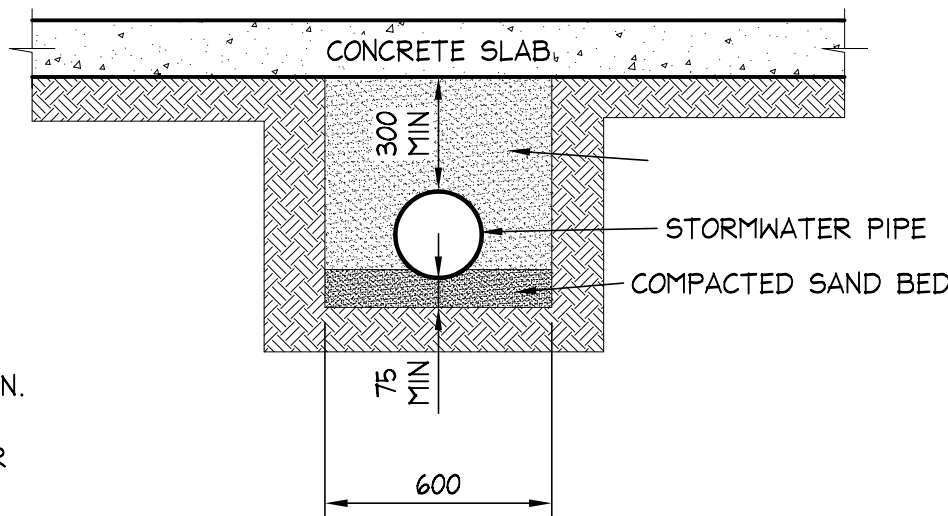


#### RAINWATER RE-USE TANKS:

1. CONSIDERING THE ROOF CATCHMENT AREA, LOCATION OF PROPERTY, INTENDED USE OF RAINWATER AND GARDEN SIZE WE RECOMMEND PROVIDING A BASIX 2000 L CAPACITY RAINWATER TANK FOR THE FOLLOWING BASIX USES: (REFER BASIX REPORT)  
a) TO WATER GARDEN AREAS, b) ALL TOILETS, c) CLOTHES WASHER
2. THE TANKS PROVIDED WILL REDUCE PRESSURE ON COUNCIL'S STORMWATER INFRASTRUCTURE.
3. REFERENCES:  
COOMBS P.J. & KUCZERA G. (2001), 'RAINWATER TANK DESIGN FOR WATER SUPPLY & STORMWATER MANAGEMENT', STORMWATER INDUSTRY ASSOCIATION REGIONAL CONFERENCE.  
PATRICK DUPONT & STEVE SHACKEL, 'RAINWATER' AUSTRALIAN GOVERNMENT (2004), 'GUIDANCE ON USE OF RAINWATER TANKS'
4. ALL CONNECTIONS TO PLUMBING AND RAINWATER TANKS TO BE IN ACCORDANCE WITH 'SYDNEY WATERS' GUIDE 'INSTALLING A RAINWATER TANK' AVAILABLE AT [www.sydneywaters.com.au](http://www.sydneywaters.com.au)
5. PROVIDE A DUAL SUPPLY SYSTEM AND BACKFLOW PREVENTION SYSTEM IN ACCORDANCE WITH 'BASIX-DESIGN GUIDE FOR SINGLE DWELLINGS' BY NSW DEPARTMENT OF INFRASTRUCTURE, PLANNING AND NATURAL RESOURCES.
6. PROVIDE A PROPRIETARY FIRST FLUSH DIVERTER UPSTREAM OF THE RAINWATER TANK.

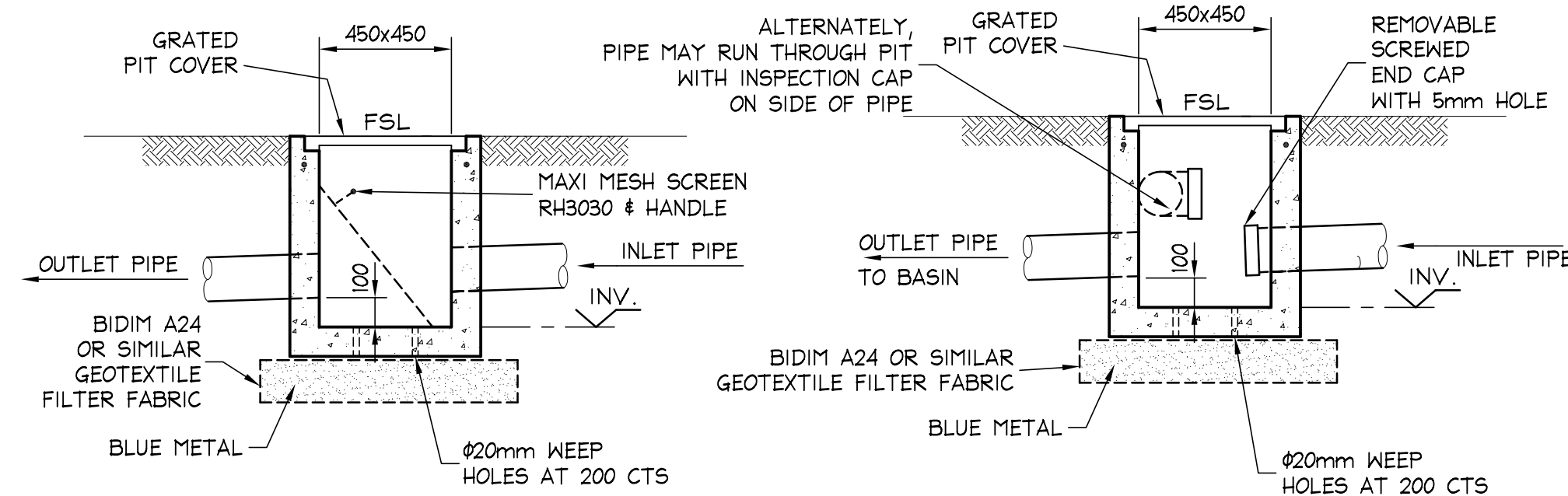
#### STORMWATER NOTES:

- 1 - ALL PIPES TO BE 100mm Ø SEWER GRADE uPVC UNLESS NOTED OTHERWISE.
- 2 - ALL PIPES TO BE uPVC TO AS 1254-2002 UNLESS NOTED OTHERWISE.
- 3 - ALL PIPES TO BE LAID AT 1 % MINIMUM GRADE UNLESS NOTED OTHERWISE.
- 4 - ALL PIPES SHALL BE LAID ON A 75mm SAND BED, COMPACTED TO 100% S.M.D.D. BELOW PAVEMENTS.  
( NO COMPACTION REQUIRED BELOW LANDSCAPING )  
COVER TO SURFACE FROM TOP OF PIPE TO BE AS PER AS3500.  
BACKFILL TO BE ADEQUATELY CONSOLIDATED AROUND PIPES BY METHOD OF RAMMING AND WATERING IN. TRENCHES TO BE FILLED WITH GRANULAR MATERIAL AS SPECIFIED.
- 5 - DOWN PIPE LOCATIONS ARE INDICATIVE ONLY. LOCATIONS TO BE CONFIRMED WITH ARCHITECT PRIOR TO COMMENCEMENT WITH WORK.
- 6 - PROVIDE CLEANING EYES AT ALL DOWNPIPES.
- 7 - ALL PITS TO BE PRECAST, PREFORMED OR HDPE, IN ACCORDANCE WITH LOCAL COUNCIL SPECIFICATIONS.
- 8 - ALL PITS GREATER THAN 1000mm DEEP SHALL HAVE STEP IRONS AS PER COUNCIL STANDARDS.
- 9 - ALL WORK TO BE IN ACCORDANCE WITH LOCAL COUNCIL STANDARDS AND SPECIFICATIONS.
- 10 - PRIOR TO COMMENCING ANY SITE WORKS THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL MEASURES TO EPA GUIDELINES AND COUNCIL SPECIFICATIONS. ALL MEASURES TO REMAIN IN PLACE UNTIL COMPLETION AND STABILIZATION OF THE SITE TO COUNCIL SATISFACTION.
- 11 - ALL LEVELS SHOWN ARE TO AHD
- 12 - ENSURE THAT ALL PITS AND STORMWATER PIPES ARE LOCATED CLEAR FROM TREE ROOT SYSTEMS.
- 13 - ALL EXISTING EARTHENWARE PIPES TO BE UPGRADED TO uPVC.
- 14 - ALL WORKS TO BE IN ACCORDANCE WITH AS 3500-2015 NATIONAL PLUMBING DRAINAGE CODE PART 3 - STORMWATER DRAINAGE. AND ALL WORKS TO BE IN ACCORDANCE WITH AS 3500-2012 NATIONAL PLUMBING DRAINAGE CODE PART 5 - HOUSING INSTALLATIONS.



TYPICAL TRENCHING DETAIL

SCALE = 1 : 20



PRECAST OR HDPE PIT  
REFER STORMWATER NOTES  
450x450 PIT DETAIL

SCALE = 1 : 20

PRECAST OR HDPE PIT  
REFER STORMWATER NOTES  
450x450 INSPECTION PIT DETAIL

SCALE = 1 : 20

Gutter Calculations -20 yr ARI Storm						
Northern Beaches [Warringah] Council						
New Residence						
17 Kangaroo Road Collaroy Plateau						
to AS 3500 - 2015 & AS 3500.5 2012 & BCA2016						
					<sup>20</sup> I <sub>5</sub>	
Eaves	Horizontal	slope	Gutter		From	Downpipe
Gutters	Area A <sub>b</sub>	factor	Area A <sub>c</sub>	Slope	from	Figure
		From	steeper	DRAIN	gutter	From
		Fig 5.6.3.2	than	area reqd	size reqd	
	m <sup>2</sup>		m <sup>2</sup>	1 in	mm/hr	mm <sup>2</sup>
DP1	20.4	1.2	24.5	500	201	5300
DP2	20.4	1.2	24.5	500	201	5300
DP3	21.3	1.2	25.6	500	201	5500
DP4	29.7	1.2	35.6	500	201	7200
DP5	29.7	1.2	35.6	500	201	7200
DP6	29.7	1.2	35.6	500	201	7200
DP7	12.3	1.2	14.8	500	201	4000
DP8	29.9	1.2	35.9	500	201	7300
DP9	29.9	1.2	35.9	500	201	7300
DP10	29.9	1.2	35.9	500	201	7300
DP11	4	1.2	4.8	500	201	3000
DP12	4	1.2	4.8	500	201	3000
DP13	12.8	1.2	15.4	500	201	4000
total	274.0					
All New Gutters to be graded at 1 in 500 to Downpipes						
All Downpipes to be connected to new underground system						
New Eaves Gutters Lysaght 150 Half Round - Area					9440	mm <sup>2</sup>

#### GUTTER CALCULATIONS

#### NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: SOI.



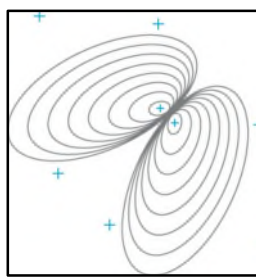
#### DOCUMENT CERTIFICATION

Date : AUGUST 2020  
Bruce Lewis .....  
(Principal : Peninsula Consulting Engineers)  
BE(Civil), CPEng, MIEAust., NPER.  
Institute of Engineers Membership No. 879131

3-08-2020	A	FOR COUNCIL SUBMISSION
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Date:	Rev:	Amendment:

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Project:  
**PROPOSED WORKS**  
**at: 17 KANGAROO ROAD**  
**COLLARROY PLATEAU**  
**for: MR & MRS CORDUKES**

Drawing Title:

#### CONCEPT STORMWATER MANAGEMENT PLAN & DETAILS

Job No:

**20-0611**

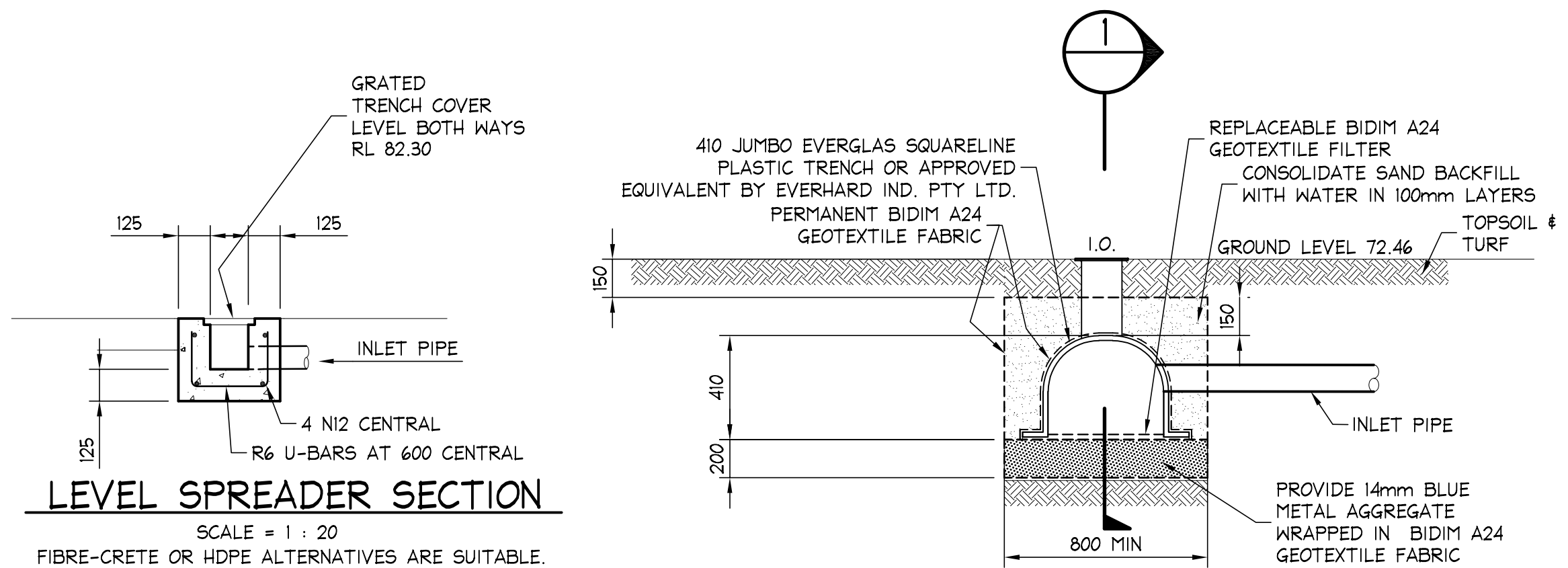
Drawing No:

**H01**

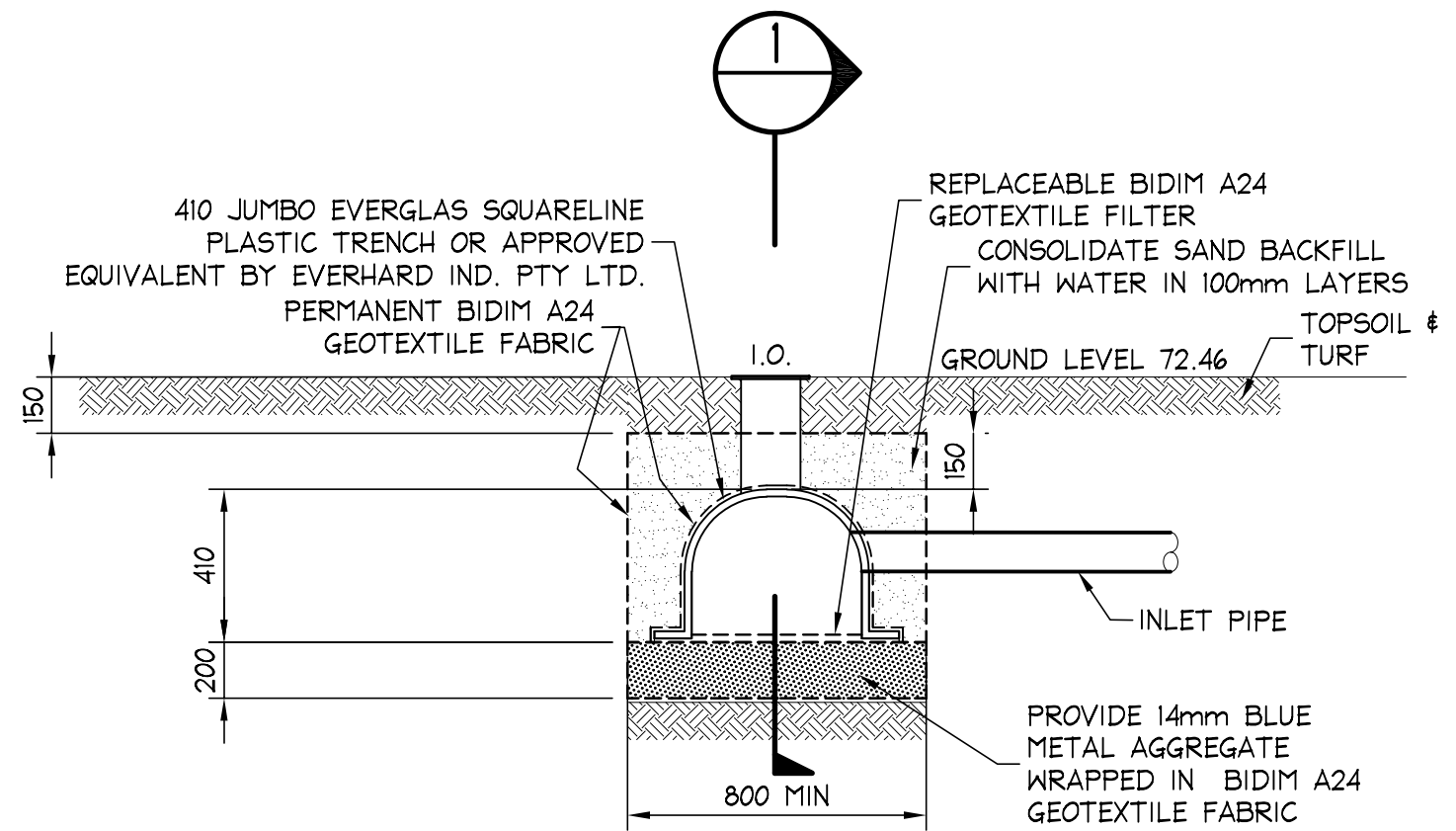
Rev:

**A**

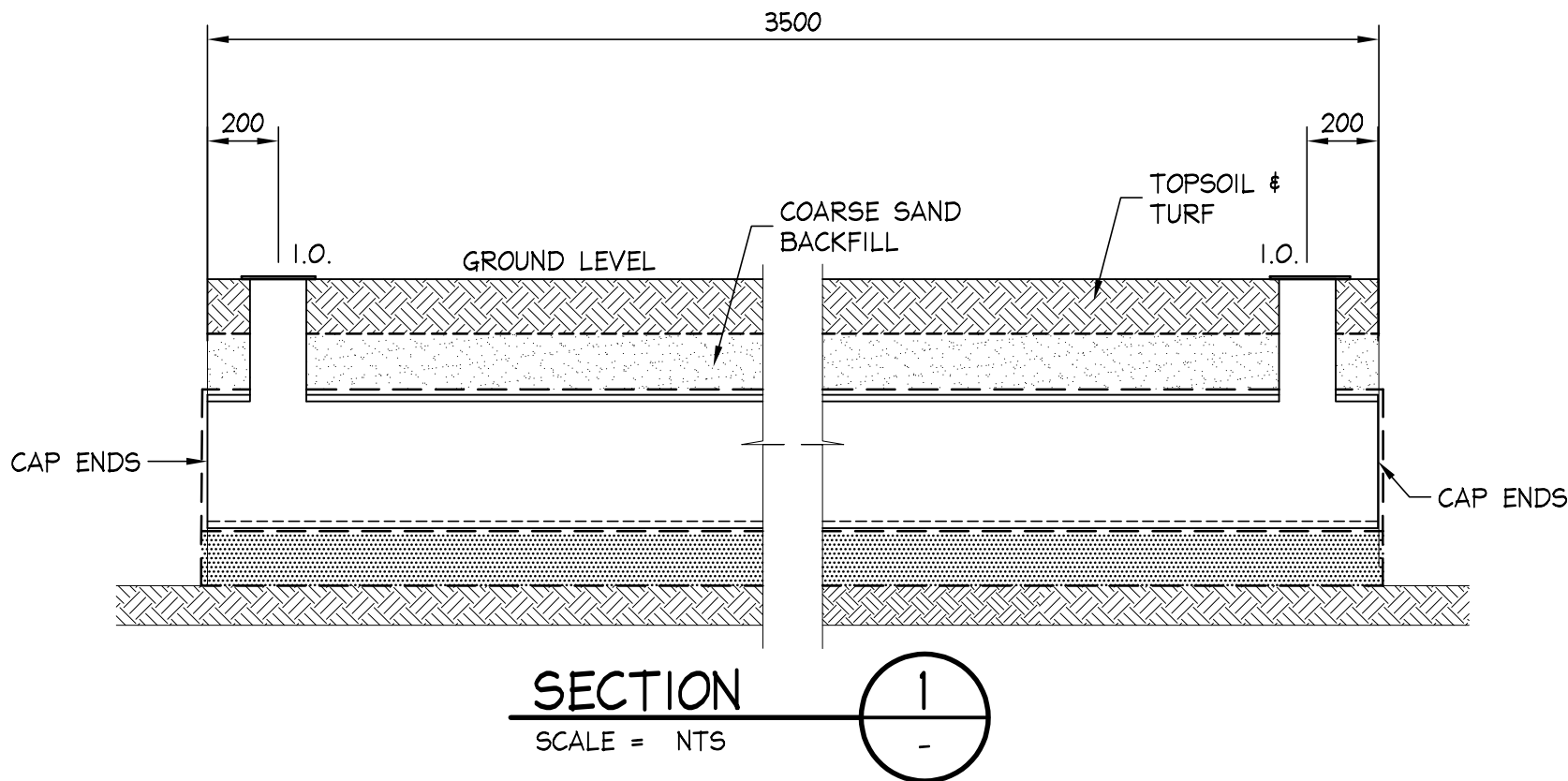




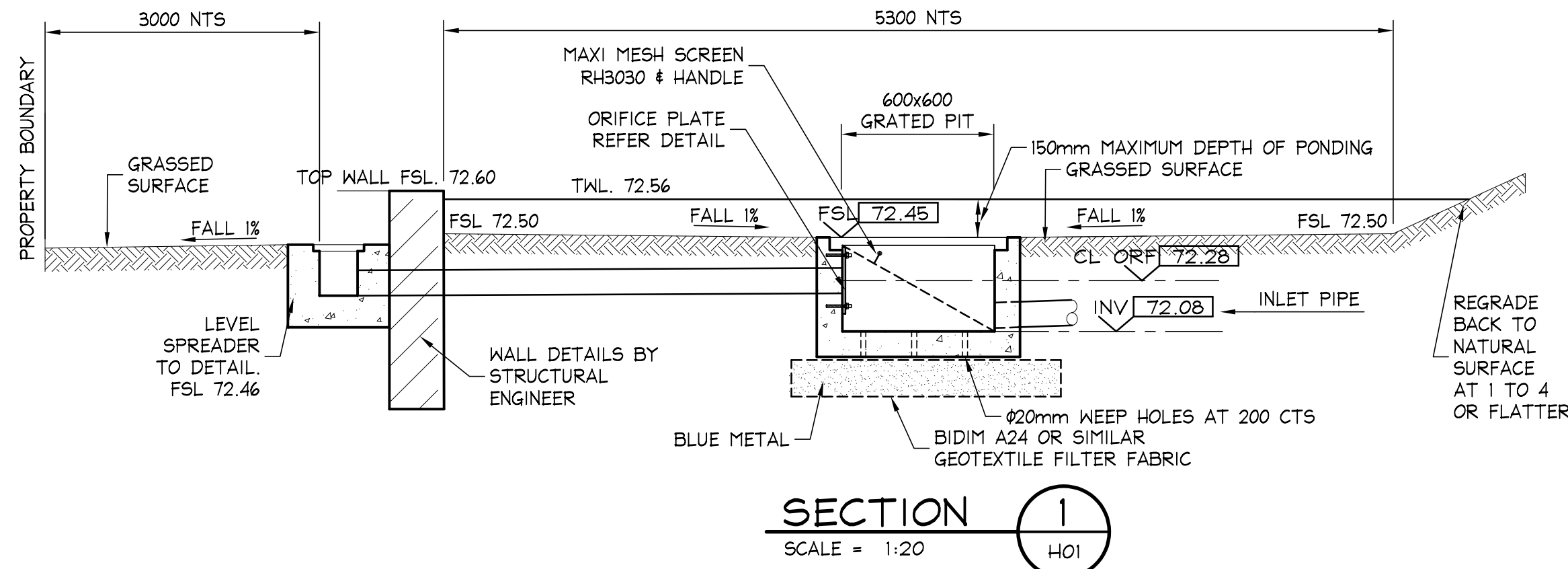
LEVEL SPREADER SECTION



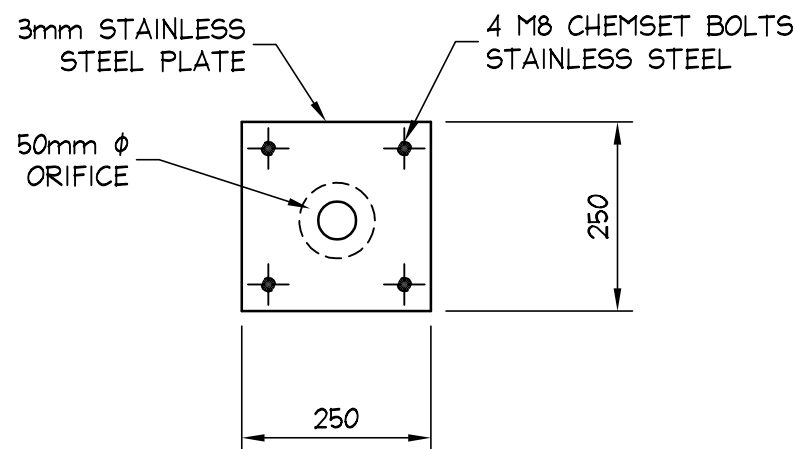
LEVEL SPREADER OPTIONAL DETAIL



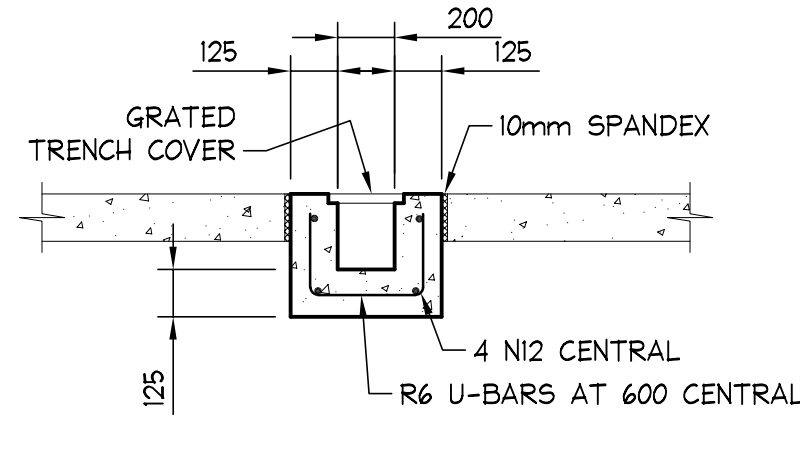
SECTION 1



SECTION 1



ORIFICE PLATE DETAIL



TYPICAL GRATED DRAIN

PRECAST OR HDPE GRATED DRAIN ALTERNATIVE

Northern Beaches [Warringah] Council							
17 Kangaroo Road Collaroy Plateau							
On Site Detention Calculations							
DRAINS Results Post Development							
DRAINS results prepared from Version 2018.01							
NODE DETAILS				Version 8			
Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)				
N1	72.41		0.003				
N2	72.4		0				
SUB-CATCHMENT DETAILS							
Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Cat1	0.01	0.001	0.009	5	5	5	AR&R 100 year, 1.5 hours storm, average 74.0 mm/h, Zone 1
Cat2	0.003	0	0.002	5	5	5	AR&R 100 year, 1.5 hours storm, average 74.0 mm/h, Zone 1
PIPE DETAILS							
Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm		
Pipe 1	0.004	0.22	72.48	72.412	AR&R 100 year, 2 hours storm, average 61.0 mm/h, Zone 1		
Pipe 2	0.005	0.25	72.412	72.4	AR&R 100 year, 2 hours storm, average 61.0 mm/h, Zone 1		
DETENTION BASIN DETAILS							
Name	Max WL	MaxVol	Max Q	Max Q	Max Q		
			Total	Low Level	High Level		
Basin 1	72.56	3.6	0.004	0.004	0		
CONTINUITY CHECK for AR&R 100 year, 1.5 hours storm, average 74.0 mm/h, Zone 1							
Node	Inflow (cu.m)	Outflow (cu.m)	Storage Change (cu.m)	Difference %			
Basin 1	6.89	6.86	0.03	0			
N1	8.76	8.76	0	0			
N2	8.76	8.76	0	0			

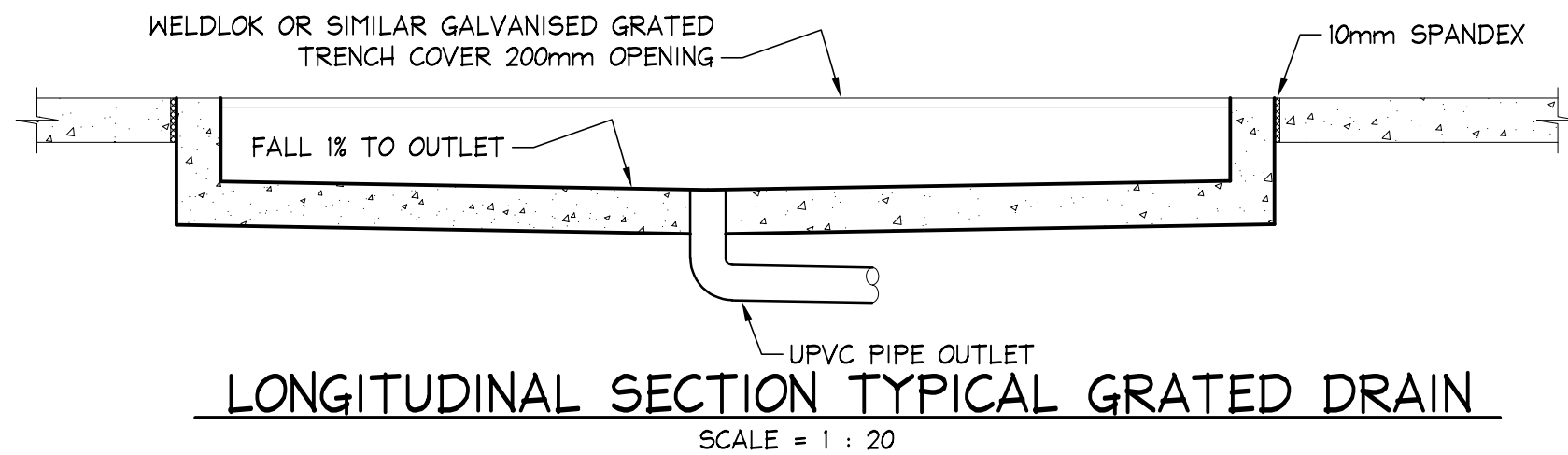
DRAINS RESULTS

Northern Beaches [Warringah] Council								
17 Kangaroo Road Collaroy Plateau								
On Site Detention Calculations								
DRAINS Data Post Development								
PIT / NODE DETAILS			Version 13					
Name	Type	Surface Elev (m)						
N1	Node	72.4						
N2	Node	72.4						
DETENTION BASIN DETAILS								
Name	Elev	Surf. Area	Outlet Type	Dia(mm)	Centre RL			
Basin 1	72	1	Orifice	50	72.28			
	72.44	1						
	72.45	28.3						
	72.6	28.3						
SUB-CATCHMENT DETAILS								
Name	Pit or Node	Total Area	Paved Area	Grass Area	Supp Area	Paved Time	Grass Time	Supp Time
		(ha)	%	%	%	(min)	(min)	(min)
Cat1	Basin 1	0.0163	5	95	0	5	5	5
Cat2	N1	0.0045	5	95	0	5	5	5
PIPE DETAILS								
Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)
Pipe 1	Basin 1	N1	5	72.2	72.15	1	Upvc	150
Pipe 2	N1	N2	4	72.15	72.11	1	Upvc	150

DRAINS DATA

Northern Beaches [Warringah] Council			
New Residence			
17 Kangaroo Road Collaroy Plateau			
On Site Detention Calculations			
Site Area	540	m <sup>2</sup>	
Under Warringah Council Conditions, "On Site Stormwater Detention" revised August 2012			
Part 1 - drain away from street - Yes			
Part 2 - > 450m <sup>2</sup> - OSD applies			
Part 3 - direct discharge to ocean - N/A			
Part 4 - flood affected - N/A			
But OSD is not required - Refer 2.1 on page 2			
"All Development Applications for Alterations & Additions for Single Residential Dwellings will not require OSD"			
From Northern Beaches Council "Water Management Policy PL 850" & "Drainage from Low Level Properties Technical Specification"			
Pol 136 Page 2	Property is in Zone R2 & does not requires OSD	Part 2.1	
Step 1 - Unable to connect to Council Drainage line or interallotment drainage			
Step 2 - Absorption System - Insufficient Capacity for Absorption only			
Step 3 - No Easement Available - Refer Letter from downstream Property Owner			
Step 4 - Use Level Spreader			
Stormwater Flows from the whole Site are to be restricted for all storm events up to and including the 1 in 100 year ARI storm event.			
This system will require the provision of an on site detention system.			
Refer Clause 4.7 of Council OSD Technical Specification			
Total Discharge including bypass flows & controlled flows through the Level Spreader must not exceed the 1 in 5 year ARI state of nature storm event			
Discharge from area to rear Pre Development			
- 5yr ARI Storm [state of Nature]	5	L/sec	
Area Calculation - Proposed			
All Roofs - to Street	274	m <sup>2</sup>	
Driveway & Front Area to Street	57.5	m <sup>2</sup>	
Total Impervious to Street	331.5	m <sup>2</sup>	
Percent Impervious	61	%	
Area to OSD Impervious	208	m <sup>2</sup>	
Pool Surround	9.7	m <sup>2</sup>	
Total	208	m <sup>2</sup>	
Percent Impervious	5%		
An OSD Basin is proposed at the rear as shown, with a factor of 0.8 for construction tolerances			
Gross Area	35.4		
Net Area [x0.8]	28.3		
Depth 150mm			
The above scenario was inputted into DRAINS with the following results			
Total OSD Storage available as per DRAINS File	3.6	m <sup>3</sup>	
total Flows From Site	5	L/sec	
Compare PSD above - on same area - satisfactory			
Orifice Diameter	50	mm	

OSD CALCULATIONS



LONGITUDINAL SECTION TYPICAL GRATED DRAIN

NOTES:

- ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
- FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.



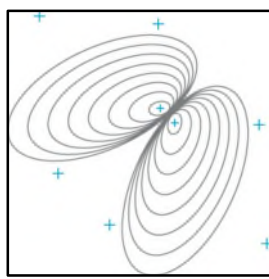
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Drawing Title:  
CONCEPT STORMWATER  
CALCULATIONS & DETAILS

Job No:  
20-0611

Drawing No:  
H02

Rev:  
A