

- STORMWATER NOTES:**
- ALL PIPES TO BE 100mm Ø UNLESS NOTED OTHERWISE.
 - ALL PIPES TO BE uPVC TO AS 1254-2002 UNLESS NOTED OTHERWISE.
 - ALL PIPES TO BE LAYED AT 1% MINIMUM GRADE UNLESS NOTED OTHERWISE.
 - 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 300mm MINIMUM.
BACKFILL TO BE ADEQUATELY CONSOLIDATED AROUND PIPES BY METHOD OF RAMMING AND WATERING IN. TRENCHES TO BE FILLED WITH GRANULAR MATERIAL AS SPECIFIED.
 - ALL DOWN PIPES TO BE 100mm Ø UNLESS NOTED OTHERWISE.
 - DOWN PIPE LOCATIONS ARE INDICATIVE ONLY. LOCATIONS TO BE CONFIRMED WITH ARCHITECT PRIOR TO COMMENCEMENT OF WORK.
 - PROVIDE CLEANING EYES AT ALL DOWNPIPES.
 - ALL PITS TO BE CAST INSITU OR, IF PRECAST, APPROVED BY ENGINEER.
CAST INSITU PITS TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH 1 N12 TOP TIE UNLESS NOTED OTHERWISE.
CAST INSITU PITS GREATER THAN 900 DEEP TO BE MINIMUM 900x600 AND TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH N12 AT 300 EACH WAY UNLESS NOTED OTHERWISE.
 - ALL PITS GREATER THAN 1000mm DEEP SHALL HAVE STEP IRONS AS PER COUNCIL STANDARDS.
 - THE BOUNDARY OR SILT ARRESTOR PIT SHOULD ALWAYS INCORPORATE A SUMP AND MAXI-MESH SCREEN AS PER LOCAL COUNCIL REQUIREMENTS. HOWEVER, UNLESS SPECIFICALLY REQUIRED BY COUNCILS POLICY OR IF THE SITE CONSISTS OF A CLAY OR ROCK SUBGRADE, ALL OTHER DRAINAGE PITS WILL NOT REQUIRE A SUMP.
 - ALL WORK TO BE IN ACCORDANCE WITH LOCAL COUNCIL STANDARDS AND SPECIFICATIONS.
 - PRIOR TO COMMENCING ANY SITE WORKS THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL MEASURES TO APPROVED SEDIMENT AND EROSION CONTROL PLAN, EPA GUIDELINES AND COUNCIL SPECIFICATIONS. ALL MEASURES TO REMAIN IN PLACE UNTIL COMPLETION AND STABILIZATION OF THE SITE TO COUNCIL SATISFACTION.
 - ALL LEVELS SHOWN ARE TO AHD
 - ENSURE THAT ALL PITS AND STORMWATER PIPES ARE LOCATED CLEAR FROM TREE ROOT SYSTEMS.
 - ALL EXISTING EARTHENWARE PIPES TO BE UPGRADED TO uPVC.
 - ALL WORKS TO BE IN ACCORDANCE WITH AS 3500-2003 NATIONAL PLUMBING DRAINAGE CODE PART 3 - STORMWATER DRAINAGE.
 - UNLESS NOTED OTHERWISE, SUB-SOIL DRAINS ARE TO BE INSTALLED IN ACCORDANCE WITH AS3500.3 ALONGSIDE WALLS THAT IMPEDE THE NATURAL FLOW OF GROUNDWATER. THIS MAY ALSO INVOLVE TRENCHING INTO THE CLAY OR ROCK SUBGRADE TO DIRECT GROUNDWATER AWAY FROM STRUCTURES.
 - IF NOT INDICATED ON PLANS, PROVIDE LEAF CATCHERS TO ALL DOWNPIPES OR GUTTER GUARD TO ALL EAVES GUTTERS.

TABALUM AVENUE

GARAGE LEVEL - DRAINAGE PLAN

SCALE = 1 : 100

NOTE:
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NOTE: EXCAVATION AROUND TREES
CARE SHOULD BE TAKEN WHEN UNDERTAKING WORKS IN THE VICINITY OF SELECTED TREES NOT TO DISTURB THE TREE ROOT SYSTEM. HAND DIGGING OF TRENCHES ETC MAY BE NECESSARY. REFER ARBORISTS REPORT.

LEGEND

- 100mm Ø DOWNPIPE TO DISCHARGE TO RWT'S
- 100mm Ø DOWNPIPE TO DISCHARGE TO BOUNDARY PIT
- RAINHEAD WITH 100mm Ø DOWNPIPE DISCHARGE TO BOUNDARY PIT
- 50mm Ø uPVC STORMWATER PIPE CAST INTO SLAB
- NEW STORMWATER PIPE
- STORMWATER PIPE FLOW DIRECTION
- STORMWATER PIT
- 200x200 FLOOR DRAIN - REFER DETAIL
- ROOF DRAIN - REFER DETAIL
- PLANTER DRAIN - REFER DETAIL
- GRATED DRAIN
GDI - 150 MIN DEPTH x 150 WIDE GRATED DRAIN
- RAINWATER TANKS TO COLLECT ALL DPI DOWNPIPES. TO BE RE-USED AS PER BASIX REQUIREMENTS LOCAL COUNCIL & SYDNEY WATER REQUIREMENTS
RWT1 = 2500 L
RWT2 = 2500 L

NOTE: ALL DRAINAGE LINES ARE INDICATIVE ONLY. LOCATION MAY VARY DUE TO CONSTRAINTS.



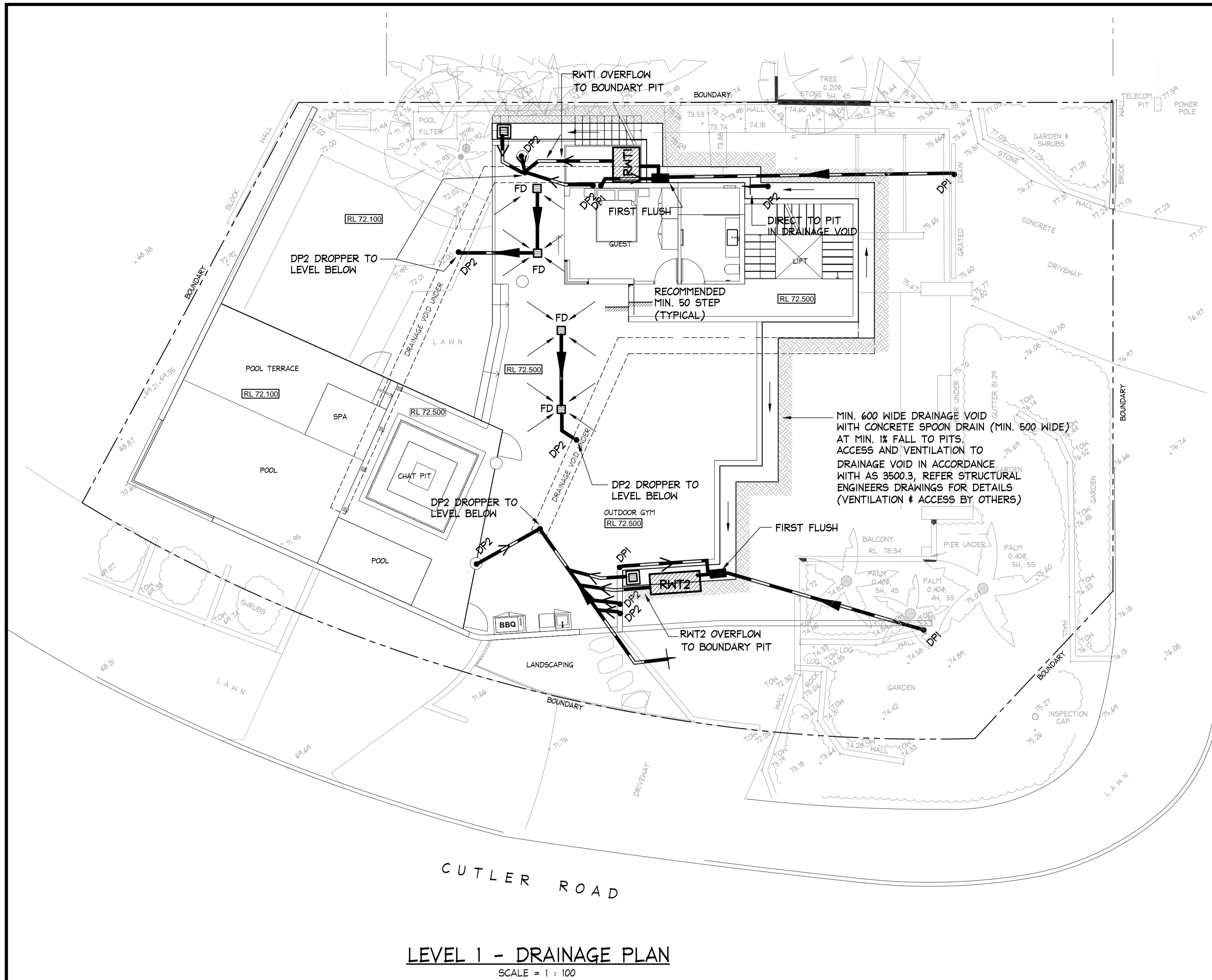
NOTE:
NO INVESTIGATION OF UNDERGROUND SERVICES HAS BEEN MADE. ALL RELEVANT AUTHORITIES SHOULD BE NOTIFIED PRIOR TO ANY EXCAVATION ON OR NEAR THE SITE.
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MINIMISE YOUR RISK AND DIAL BEFORE YOU DIG. - TEL. 1100

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<p>30-09-2019 B REVISED TO SUIT NEW ARCH. PLANS MC MW</p> <p>19-09-2019 A ISSUED FOR DA SUBMISSION MC MW</p>			<p>DOCUMENT CERTIFICATION Date: 23-09-2019 Rick G Wray BE(Civil), CPEng, MIEAust., NER, RPEQ: 08293. (Director NB Consulting Engineers)</p>			<p>NB Consulting Engineers STRUCTURAL - CIVIL - STORMWATER - REMEDIAL A.C.N. 076 121 616 A.B.N. 24 076 121 616 Sydney: Ph: (02) 9984 7000 Suite 207, 30 Fisher Road Dee Why N.S.W. 2099 Gold Coast: Ph: (07) 5631 4744 Unit 8, 1726 Gold Coast Highway Burleigh Heads QLD 4220 E: nb@nbconsulting.com.au W: www.nbconsulting.com.au</p>			<p>Architect: SANTCTUM DESIGN</p> <p>Client: KEVIN MOONEY</p>		<p>Project: NEW DWELLING 1 TABALUM ROAD, BALGOWLAH HEIGHTS</p> <p>Drawing Title: STORMWATER MANAGEMENT DRAINAGE PLANS</p>		<p>Date: AUGUST 2019</p> <p>Job No: 190832</p>	<p>Design: CF</p> <p>Drawing No: D01</p>	<p>Drawn: MC</p> <p>Issue: B</p>
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LEVEL 1 - DRAINAGE PLAN
SCALE = 1 : 100

NOTE: POOL AND PONDS
SWIMMING POOL/POND SURCHARGE OVERFLOW TO BE CONNECTED TO SYDNEY WATER SEWER IN ACCORDANCE WITH AS3500.2.2.2003 DETAILS AND CERTIFICATION BY OTHERS.

NOTE:
ALL DPI DOWN PIPES TO DISCHARGE INTO RAINWATER RE-USE TANKS IN ACCORDANCE WITH AS 3500.3

NOTE: EXCAVATION AROUND TREES
CARE SHOULD BE TAKEN WHEN UNDERTAKING WORKS IN THE VICINITY OF SELECTED TREES NOT TO DISTURB THE TREE ROOT SYSTEM. HAND DIGGING OF TRENCHES ETC MAY BE NECESSARY. REFER ARBORISTS REPORT.

NOTE:
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MIN. 600 WIDE DRAINAGE VOID WITH CONCRETE SPOON DRAIN (MIN. 500 WIDE) AT MIN. 1% FALL TO PITS. ACCESS AND VENTILATION TO DRAINAGE VOID IN ACCORDANCE WITH AS 3500.3. REFER STRUCTURAL ENGINEERS DRAWINGS FOR DETAILS (VENTILATION & ACCESS BY OTHERS)

- RAINWATER RE-USE TANKS:**
1. CONSIDERING THE ROOF CATCHMENT AREA, LOCATION OF PROPERTY, INTENDED USE OF RAINWATER AND GARDEN SIZE WE RECOMMEND PROVIDING A RAINWATER TANK FOR USE AS PER BASIX REQUIREMENTS, SYDNEY WATER AND NSW HEALTH REQUIREMENTS FOR NON DRINKING USE ONLY AND TO BASIX AND COUNCIL REQUIREMENTS.
 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.sydneywater.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. IF NOT SPECIFIED ON PLANS, THE FIRST FLUSH SYSTEM IS TO HAVE A MINIMUM SIZE OF 20L PER 100m² OF ROOF CATCHMENT AREA PRIOR TO ENTERING THE RAINWATER TANK. INDIVIDUAL SITE ANALYSIS IS REQUIRED IN HEAVILY POLLUTED AREAS TO DETERMINE IF LARGER VOLUMES OF FIRST FLUSH RAINWATER ARE TO BE DIVERTED. IF IN DOUBT, CHECK WITH LOCAL HEALTH AUTHORITIES.
 7. SCREENED DOWNPIPE RAINWATER HEAD OR OTHER SUITABLE LEAF AND DEBRIS DEVICE TO BE INSTALLED ON EACH DOWNPIPE. SCREEN MESH TO BE 4-6mm AND DESIGNED TO BE SELF-CLEANING.
 8. FIRST FLUSH DEVICES, OR APPROVED ALTERNATIVE, TO BE INSTALLED WITH AN AUTOMATED DIVERSION AND DRAINAGE SYSTEM, THAT IS, NO MANUAL DIVERSION AND DRAINAGE VALVES. REFER TYPICAL FLUSH OUT PIT FOR DETAILS.
 9. BEFORE PURCHASING MATERIALS OR PAINT TO BE USED ON ROOF CATCHMENT AREAS, THE MANUFACTURER'S RECOMMENDATIONS ON LABELS AND BROCHURES FOR RAINWATER TANK SUITABILITY TO BE READ AND ADHERED TO.
 10. PRE-STORAGE PITS FOR UNDERGROUND RAINWATER STORAGE TANKS AND FLUSH OUT PITS MAY ASSIST IN LIMITING SILT, AND PREVENT VERMIN, INSECTS (INCLUDING MOSQUITOES) AND DEBRIS FROM ENTERING THE RAINWATER STORAGE AREA.
 11. BUILDER/PLUMBER TO ENSURE THE INSTALLATION OF THE RAINWATER TANK SYSTEM IS IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS AND THE RAINWATER TANK DESIGN AND INSTALLATION HANDBOOK - HB 230-2008. IF IN DOUBT CONTACT ENGINEER.
 12. RAINWATER TANK TO BE WATER PROOFED IN ACCORDANCE WITH HB 230-2008

TABALUM AVENUE

NORTHERN BEACHES COUNCIL (MANLY AREA) ON SITE DETENTION SYSTEM CALCULATION SHEET	
ADDRESS: 1 TABALUM STREET, BALGOWLAH HEIGHTS	
SITE DETAILS	
TOTAL SITE AREA	754 m ²
PRE DEVELOPMENT IMPERVIOUS AREA	405 m ² (54% IMPERVIOUS)
POST DEVELOPMENT IMPERVIOUS AREA	446 m ² (59% IMPERVIOUS)
INCREASE	41 m ²
OSD REQUIREMENT	
THE DEVELOPMENT PROPOSES THE CONSTRUCTION OF A NEW DWELLING, THEREFORE OSD IS REQUIRED	
PERMITTED SITE DISCHARGE	
PRE DEVELOPMENT SITE DISCHARGE	
5 YR	20 l/s
100	40 l/s
POST DEVELOPMENT SITE DISCHARGE	
5 YR	13 l/s (12 l/s FROM OSD)
100	20 l/s (18 l/s FROM OSD)
PSD	20 l/s
SITE STORAGE REQUIREMENT	
OSD VOLUME REQUIRED	5.0 m ³
RAINWATER 'BASIX' REQUIRED	5.0 m ³ (5.0 m ³ PROVIDED)
NOTE: 100% OSD OFFSET PERMITTED WITH BASIX RAINWATER RE-USE AS PER MANLY COUNCIL POLICY	
OUTLET CONTROL	
METHOD OF DISCHARGE	KERB & GUTTER



NOTE:
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DEVELOPERS & EXCAVATORS MAY BE HELD FINANCIALLY RESPONSIBLE BY THE ASSET OWNER SHOULD THEY DAMAGE UNDERGROUND NETWORKS.

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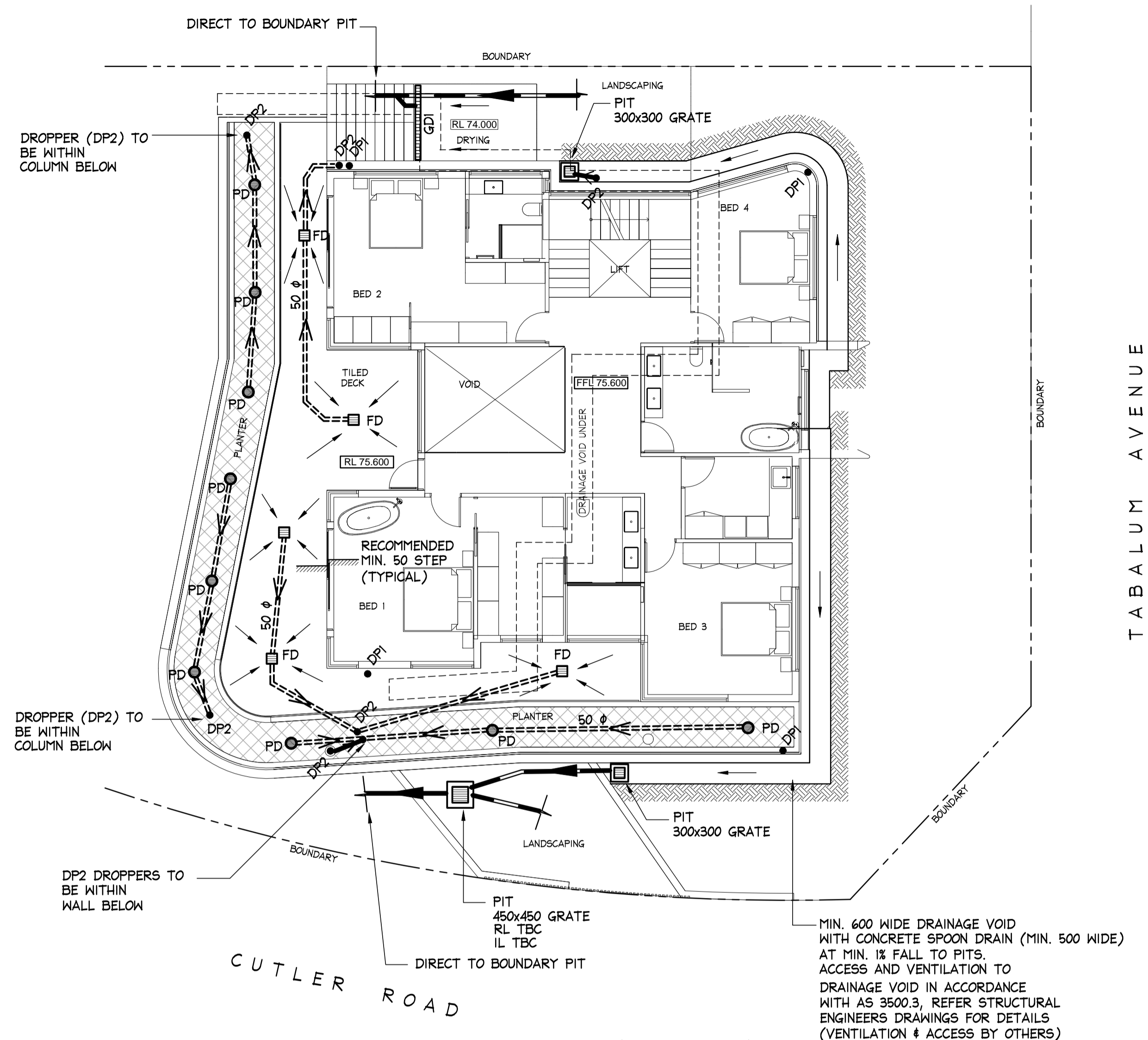
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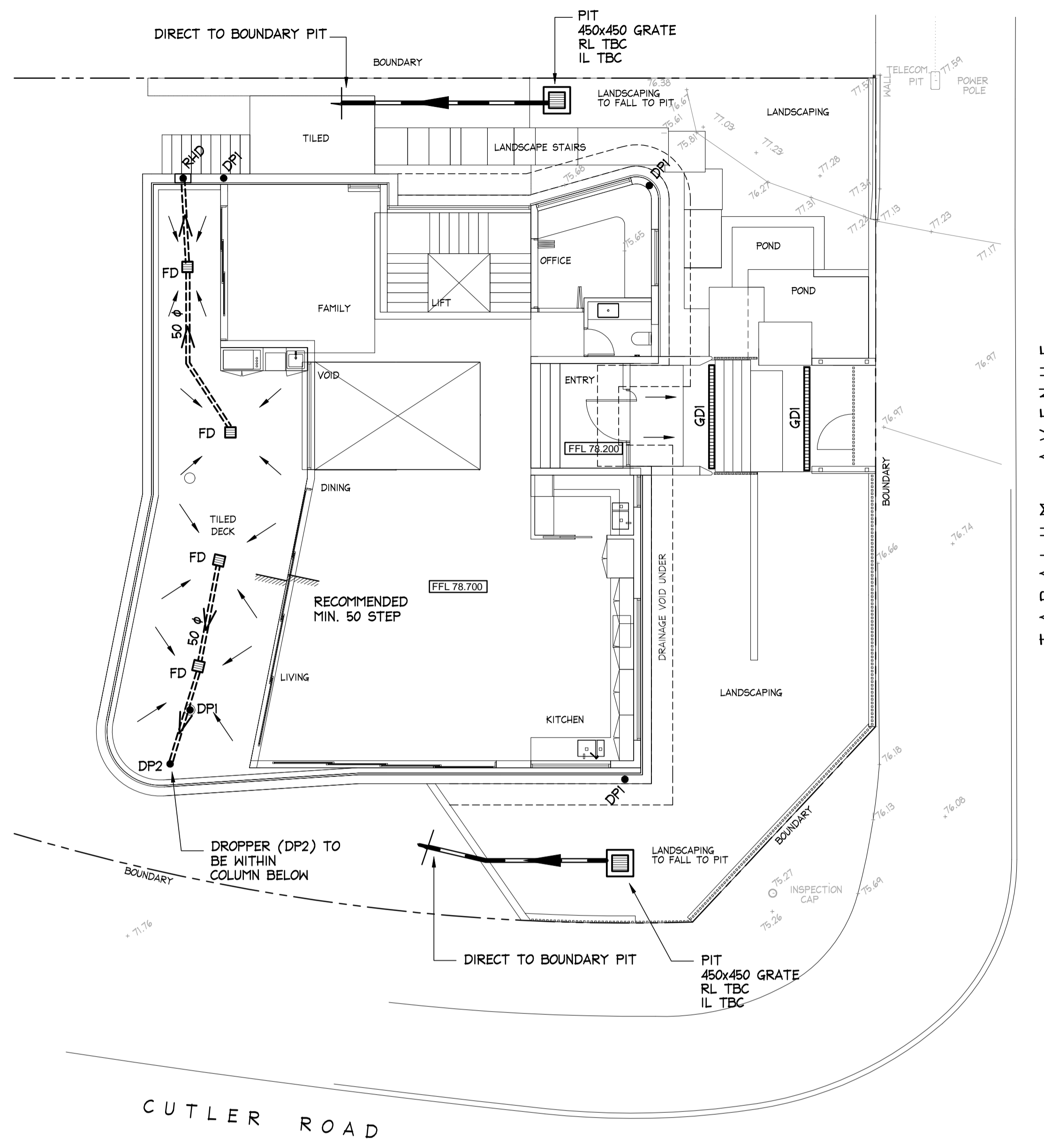
			DOCUMENT CERTIFICATION		NB Consulting Engineers STRUCTURAL - CIVIL - STORMWATER - REMEDIAL A.C.N. 076 121 616 A.B.N. 24 076 121 616		Architect:	SANTCTUM DESIGN		Project:	NEW DWELLING 1 TABALUM ROAD, BALGOWLAH HEIGHTS		Date:	AUGUST 2019	Design:	CF	Drawn:	MC
30-09-2019	B	REVISED TO SUIT NEW ARCH. PLANS	MC	MW	Sydney: Ph: (02) 9984 7000 Suite 207, 30 Fisher Road Dee Why N.S.W. 2099 Gold Coast: Ph: (07) 5631 4744 Unit 8, 1726 Gold Coast Highway Burleigh Heads QLD 4220 E: nb@nbconsulting.com.au W: www.nbconsulting.com.au		Client:	KEVIN MOONEY		Drawing Title:	STORMWATER MANAGEMENT DRAINAGE PLANS		Job No:	190832	Drawing No:	D02	Issue:	B
19-09-2019	A	ISSUED FOR DA SUBMISSION	MC	MW	Date: 23-09-2019 By: Rick G Wray BE(Civil), CP(Eng), MIE(Aust.), NER, RPEQ: 08293. (Director NB Consulting Engineers) <small>The copyright in this drawing remains with Northern Beaches Consulting Engineers Pty Ltd. Trading as NB Consulting Engineers</small>													

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LEVEL 2 - DRAINAGE PLAN
SCALE = 1 : 100

 DENOTES EXTENT OF PLANTER AREA OVER ATLANTIS DRAINAGE SYSTEM (OR APPROVED EQUIVALENT) INSTALLATION TO MANUFACTURER'S SPECIFICATIONS AND TO AS 3500.3. DRAINAGE TO BE DIRECTED TO BOUNDARY PIT.



LEVEL 3 - DRAINAGE PLAN
SCALE = 1 : 100

NOTE: POOL AND PONDS
 SWIMMING POOL/POND SURCHARGE OVERFLOW TO BE CONNECTED TO SYDNEY WATER SEWER IN ACCORDANCE WITH AS3500.2.2.2003 DETAILS AND CERTIFICATION BY OTHERS.

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Date:	Issue:	Description:	By:	Review:
30-09-2019	B	REVISED TO SUIT NEW ARCH. PLANS	MC	MW
19-09-2019	A	ISSUED FOR DA SUBMISSION	MC	MW

DOCUMENT CERTIFICATION

Date: 23-09-2019

R. Wray

Rick G Wray

BE(Civil), CP(Eng, MIEAust.), NER, RPEQ: 08293.
(Director NB Consulting Engineers)

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Architect: **SANTCTUM DESIGN**

Client: **KEVIN MOONEY**

Project: **NEW DWELLING
1 TABALUM ROAD, BALGOWLAH HEIGHTS**

Drawing Title: **STORMWATER MANAGEMENT
DRAINAGE PLANS**

Date: **AUGUST 2019**

Design: **CF**

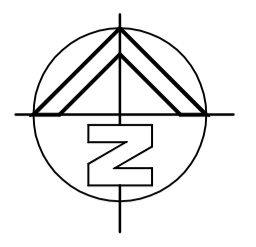
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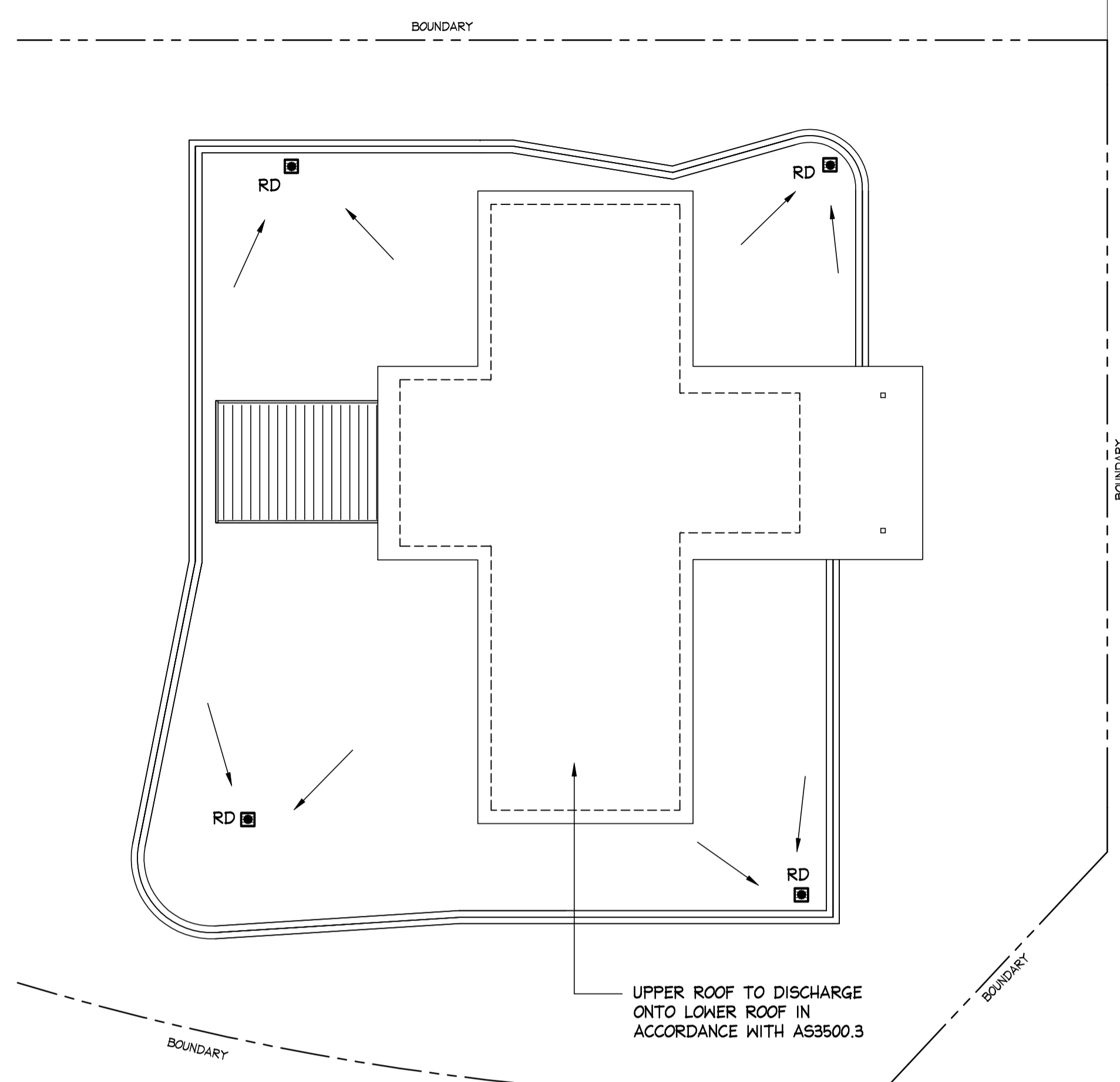
Job No: **190832**

Drawing No: **D03**

Issue: **B**

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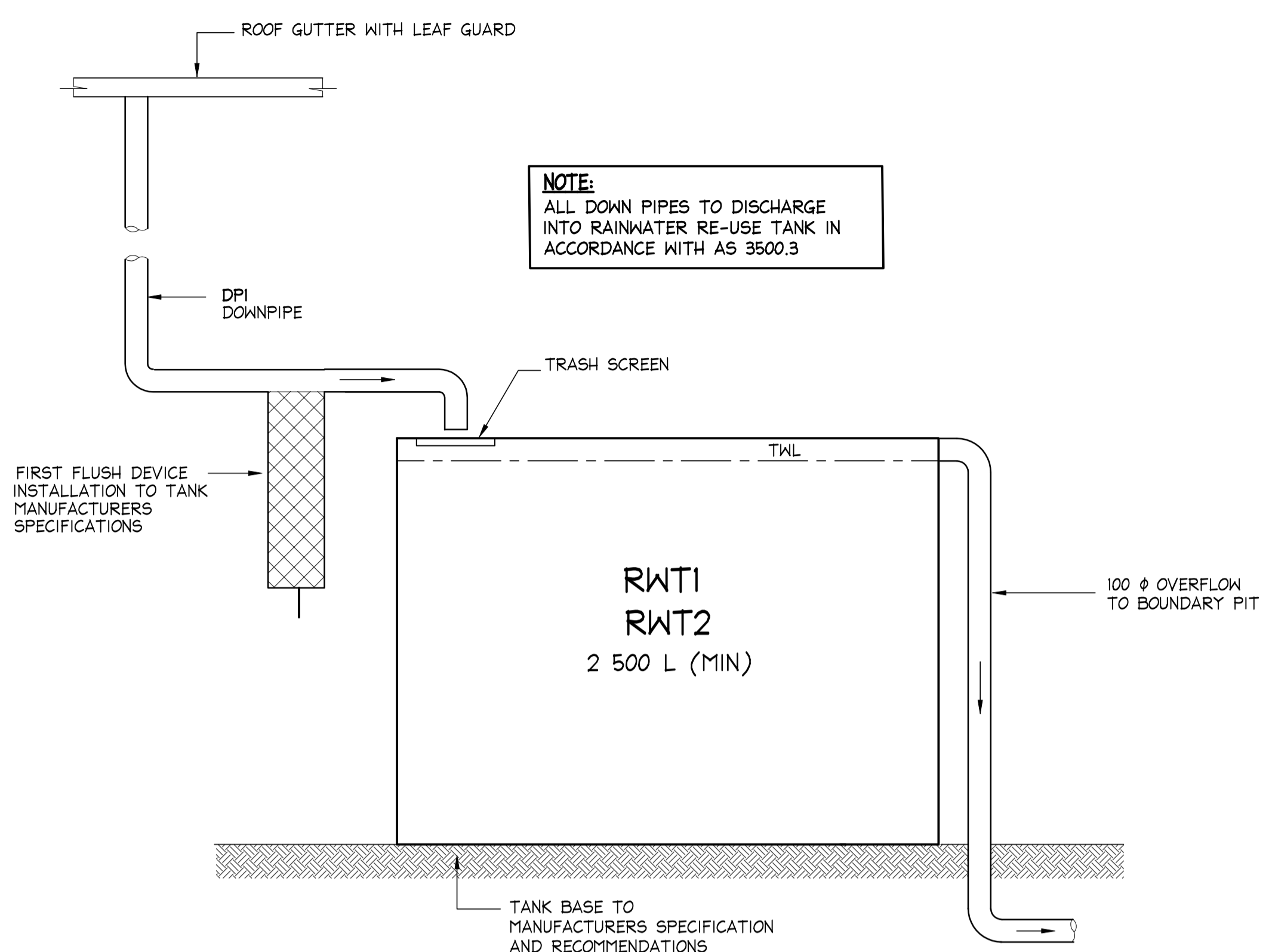
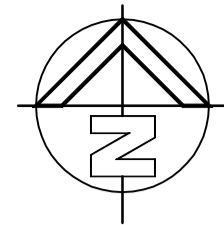




ROOF - DRAINAGE PLAN
SCALE = 1 : 100

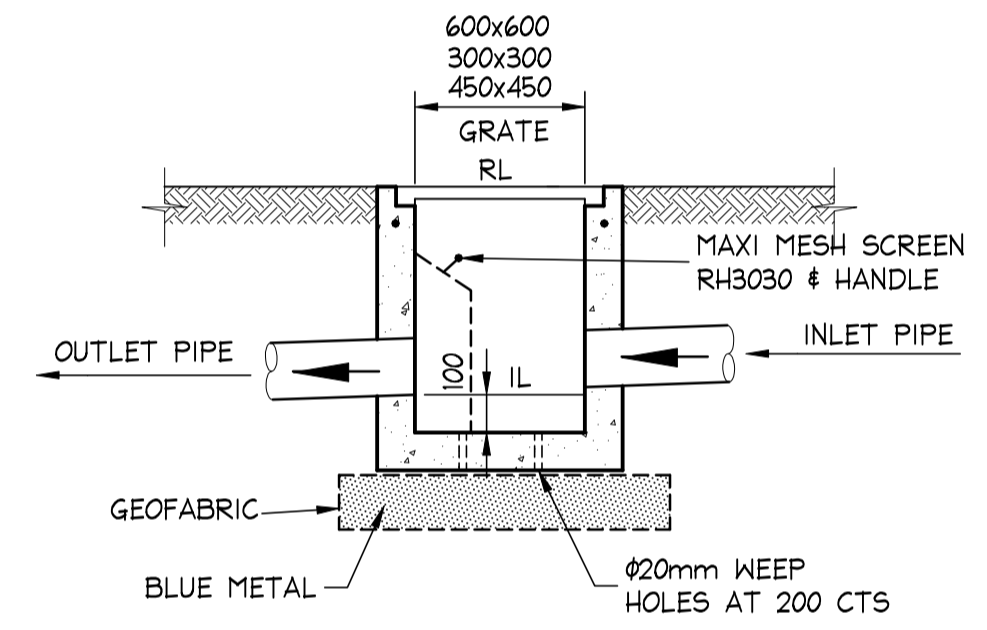
TABALUM AVENUE

CUTLER ROAD

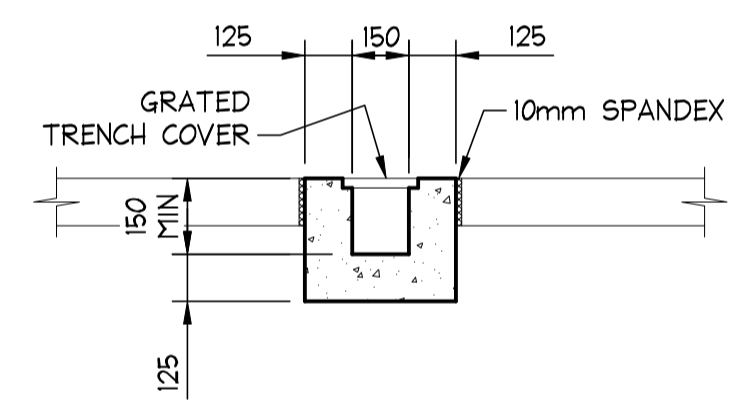


TYPICAL RAINWATER RE-USE TANK DETAIL
NOT TO SCALE

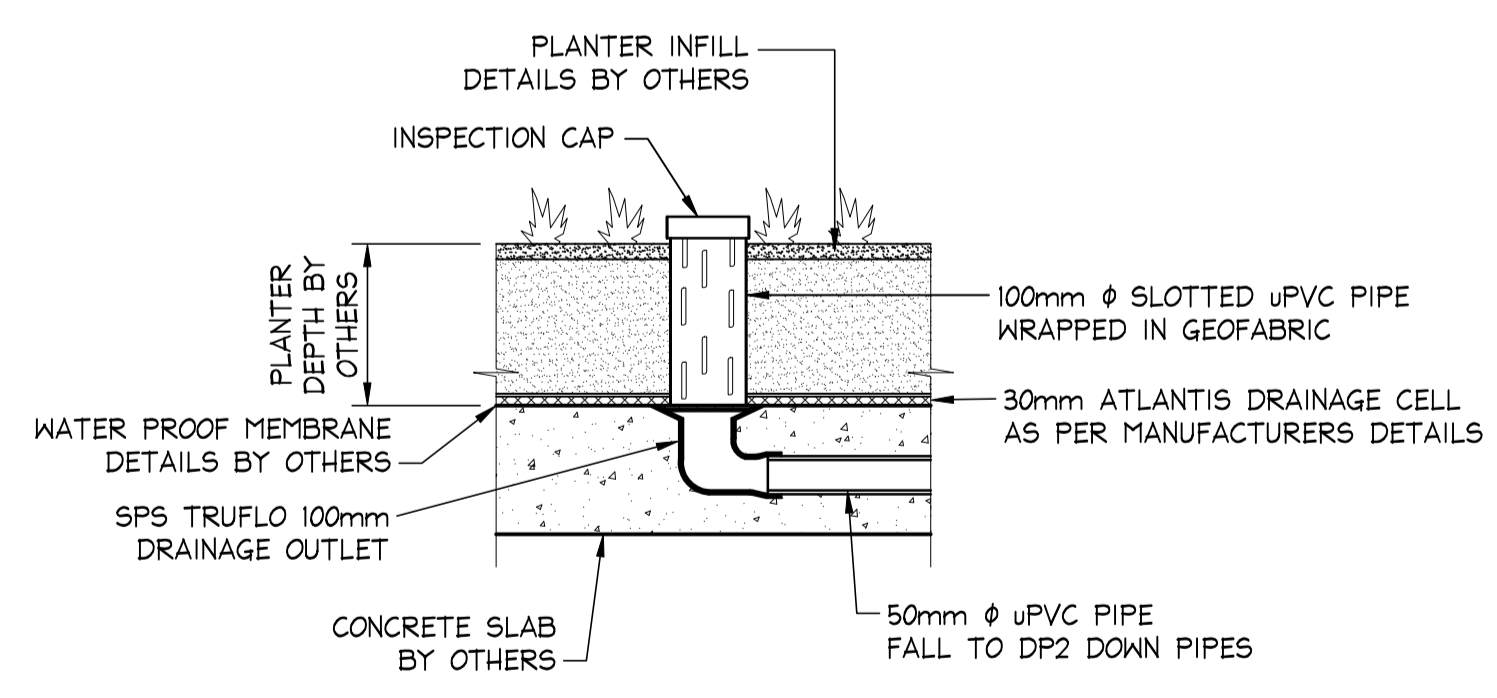
NOTE:
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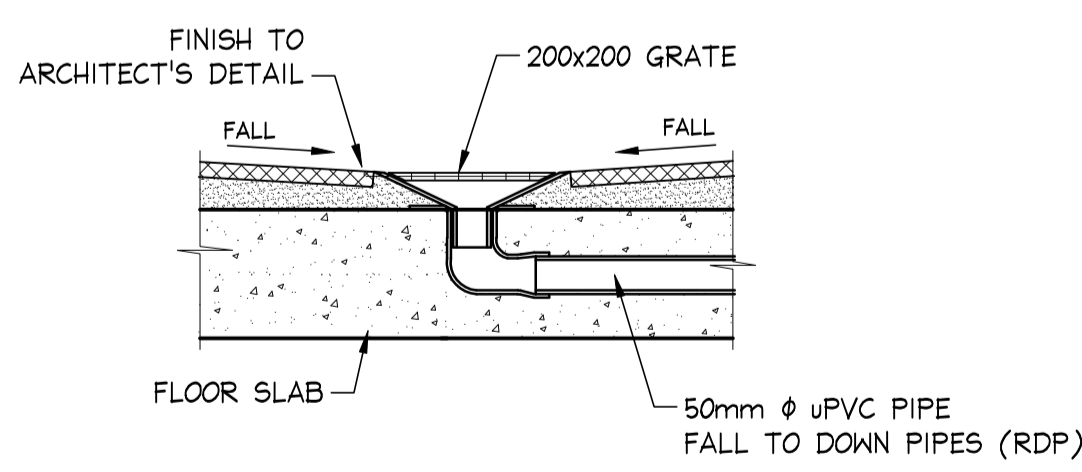
TYPICAL PIT DETAIL
SCALE = 1 : 20



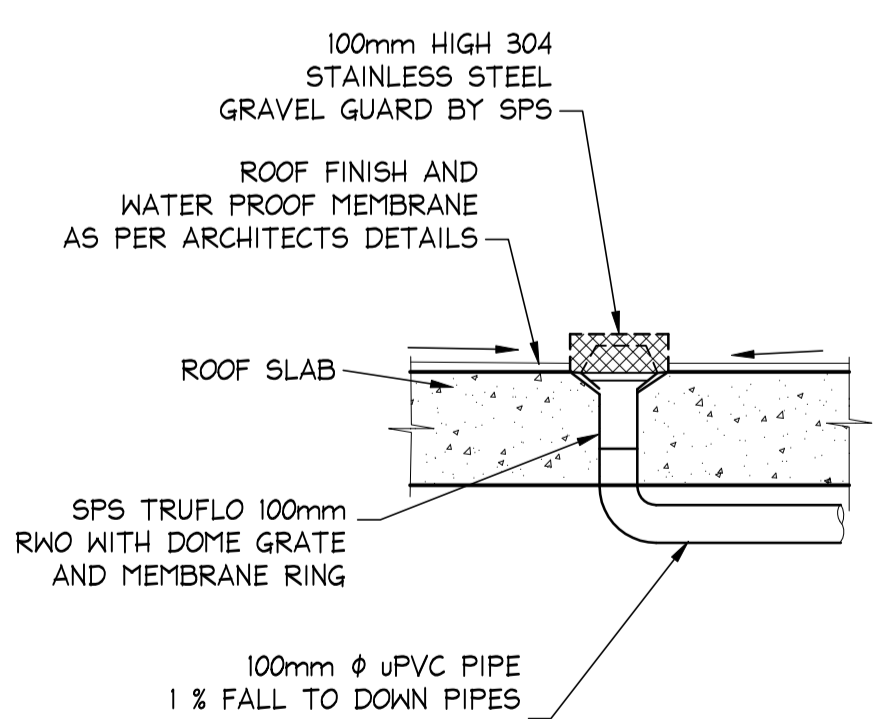
OR PRECAST GRATED DRAIN
ALTERNATIVE POLYPROPYLENE DRAIN BY MANUFACTURER
TYPICAL GRATED DRAIN - 'GDI'
SCALE = 1 : 20



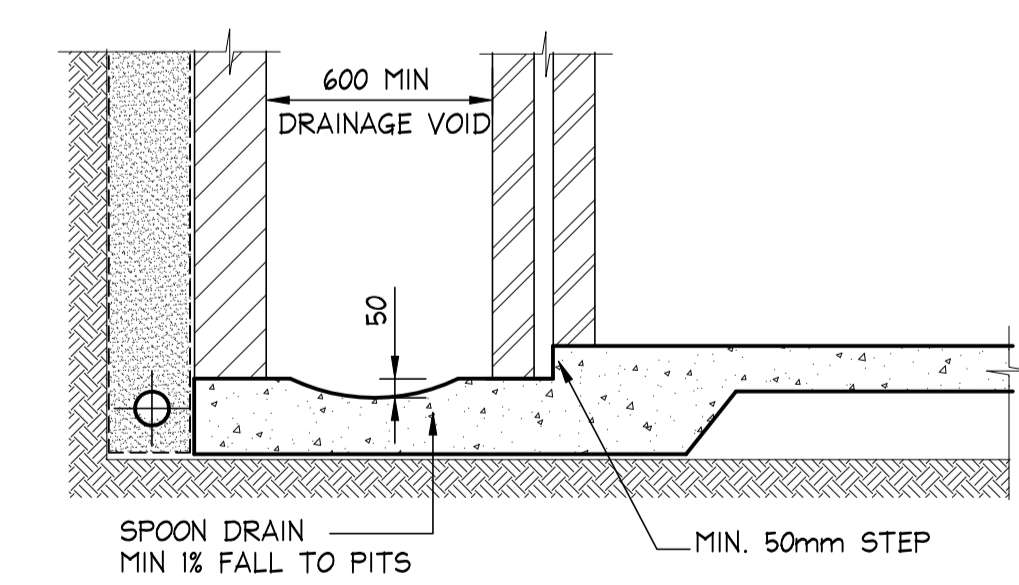
REFER TO MANUFACTURERS SPECIFICATION FOR SPS DRAINAGE OUTLETS
STANDARD PLANTER DRAIN - 'PD'
SCALE = 1 : 10



STANDARD FLOOR DRAIN - 'FD'
SCALE = 1 : 10
OR TO ARCHITECT'S DETAIL



RD - ROOF DRAIN DETAIL
NOT TO SCALE



TYPICAL SPOON DRAIN DETAIL
SCALE = 1 : 20

NOTE:
REFER STRUCTURAL ENGINEERS PLANS FOR STRUCTURAL DETAILS

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19-09-2019		A	ISSUED FOR DA SUBMISSION	MC	MJM	DOCUMENT CERTIFICATION Date: 23-09-2019 Rick G Wray BE(Civil), CPEng, MIEAust., NER, RPEQ: 08293. (Director NB Consulting Engineers) <small>The copyright of this drawing remains with Northern Beaches Consulting Engineers Pty Ltd. Trading as NB Consulting Engineers</small>		NB Consulting Engineers STRUCTURAL - CIVIL - STORMWATER - REMEDIAL A.C.N. 076 121 616 A.B.N. 24 076 121 616 Sydney: Ph: (02) 9984 7000 Suite 207, 30 Fisher Road Dee Why N.S.W. 2099 Gold Coast: Ph: (07) 5631 4744 Unit 8, 1726 Gold Coast Highway Burleigh Heads QLD 4220 E: nb@nbconsulting.com.au W: www.nbconsulting.com.au		Architect: SANTCTUM DESIGN Client: KEVIN MOONEY	Project: NEW DWELLING 1 TABALUM ROAD, BALGOWLAH HEIGHTS Drawing Title: STORMWATER MANAGEMENT DRAINAGE PLANS AND DETAILS	Date: AUGUST 2019 Design: CF Drawn: MC	Job No: 190832 Drawing No: D04 Issue: A
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