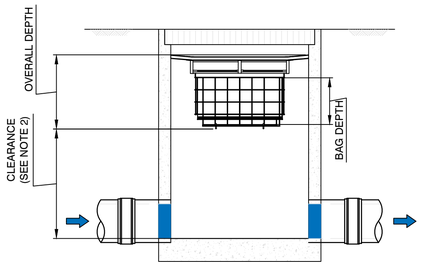
Discipline
STORMWATER SERVICES

Scale N.T.S @ A1

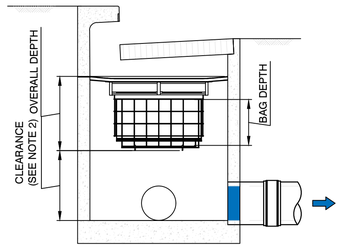
Job No. 13816
Drawing No. SW-30-004
Rev 2



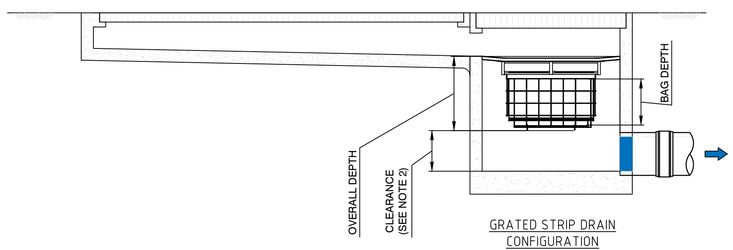
PIPE FLOW CONFIGURATION



SURFACE FLOW CONFIGURATION



SURFACE FLOW CONFIGURATION

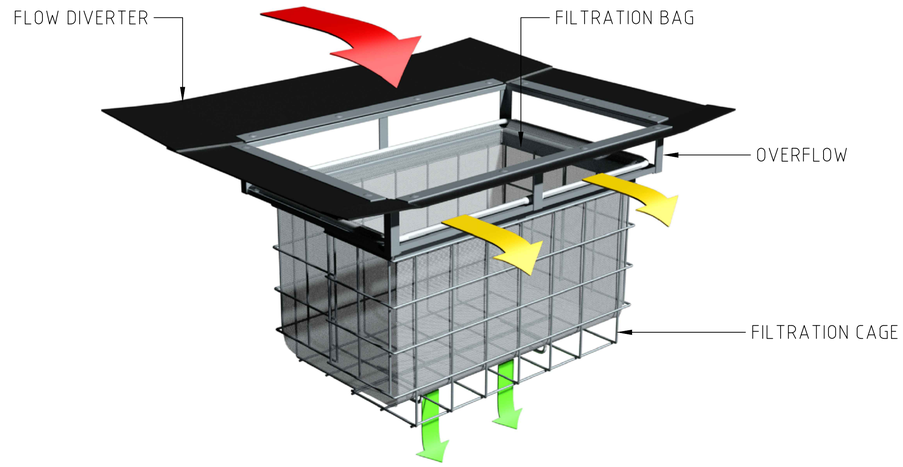


GRATED STRIP DRAIN CONFIGURATION

PLAN ID	MAXIMUM PIT PLAN DIMENSIONS
S	450mm x 450mm
M	600mm x 600mm
L	900mm x 900mm
XL	1200mm x 1200mm

DEPTH ID	BAG DEPTH	OVERALL DEPTH
1	170	270
2	300	450
3	600	700

		DEPTH ID		
		1	2	3
PLAN ID	S	■		
	M	■	■	
	L	■	■	■
	XL	■	■	■



GENERAL NOTES

1. THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
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3. OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES:- 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING AND A COARSE BAG FOR TARGETING GROSS POLLUTANTS.
4. DRAWINGS NOT TO SCALE.

LAST MODIFIED: 04-12-19

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OCEAN PROTECT
OCEANGUARD
GRATED STRIP DRAIN TYPICAL ARRANGEMENTS
SPECIFICATION DRAWING

Rev	Date	Reason for Issue	Drawn	Design	Verify
2	09.02.23	DA ISSUE	JC	JA	BM
1	23.01.20	80% ISSUE FOR REVIEW	JC	JA	BM

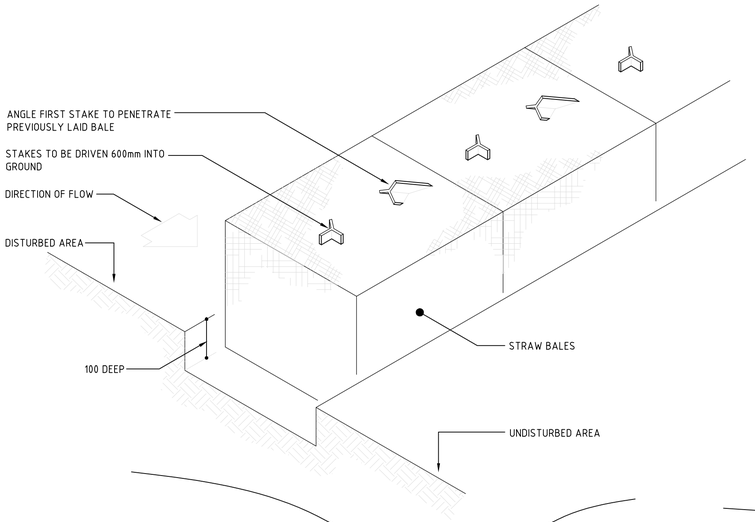
Project
MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

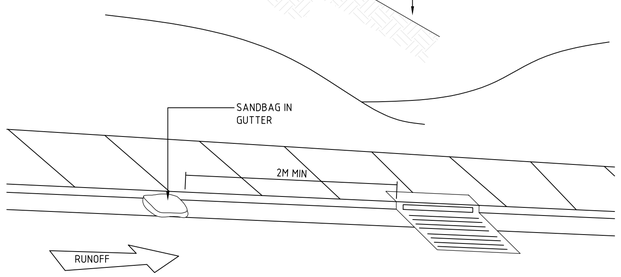
Drawing Title
DETAILS - SHEET 5

Discipline
STORMWATER SERVICES

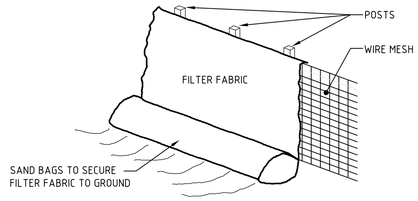
Scale N.T.S @ A1

Job No. 13816
Drawing No. SW-30-005
Rev 2



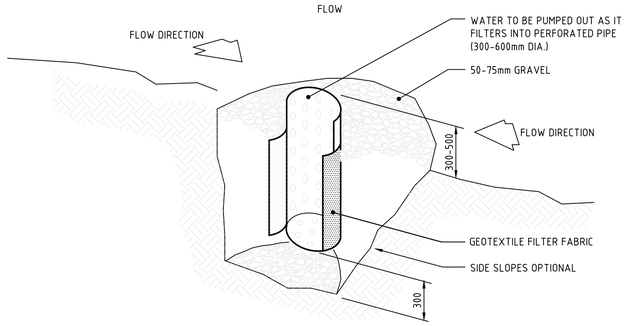


SANDBAG KERB SEDIMENT TRAP

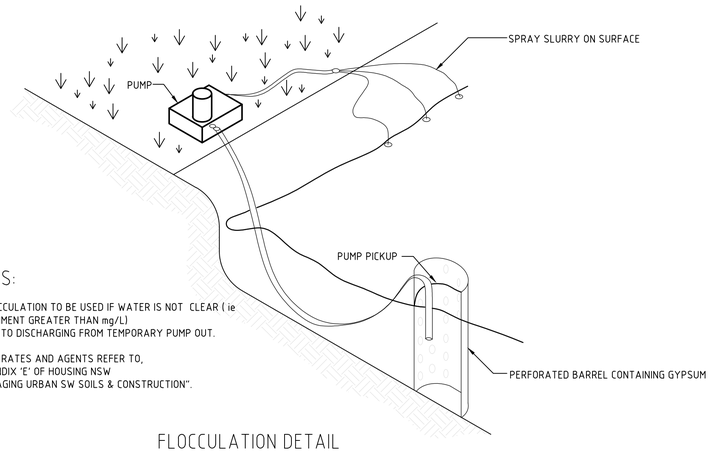


TYPICAL DETAIL OF A FILTER FENCE AROUND THE COLLECTION PITS WITH SUBMERSIBLE PUMP

PUMP DISCHARGE TO DRAIN TO NEAREST STORMWATER GRATE DOWN SLOPE OF THE CONSTRUCTION ACTIVITY ADEQUATELY PROTECTED BY STRAW BALES WRAPPED IN GEOTEXTILE FABRIC.



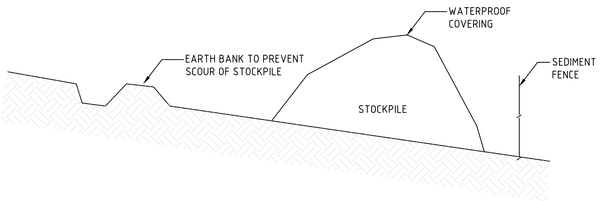
SUMP PIT SEDIMENT TRAP



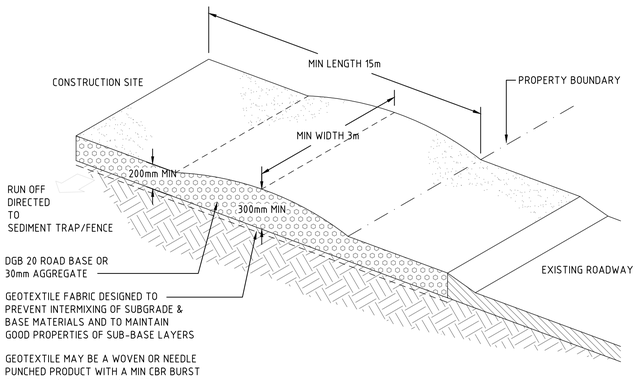
NOTES:

1. FLOCCULATION TO BE USED IF WATER IS NOT CLEAR (ie SEDIMENT GREATER THAN mg/L) PRIOR TO DISCHARGING FROM TEMPORARY PUMP OUT.
2. FOR RATES AND AGENTS REFER TO, APPENDIX 'E' OF HOUSING NSW "MANAGING URBAN SW SOILS & CONSTRUCTION".

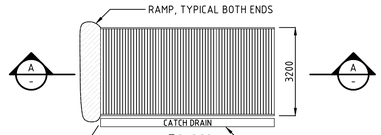
FLOCCULATION DETAIL



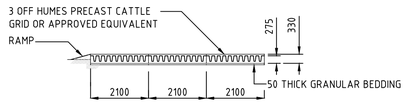
BUILDING MATERIAL STOCKPILES



STABILISED SITE ACCESS



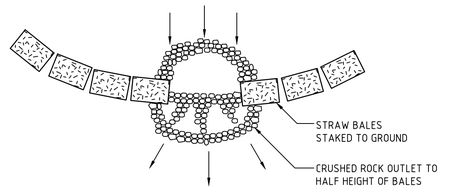
PLAN



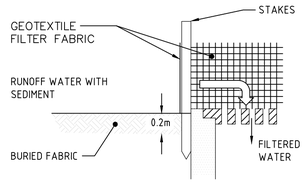
SECTION A-A
CATTLE GRID

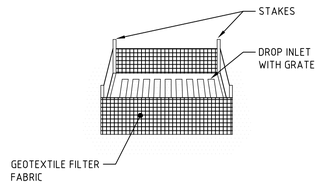
NOTES:

1. EXCAVATE AREA APROX 3.3m WIDE BY 2.2m LENGTH. THE FLOOR OF THE EXCAVATION MUST BE FLAT, WITHOUT HIGH POINTS. AN EXCAVATED DEPTH OF 100mm ACCOMMODATES A BEDDING LAYER 50mm THICK & GRID SET DOWN OF 50mm PER UNIT.
2. BEDDING MATERIAL SHALL BE SAND OR OTHER SUITABLE APPROVED MATERIAL. BEDDING MATERIAL SHALL BE EVENLY RAKED OVER FLOOR OF EXCAVATION TO A DEPTH SLIGHTLY MORE THAN 50mm. ENSURE BEDDING IS LEVEL IN BOTH DIRECTIONS.
3. LOWER CATTLE GRID ONTO THE PREPARED BASE. ENSURE THAT NO PART OF THE UNIT IS SITTING ON ANY HIGH POINTS.
4. BACKFILL & COMPACT AROUND GRID. GRADE EXCAVATED MATERIAL UP TO GRID ON EACH SIDE TO FORM A RAMP. IF DEPRESSIONS OCCUR ON THESE RAMPS WITH USE, ADD ADDITIONAL MATERIAL.
5. MAINTAIN SHAKER GRIDS IN CLEAN & SERVICEABLE CONDITION DURING TOTAL TIME OF USAGE.
6. MINIMUM LENGTH OF SHAKER PAD - 5 UNITS.



STRAW BALES DETAIL





GEOTEXTILE FILTER FABRIC DROP INLET SEDIMENT TRAP

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0 25mm 50mm 100mm ON A1 ORIGINAL

Rev	Date	Reason for Issue	Drawn	Design	Verify
2	09.02.23	DA ISSUE	JC	JA	BM
1	23.01.20	80% ISSUE FOR REVIEW	JC	JA	BM

Project
MONA VALE TOYOTA
61 DARLEY STREET,
MONA VALE, NSW 2103

Drawing Title
DETAILS - SHEET 6

Discipline
STORMWATER SERVICES

Scale N.T.S @ A1

Job No. 13816
Drawing No. SW-30-006
Rev 2