

STORMWATER MANAGEMENT PLANS

PROPOSED DUPLEX

Lot 1, No. 79 ASHWORTH AVENUE, BELROSE

DRAINAGE NOTES

PIPE SIZE:

THE MINIMUM PIPE SIZE SHALL BE:

- 90mm DIA WHERE THE LINE ONLY RECEIVES ROOFWATER RUNOFF; OR
- 100mm DIA WHERE THE LINE RECEIVES RUNOFF FROM PAVED OR UNPAVED AREAS ON THE PROPERTY

THE MINIMUM PIPE VELOCITY SHOULD BE 0.6 m/s AND A MAXIMUM PIPE VELOCITY OF 6.0 m/s DURING THE DESIGN STORM.

PIPE GRADE:

THE MINIMUM PIPE GRADE SHALL BE:

- 1.0% FOR PIPES LESS THAN 225mm DIA
- 0.5% FOR ALL LARGER PIPES

PIPES WITH A GRADIENT GREATER THAN 20% WILL REQUIRE ANCHOR BLOCKS AT THE TOP AND BOTTOM OF THE INCLINED SECTION; AND AT INTERVALS NOT EXCEEDING 3.0m

ANCHOR BLOCKS ARE DESIGNED ACCORDING TO *CLAUSE 7.9 OF AS3500.3:2021*

DEPTH OF COVER FOR PVC PIPES:

MINIMUM PIPE COVER SHALL BE AS FOLLOWS:

| LOCATION | MINIMUM COVER |
|--|--|
| NOT SUBJECT TO VEHICLE LOADING | 100mm SINGLE RESIDENTIAL 300mm ALL OTHER DEVELOPMENTS |
| SUBJECT TO VEHICLE LOADING UNDER A SEALED ROAD | 450mm WHERE NOT IN A ROAD 600mm |
| UNSEALED ROAD | 750mm |
| PAVED DRIVEWAY | 100mm PLUS DEPTH OF CONCRETE |

SEE AS2032 INSTALLATION OF UPVC PIPES FOR FURTHER INFORMATION.

CONCRETE PIPE COVER SHALL BE IN ACCORDANCE WITH *AS3725-2007 LOADS ON BURIED CONCRETE PIPES*, HOWEVER A MINIMUM COVER OF 450mm WILL APPLY.

WHERE INSUFFICIENT COVER IS PROVIDED, THE PIPE SHALL BE COVERED AT LEAST 50mm THICK OVERLAY AND SHALL THEN BE PAVED WITH AT LEAST:

- 150mm REINFORCED CONCRETE WHERE SUBJECT TO HEAVY VEHICLE TRAFFIC;
- 75mm THICKNESS OF BRICK OR 100mm OF CONCRETE PAVING WHERE SUBJECT TO LIGHT VEHICLE TRAFFIC; OR
- 50mm THICK BRICK OR CONCRETE PAVING WHERE NOT SUBJECT TO VEHICLE TRAFFIC.

CONNECTIONS TO STORMWATER DRAINS UNDER BUILDINGS:

SHALL BE CARRIED OUT IN ACCORDANCE WITH *SECTION 6.2.8 OF AS3500.3:2021*

ABOVE GROUND PIPEWORK:

SHALL BE CARRIED OUT IN ACCORDANCE WITH *SECTION 6 OF AS3500.3:2021*

PIT SIZES AND DESIGN:

| DEPTH (mm) | MINIMUM PIT SIZE (mm) |
|------------------|-------------------------------|
| UP TO 450mm | 450 x 450 |
| 450mm TO 600mm | 600 x 600 |
| 600mm TO 900mm | 600 x 900 |
| 900mm TO 1500mm | 900 x 900 (WITH STEP IRONS) |
| 1500mm TO 2000mm | 1200 x 1200 (WITH STEP IRONS) |

ALL PIPES SHOULD BE CUT FLUSH WITH THE WALL OF THE PIT.

PITS GREATER THAN 600mm DEEP SHALL HAVE A MINIMUM ACCESS OPENING OF 600 x 600mm

THE GRATED COVERS OF PITS LARGER THAN 600 x 600mm ARE TO BE HINGED TO PREVENT THE GRATE FROM FALLING INTO THE PIT.

THE BASE OF THE DRAINAGE PITS SHOULD BE AT THE SAME LEVEL AS THE INVERT OF THE OUTLET PIPE. RAINWATER SHOULD NOT BE PERMITTED TO POND WITHIN THE STORMWATER SYSTEM

- TRENCH DRAINS:**
CONTINUOUS TRENCH DRAINS ARE TO BE OF WIDTH NOT LESS THAN 150mm AND DEPTH NOT LESS THAN 100mm. THE BARS OF THE GRATING ARE TO BE PARALLEL TO THE DIRECTION OF SURFACE FLOW.

- STEP IRONS:**
PITS BETWEEN 1.2m AND 6m ARE TO HAVE STEP IRONS IN ACCORDANCE WITH AS1657. FOR PITS GREATER THAN 6m OTHER MEANS OF ACCESS MUST BE PROVIDED.

- IN-SITU PITS:**
IN-SITU PITS ARE TO BE CONSTRUCTED ON A CONCRETE BED OF AT LEAST 150mm THICK. THE WALLS ARE TO BE DESIGNED TO MEET THE MINIMUM REQUIREMENTS OF *CLAUSE 7.5.5.1 OF AS3500.3:2021*. PITS DEEPER THAN 1.8m SHALL BE CONSTRUCTED WITH REINFORCED CONCRETE.

- GRATES:**
GRATES ARE TO BE GALVANISED STEEL GRID TYPE. GRATES ARE TO BE OF HEAVY-DUTY TYPE IN AREAS WHERE THEY MAY BE SUBJECT TO VEHICLE LOADING.

| CLASS | USE |
|-------|------------------|
| A | EXTRA LIGHT DUTY |
| B | LIGHT DUTY |
| C | MEDIUM DUTY |
| D | HEAVY DUTY |
| E | EXTRA HEAVY DUTY |
| F | EXTRA HEAVY DUTY |
| G | EXTRA HEAVY DUTY |

| CLASS | USE |
|-------|------------------|
| A | EXTRA LIGHT DUTY |
| B | LIGHT DUTY |
| C | MEDIUM DUTY |
| D | HEAVY DUTY |
| E | EXTRA HEAVY DUTY |
| F | EXTRA HEAVY DUTY |
| G | EXTRA HEAVY DUTY |

GENERAL NOTES

- FINAL LOCATION OF NEW DOWNPIPES TO BE DETERMINED BY BUILDER/ARCHITECT AT TIME OF CONSTRUCTION.
- THESE DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTS AND OTHER CONSULTANTS DRAWINGS. ANY DISCREPANCIES TO BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH WORK.
- ALL MATERIALS AND WORKMANSHIP TO BE IN ACCORDANCE WITH AS/NZS 3500.3:2021 STORMWATER DRAINAGE, BCA AND LOCAL COUNCIL POLICY/CONSENT/REQUIREMENTS.
- ALL DIMENSIONS AND LEVELS TO BE VERIFIED BY BUILDER ON-SITE PRIOR TO COMMENCEMENT OF WORKS. THESE DRAWINGS ARE NOT TO BE SCALED FOR DIMENSIONS NOR TO BE USED FOR SETOUT PURPOSES.
- ALL SURVEY INFORMATION AND PROPOSED BUILDING AND FINISHED SURFACE LEVELS SHOWN IN THESE DRAWINGS ARE BASED ON LEVELS OBTAINED FROM DRAWINGS BY OTHERS. THESE DRAWINGS DEPICT THE DESIGN OF SURFACE STORMWATER RUNOFF DRAINAGE SYSTEMS ONLY AND DO NOT DEPICT ROOF DRAINAGE OR SUBSOIL DRAINAGE SYSTEMS UNLESS NOTED OTHERWISE. THE DESIGN OF ROOF AND SUBSOIL DRAINAGE SYSTEMS IS THE RESPONSIBILITY OF OTHERS.
- ALL STORMWATER DRAINAGE PIPES ARE TO BE uPVC AT MINIMUM 1% GRADE UNLESS NOTED OTHERWISE.
- IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE AND LEVEL ALL EXISTING SERVICES OR OTHER STRUCTURES WHICH MAY AFFECT/BE AFFECTED BY THIS DESIGN PRIOR TO COMMENCEMENT OF WORKS.
- ALL PITS WITHIN DRIVEWAYS TO BE 150mm THICK CONCRETE OR EQUAL.
- THIS PLAN IS THE PROPERTY OF QUANTUM ENGINEERS AND MAY NOT BE USED OR REPRODUCED WITHOUT WRITTEN PERMISSION FROM QUANTUM ENGINEERS.

PLAN NOTES

- ROOF DRAINAGE NOTE:** AS 3500 ROOF DRAINAGE REQUIRES EAVES GUTTERS TO BE SIZED FOR 20 YEAR 5 MIN. STORM = 205mm/hr. FOR EAVES GUTTERS, AS 3500.3:2021 THEN HAS THE FOLLOWING REQUIREMENTS:
 - FOR TYPICAL STANDARD QUAD GUTTER WITH $A_e = 6000\text{mm}^2$ AND GUTTER SLOPE 1:500 AND STEEPER, THIS REQUIRES ONE DOWNPIPE PER 30m² ROOF AREA.
 - DOWNPIPES TO BE MINIMUM 90mm DIA. OR 100 x 50mm FOR GUTTERS SLOPE 1:500 AND STEEPER.
 - OVERFLOW METHOD TO FIGURE F.1 OF AS 3500.3:2021 IT IS THE RESPONSIBILITY OF THE PLUMBER AND / OR BUILDER TO COMPLY WITH THIS. THIS DRAWING SHOWS PRELIMINARY LOCATIONS / NUMBERS OF DOWNPIPES ONLY WHICH ARE TO BE VERIFIED BY BUILDER / PLUMBER
- TREE PRESERVATION:** IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY PRIOR APPROVAL REQUIRED FROM COUNCIL WITH RESPECT TO POTENTIAL IMPACT ON TREES FOR ANY WORKS SHOWN ON THIS DRAWING PRIOR TO THE COMMENCEMENT OF THOSE WORKS
- ALL ROOF GUTTERS TO HAVE OVERFLOW PROVISION IN ACCORDANCE WITH AS 3500.3:2021 AND SECTIONS 3.5, 3.7.7 AND APPENDIX G OF AS 3500.3:2021
- THIS DRAWING IS NOT TO BE USED FOR SET-OUT PURPOSES - REFER TO ARCHITECTURAL DRAWINGS
- LOCATION OF SURFACE STORMWATER GRATED INLET PITS MAY BE VARIED OR NEW PITS INSTALLED AT THE CONSTRUCTION STAGE PROVIDED DESIGN INTENT OF THIS DRAWING IS MAINTAINED

| LEGEND | |
|---|-----------|
| SURFACE INLET PIT | |
| SURFACE INLET PIT (WITH ENVIROPOD 200 MICRON) | |
| ACCESS GRATE (WITH ENVIROPOD 200 MICRON) | |
| ACCESS GRATE (TO HED PIT) | |
| 450 SQUARE INTERVAL | 450 X 450 |
| GRATE LEVEL = 75.50 | SL 75.50 |
| INVERT LEVEL = RL 75.20 | IL 75.20 |
| PROPOSED DOWNPIPE 90mm DIA. PVC | |
| GRATED TRENCH DRAIN | |
| ABSORPTION TRENCH | |
| PROPOSED ROOF GUTTER FALL | |
| PROPOSED DOWNPIPE SPREADER | |
| STORMWATER PIPE 100mm DIA. MIN. UNO | |
| SUBSOIL PIPE | |
| EXISTING STORMWATER PIPE | |
| INSPECTION RISER | |
| RAINWATER HEAD | |

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DRAWING TITLE
 DETAILS, NOTES & LEGEND

PROPOSED DUPLEX
 Lot 1, No. 79 ASHWORTH AVENUE,
 BELROSE

| REVISION | DRAWN | DESCRIPTION | DATE |
|----------|-------|-------------------|------------|
| A | EW | PRELIMINARY ISSUE | 01.04.2025 |
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|--------------|-------------|
| EW | 12 |
| SCALE - SIZE | REVISION |
| - | B |
| JOB NUMBER | DRAWING No. |
| 240392_SW | D1 |

| SITE AREA CALCULATIONS | | |
|---|-------|----------------|
| TOTAL SITE AREA | 1094 | m ² |
| EXISTING DEVELOPMENT | | |
| BUILDING FOOTPRINT AREA | 173.6 | m ² |
| PAVED AREA | 149.1 | m ² |
| DRIVEWAY AREA | 75.6 | m ² |
| TOTAL IMPERVIOUS AREA | 398.3 | m ² |
| IMPERVIOUS AREA PERCENTAGE | 36.4% | |
| PROPOSED DEVELOPMENT | | |
| BUILDING FOOTPRINT AREA | 438.7 | m ² |
| PAVED AREA | 18.3 | m ² |
| DRIVEWAY AREA | 97.68 | m ² |
| TOTAL IMPERVIOUS AREA | 554.7 | m ² |
| INCREASE IN IMPERVIOUS AREA | 156.4 | m ² |
| TOTAL IMPERVIOUS AREA PERCENTAGE | 50.7% | |
| AREA CALCULATIONS HAVE TAKEN INTO ACCOUNT THE REMOVED IMPERVIOUS AREA AS NOTED ON THE ARCHITECTURAL PLANS | | |

DRAINAGE PIPE LEGEND

- DRAINAGE PIPES VIA GRAVITY
- DRAINAGE PIPES TO RAINWATER TANK
- SUBSOIL DRAINAGE (AGG. LINE)

NOTE: ALL PIPES TO BE 100mm DIA UNO

NOTE: ALL PROPOSED GRATED DRAINS TO BE 100mm WIDE (UNO)

ALL STORMWATER DRAINAGE TO BE SEWER GRADE PVC U.N.O

ALL STORMWATER DRAINAGE TO BE 1% MINIMUM GRADE U.N.O

OSD WARRANT

LGA: NORTHERN BEACHES COUNCIL
 RELEVANT CODE: WATER MANAGEMENT FOR DEVELOPMENT POLICY SECTION 9.3.2

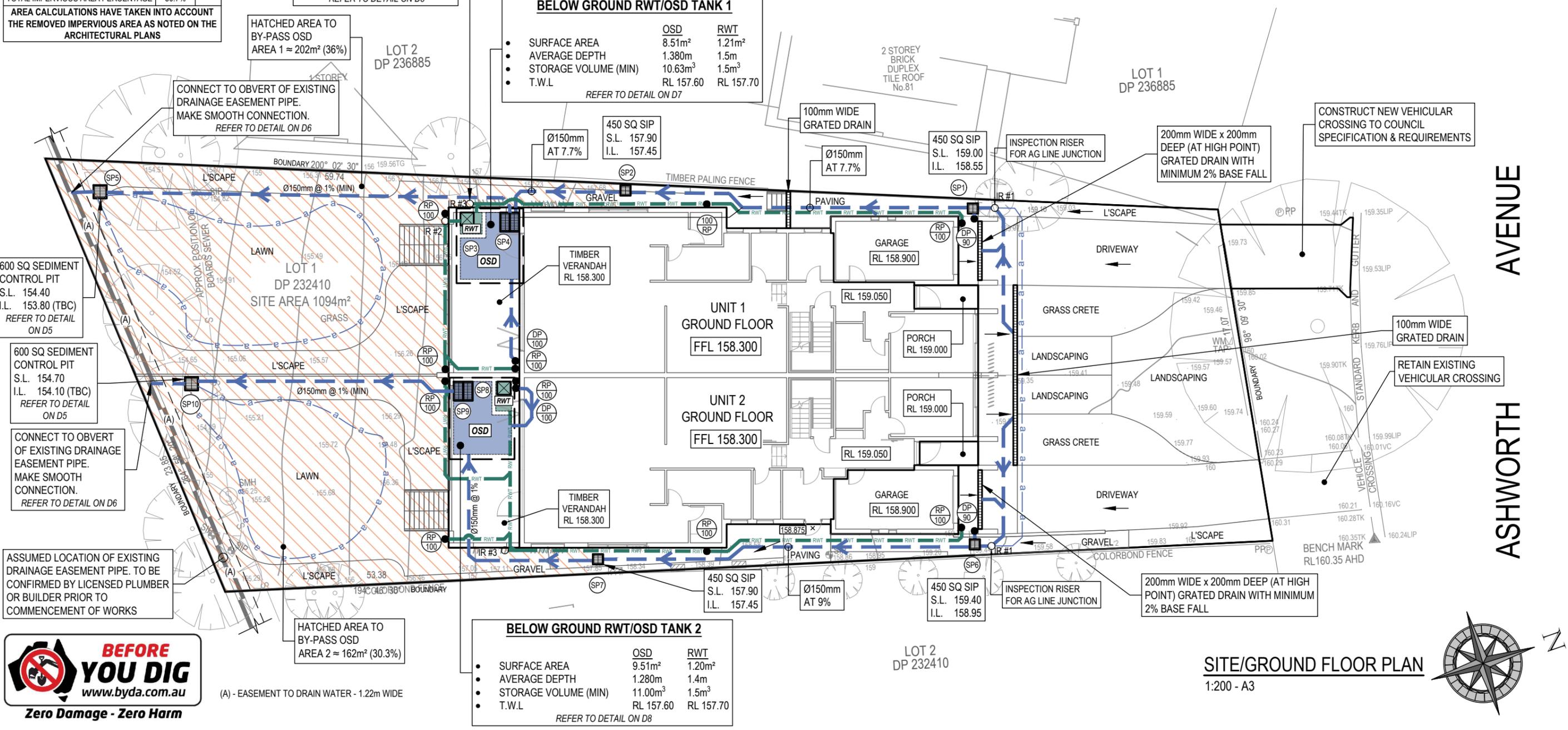
"OSD IS REQUIRED FOR ALL DEVELOPMENTS IN REGION 2 WHERE THE TOTAL EXISTING AND PROPOSED IMPERVIOUS AREAS EXCEED 40% OF THE TOTAL SITE AREA"

- PROPOSED IMPERVIOUS AREA 50.7%

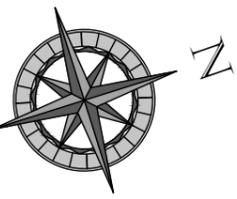
THEREFORE, OSD REQUIRED
FULL COMPUTATIONAL METHOD TO BE USED

DOWNPIPE LEGEND

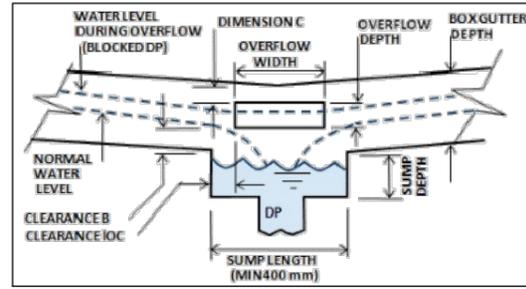
- RP 150 INDICATES DOWNPIPE TO RWT
- DP 150 INDICATES DOWNPIPE DIRECTLY TO KERB OUTLET
- INDICATES DOWNPIPE DIAMETER
- INDICATES DOWNPIPE DIAMETER
- DOWNPIPE PENETRATING FLOOR SLAB
- DOWNPIPE COMMENCING BELOW FLOOR SLAB
- SPREADER



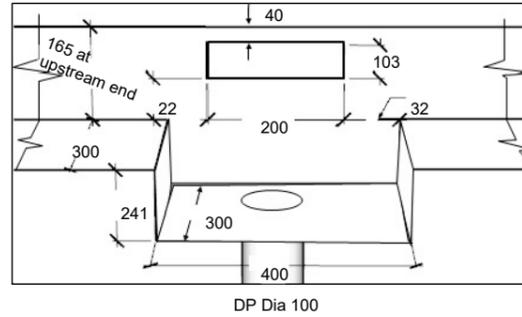
SITE/GROUND FLOOR PLAN
 1:200 - A3



| <p>QUANTUM ENGINEERS Suite 1A, Level 2, 2 Rowe Street, EASTWOOD NSW 2122 02 9807 7800 admin@quantumengineers.com.au quantumengineers.com.au</p> | <p>APPROVED BY ROBERT ELTOBAGI BE(CIVIL) MIEAust CPEng NER (1052208) RPEQ (25464) APEC Engineer IntPE(Aus)</p> | <p>CLIENT LUCA MASTROIANI</p> | <p>DRAWING TITLE SITE/GROUND FLOOR PLAN</p> | <table border="1"> <thead> <tr> <th>REVISION</th> <th>DRAWN</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>EW</td> <td>PRELIMINARY ISSUE</td> <td>01.04.2025</td> </tr> <tr> <td>B</td> <td>EW</td> <td>ISSUED FOR CDC</td> <td>02.04.2025</td> </tr> </tbody> </table> | REVISION | DRAWN | DESCRIPTION | DATE | A | EW | PRELIMINARY ISSUE | 01.04.2025 | B | EW | ISSUED FOR CDC | 02.04.2025 | <p>DESIGNED BY EW</p> <p>No. IN SET 12</p> |
|--|---|--|---|---|----------|-------|-------------|------|---|----|-------------------|------------|---|----|----------------|------------|--|
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| <p>ARCHITECT RJK ARCHITECTS</p> | <p>PROPOSED DUPLEX Lot 1, No. 79 ASHWORTH AVENUE, BELROSE</p> | <p>SCALE - SIZE 1:200 - A3</p> <p>REVISION B</p> | <p>JOB NUMBER 240392_SW</p> <p>DRAWING No. D2</p> | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |



**SUMP AND OVERFLOW
DETAIL (TYPICAL)**



BOX GUTTER #2 DIAGRAM

DRAINAGE PIPE LEGEND

- DRAINAGE PIPES VIA GRAVITY
- NOTE: ALL PIPES TO BE 100mm DIA UNO

DOWNPIPE LEGEND

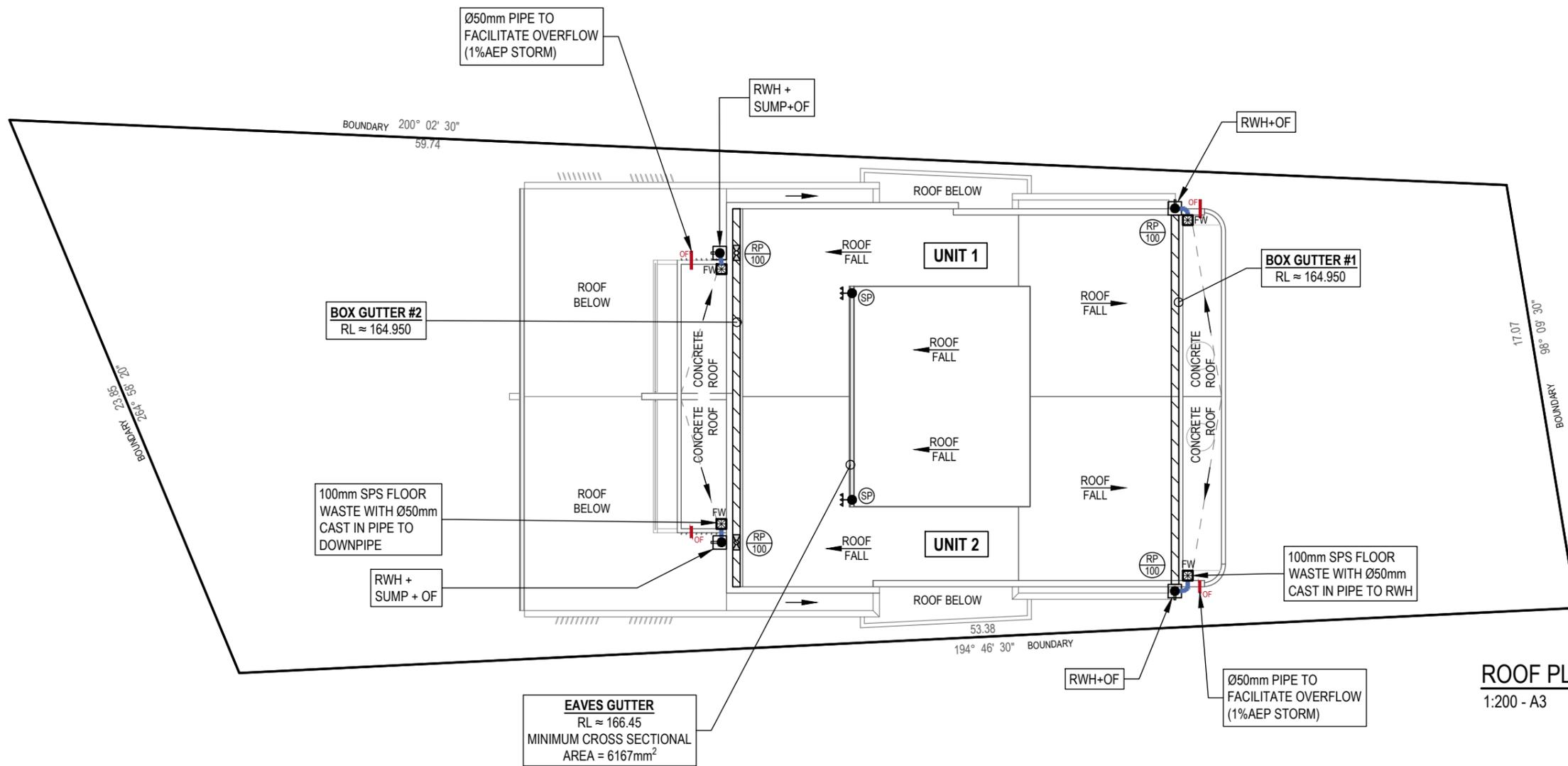
- INDICATES DOWNPIPE TO RWI
- INDICATES DOWNPIPE DIAMETER
- INDICATES DOWNPIPE DIRECTLY TO KERB OUTLET
- INDICATES DOWNPIPE DIAMETER
- DOWNPIPE PENETRATING FLOOR SLAB
- DOWNPIPE COMMENCING BELOW FLOOR SLAB
- SPREADER

BOX GUTTER #1

- BOX GUTTER TO BE CONSTRUCTED IN ACCORDANCE WITH AS/NZS 3500.3.2:2021: SECTION J2
- BOX GUTTER - 300mm WIDTH x 150mm DEPTH (MIN)
 - RWH (EXTERNAL) - 110mm LENGTH x 300 WIDTH x 113mm DEPTH (MIN)
- REFER TO DRAWING D10 FOR CALCULATIONS

BOX GUTTER #2

- BOX GUTTER TO BE CONSTRUCTED IN ACCORDANCE WITH AS/NZS 3500.3.2:2021: SECTION J2
- BOX GUTTER - 300mm WIDTH x 165mm DEPTH (MIN)
 - SUMP - 400mm LENGTH x 300 WIDTH x 241mm DEPTH (MIN)
 - RWH (EXTERNAL) - 110mm LENGTH X 300 WIDTH X 113mm DEPTH (MIN)
 - RWH OVERFLOW (OF) - 200mm WIDE x 103mm HIGH (MIN)
- REFER TO DRAWING D10 FOR CALCULATIONS



**ROOF PLAN
1:200 - A3**

ASHWORTH AVENUE



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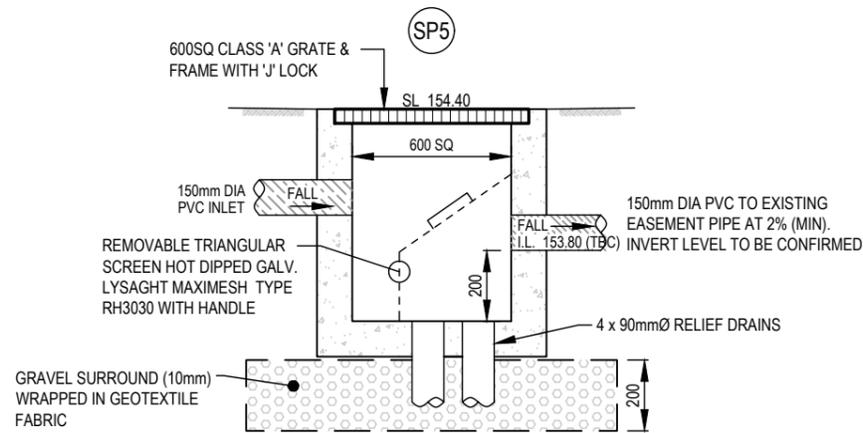
ARCHITECT
RJK ARCHITECTS

DRAWING TITLE
ROOF PLAN

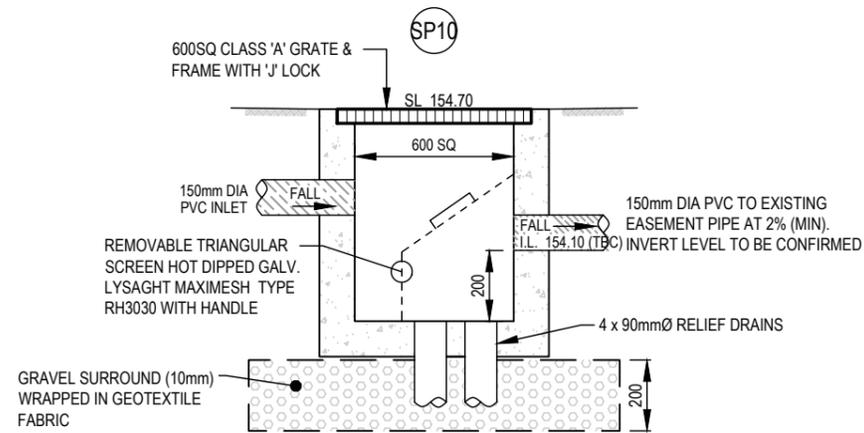
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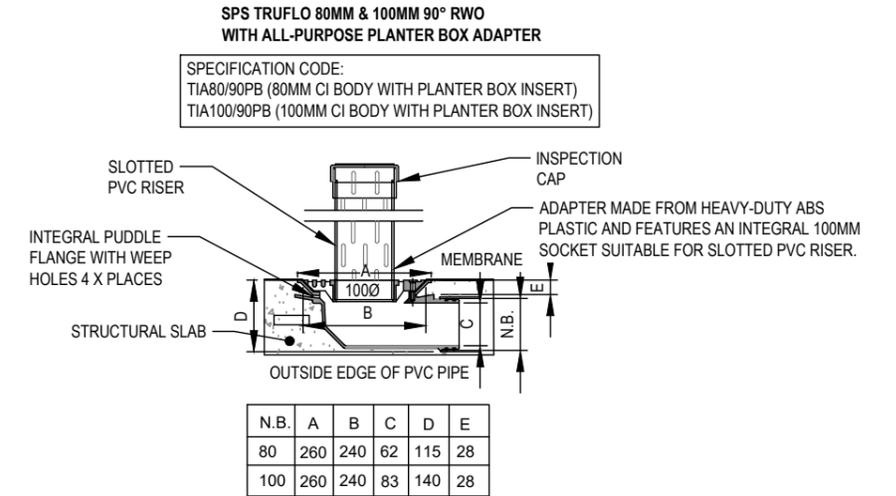
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| SCALE - SIZE | REVISION |
| 1:200 - A3 | B |
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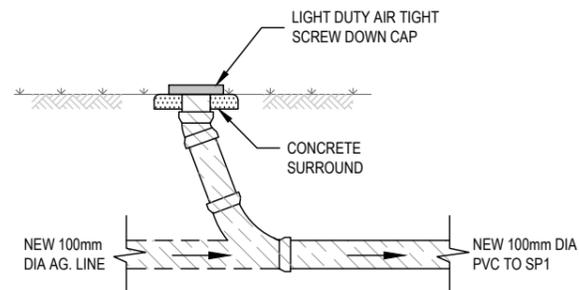
SEDIMENT CONTROL PIT - SP5
NTS



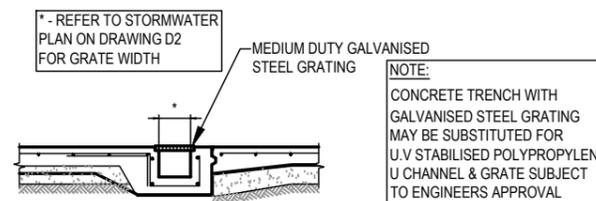
SEDIMENT CONTROL PIT - SP10
NTS



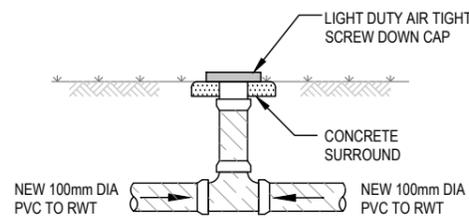
PLANTER GRATE (SPS) - PG
NTS



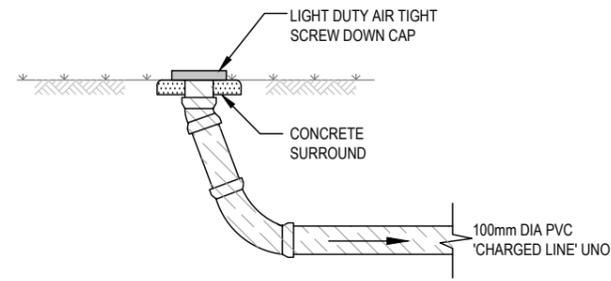
AG. LINE INSPECTION RISER - IR #1
NTS



GRATED DRAIN
NTS



INSPECTION RISER - IR #2
NTS



INSPECTION RISER - IR #3
NTS



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ARCHITECT
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DRAWING TITLE
STORMWATER DETAILS SHEET 1

PROPOSED DUPLEX
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| 240392_SW | D5 |

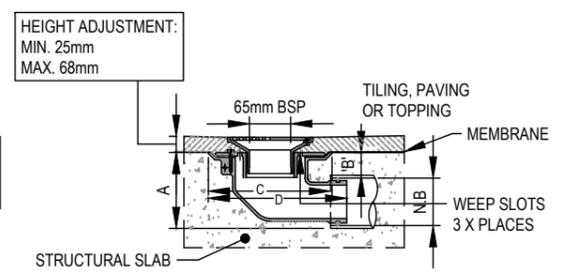
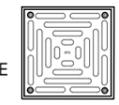
SPS 130MM SQUARE VARI-LEVEL SIDE OUTLET DRAIN
65/50MM OUTLET

SPECIFICATION CODE:
Q130S4/C90 (POLISHED 304 STAINLESS STEEL, ABS LOWER BODY)
Q130S/C90 (SATIN 316 STAINLESS STEEL GRATE, ABS LOWER BODY)

130MM SQUARE

SQUARE GRATE POLISHED 304 OR SATIN 316 STAINLESS STEEL.

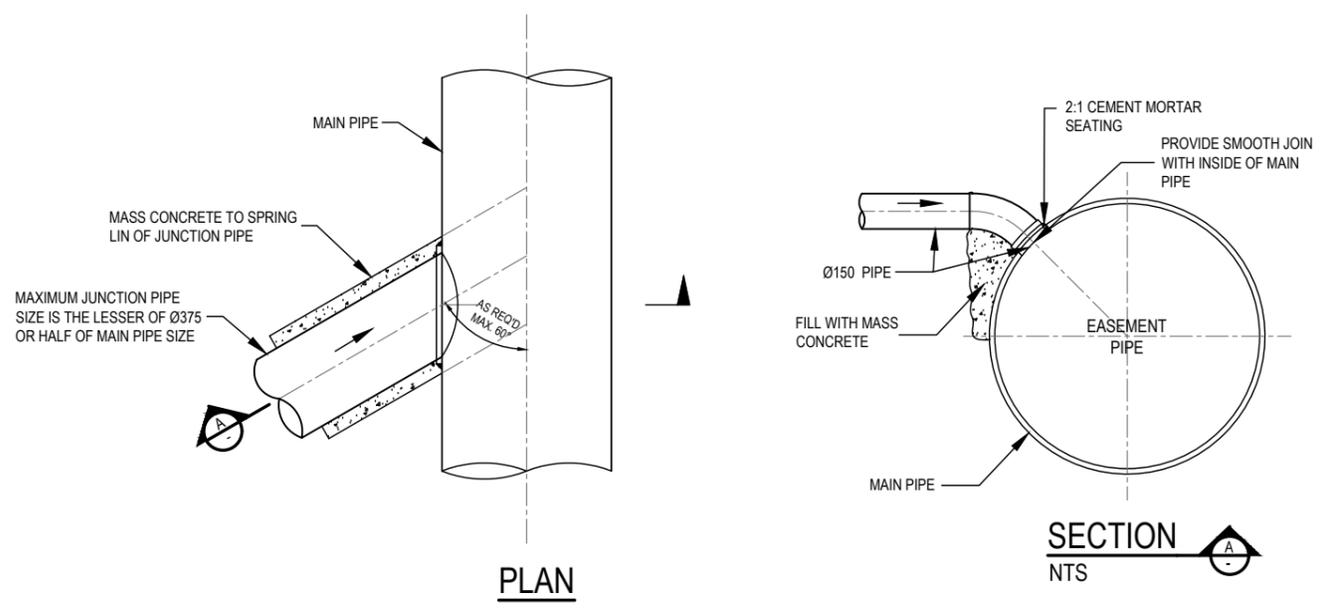
UPVC 90° BODY AND REVERSIBLE MEMBRANE CLAMP COLLAR WITH FEMALE 65MM BSP THREAD.



SPIGOT PUSHES INTO 65MM PVC OR COPPER WITH O-RING CONNECTION, OR CONNECTS TO 50MM PVC/HDPE WITH NO-HUB COUPLING.

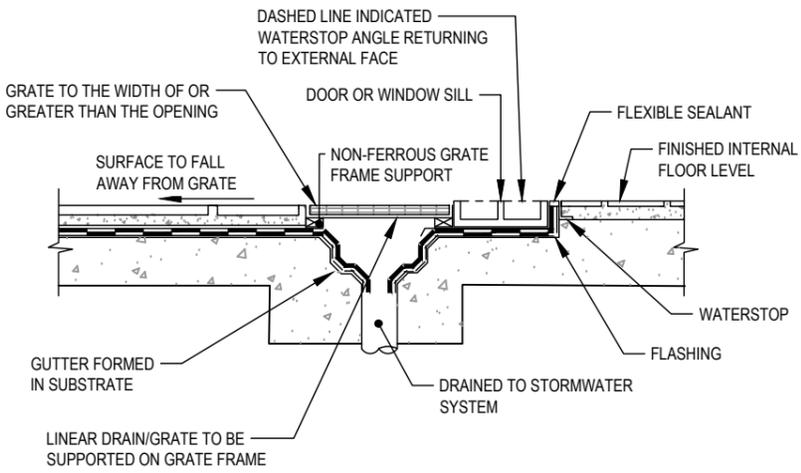
| | | | | |
|------|-----|----|-----|-----|
| N.B. | A | B | C | D |
| 50 | 100 | 40 | 180 | 200 |
| 65 | 105 | 37 | 180 | 200 |

FLOOR WASTE (SPS) - FW
NTS



DIRECT CONNECTION TO STORMWATER PIPE
NTS

- NOTE:
1. ALL CONNECTIONS TO BE IN TOP HALF OF MAIN PIPE ONLY.
 2. THE R.C. STORM WATER PIPE SHALL BE PIERCED BY A NEAT OPENING AS SHOWN TO ALLOW THE INSTALLATION OF A PIPE CONNECTION FLANGE WHICH SHALL NOT PROTRUDE BEYOND THE INNER SURFACE OF THE R.C. STORM WATER PIPE. THE INTERNAL JUNCTION SHALL BE SMOOTHLY FINISHED WITH 2:1 CEMENT MORTAR SO AS TO PRESENT NO OBSTRUCTION WITHIN THE INTERNAL CHANNEL OF THE R.C. STORM WATER PIPE. THE CONNECTION FLANGE IS TO BE INSPECTED & APPROVED PRIOR TO INSTALLATION OF THE DRAINAGE PIPE.
 3. DRAINAGE HOLES IN KERBS WHERE REQUIRED ARE TO BE PROVIDED USING APPROVED PROPRIETARY KERB CONNECTORS AND ARE TO BE FINISHED FLUSH WITH KERB FACES.
 4. PROVIDE STANDARD JUNCTION PIT FOR CONNECTION OF PIPE SIZES NOT COMPLYING WITH THIS STANDARD.
 5. COMPRESSIVE STRENGTH (FC) FOR CAST INSITU CONCRETE TO BE 32 MPa AT 28 DAYS.
 6. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

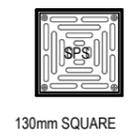
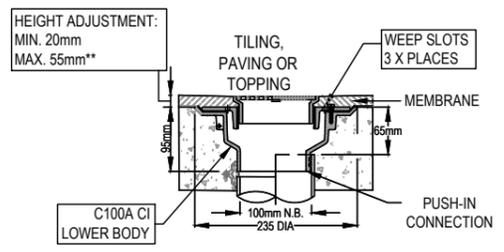


AS 4654.2-2012, CLAUSE 2.8.4:
ANY FIXINGS THAT PENETRATE THE MEMBRANE SHALL BE SEALED. THE SEALANT SHALL BE COMPATIBLE WITH THE SURFACE MATERIAL.
WHERE BACKING RODS ARE USED TO SUPPORT THE SEALANT, THEY SHALL BE A MINIMUM OF 12mm.

'ZERO' THRESHOLD LINEAR DRAIN DETAIL
NTS

SPS 130mm SQUARE VARI-LEVEL VERTICAL DRAIN
65/50MM OUTLET

SPECIFICATION CODES:
Q130S4/C (POLISHED 304 STAINLESS STEEL GRATE)
Q130S/C (SATIN 316 STAINLESS STEEL GRATE)
INCLUDES 100MM CAST IRON LOWER BODY



FLOOR DRAIN (SPS) - FD
NTS



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BE(CIVIL) MIEAust CPEng
NER (1052208) RPEQ (25464)
APEC Engineer IntPE(Aus)

CLIENT
LUCA MASTROIANI

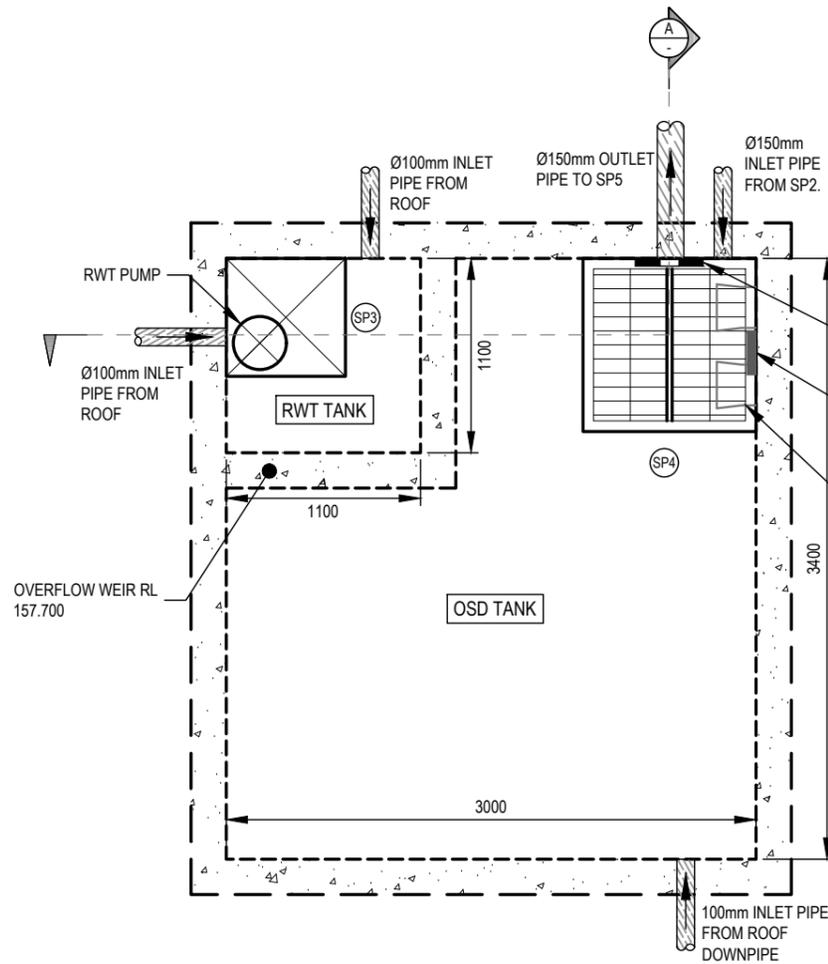
ARCHITECT
RJK ARCHITECTS

DRAWING TITLE
STORMWATER DETAILS SHEET 2

PROPOSED DUPLEX
Lot 1, No. 79 ASHWORTH AVENUE,
BELROSE

| REVISION | DRAWN | DESCRIPTION | DATE |
|----------|-------|-------------------|------------|
| A | EW | PRELIMINARY ISSUE | 01.04.2025 |
| B | EW | ISSUED FOR CDC | 02.04.2025 |

| DESIGNED BY | No. IN SET |
|---------------|-------------|
| EW | 12 |
| SCALE - SIZE | REVISION |
| AS NOTED - A3 | B |
| JOB NUMBER | DRAWING No. |
| 240392_SW | D6 |



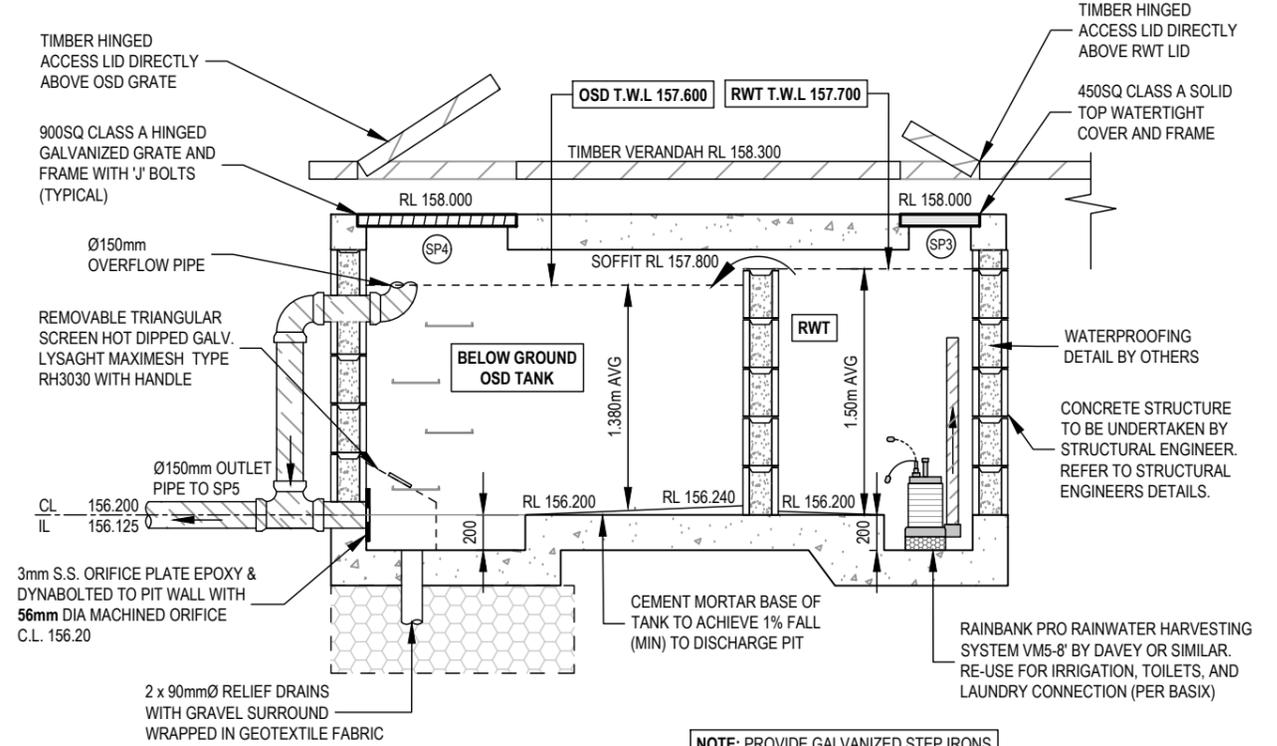
3mm S.S. ORIFICE PLATE EPOXY & DYNABOLTED TO PIT WALL WITH 56mm DIA MACHINED ORIFICE C.L. 156.20

PROVIDE CONFINED SPACE DANGER SIGN. SEE DETAILS.

PROVIDE GALVANIZED STEP IRONS AT 300mm CENTRES IN ACCORDANCE WITH THE AUST STANDARDS AT ALL ACCESS POINTS OF THE TANK (TYPICAL)

| BELOW GROUND RWT/OSD TANK 1 | | |
|-----------------------------|---------------------|--------------------|
| | OSD | RWT |
| • SURFACE AREA | 8.51m ² | 1.21m ² |
| • AVERAGE DEPTH | 1.380m | 1.5m |
| • STORAGE VOLUME (MIN) | 10.63m ³ | 1.5m ³ |
| • T.W.L | RL 157.60 | RL 157.70 |

COMBINED BELOW GROUND RWT / OSD TANK 1
1:40 @ A3



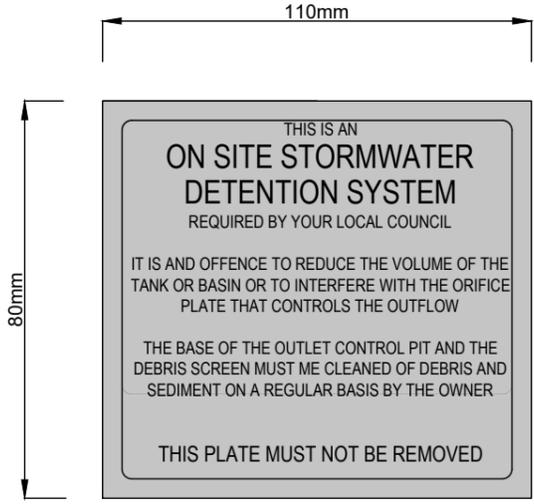
SECTION A
1:40 @ A3

NOTE: PROVIDE GALVANIZED STEP IRONS AT 300mm CENTRES IN ACCORDANCE WITH THE AUST STANDARDS AT ALL ACCESS POINTS OF THE TANK.



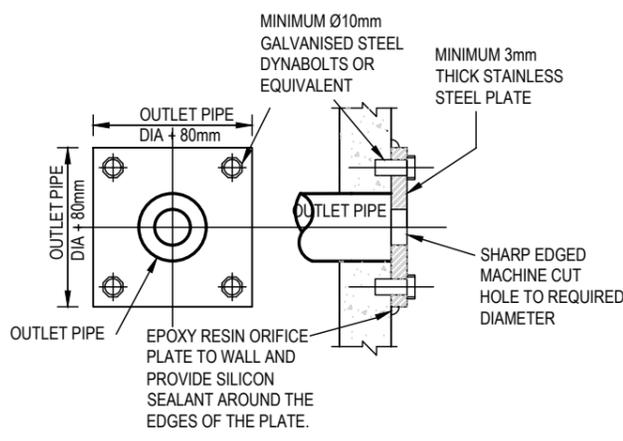
TYPICAL WARNING SIGN
NTS

EVERY EXTERNAL SUPPLY OUTLET FROM RAINWATER RE-USE TANK TO BE LABELED WITH METALLIC WARNING SIGN



OSD PLAQUE
NTS

CORNERS: SQUARE
COLOUR: ETCHED AND FILLED BLACK LEGEND ON NATURAL SILVER BACKGROUND
MATERIAL: ALUMINIUM 0.9mm MILL



ORIFICE PLATE DETAIL
NTS



CONFINED SPACE DANGER SIGN

COLOURS: "DANGER" AND BACKGROUND - WHITE
ELLIPTICAL AREA - RED
RECTANGLE CONTAINING ELLIPSE - RED
OTHER LETTERING AND BORDER - BLACK

A) A CONFINED SPACE DANGER SIGN SHALL BE POSITIONED AT ALL ACCESS POINTS, SUCH THAT IT IS CLEARLY VISIBLE TO PERSONS PROPOSING TO ENTER THE BELOW GROUND TANK'S CONFINED SPACE.

B) MINIMUM DIMENSIONS OF THE SIGN
- 300mm x 450mm (LARGE ENTRIES, SUCH AS DOORS)
- 250mm x 180mm (SMALL ENTRIES SUCH AS GRATES AND MANHOLES)

C) THE SIGN SHALL BE MANUFACTURED FROM COLOUR BONDED ALUMINIUM OR POLYPROPYLENE.

D) SIGN SHALL BE AFFIXED USING SCREWS AT EACH CORNER OF THE SIGN.

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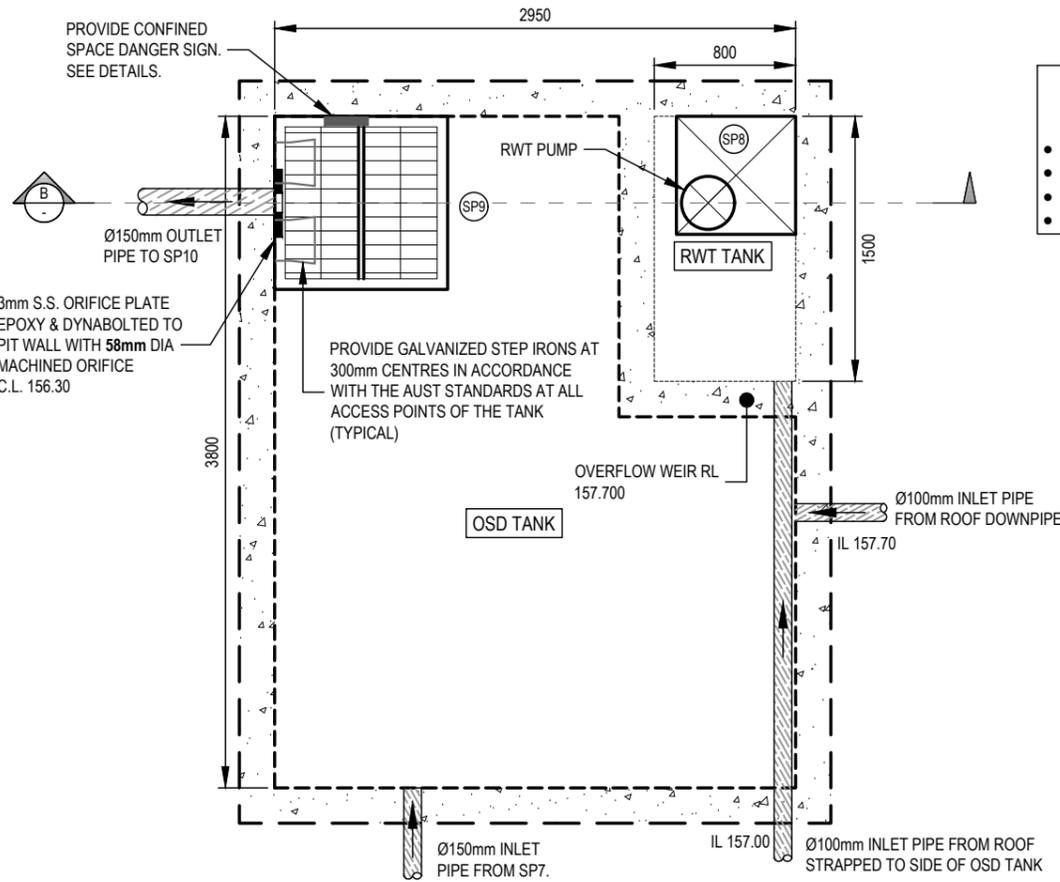
ARCHITECT
RJK ARCHITECTS

DRAWING TITLE
UNIT 1 - COMBINED RWT/OSD TANK

PROPOSED DUPLEX
Lot 1, No. 79 ASHWORTH AVENUE,
BELROSE

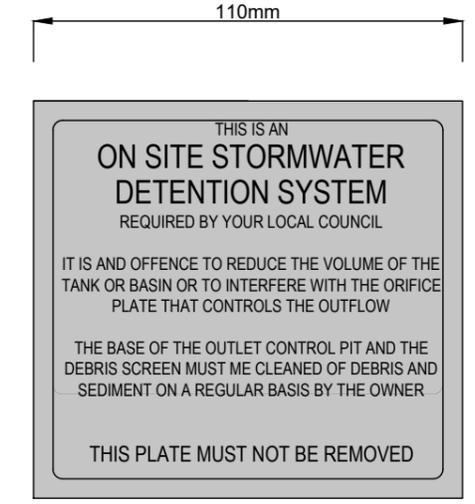
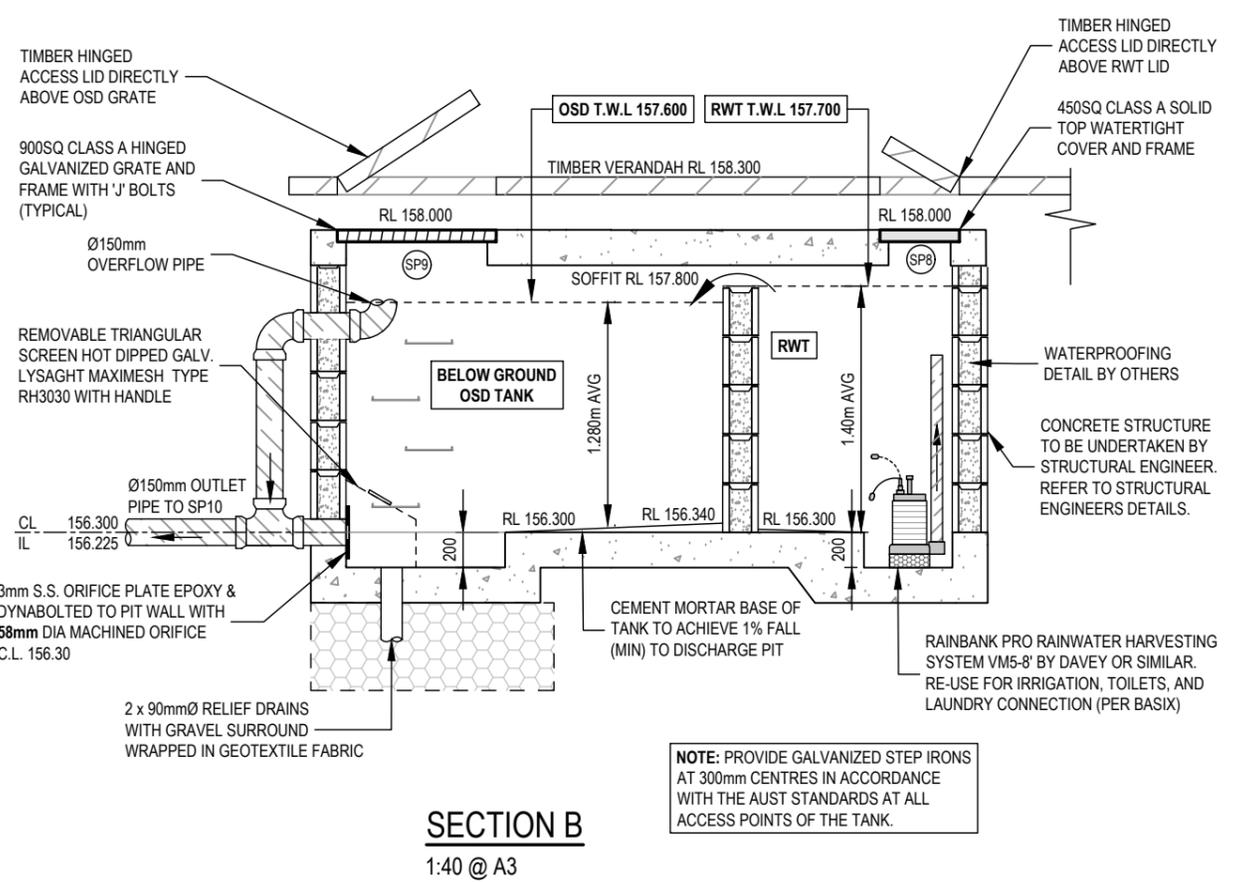
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| 1:40 - A3 | B |
| JOB NUMBER | DRAWING No. |
| 240392_SW | D7 |



BELOW GROUND RWT/OSD TANK 2

| | OSD | RWT |
|------------------------|---------------------|--------------------|
| • SURFACE AREA | 9.51m ² | 1.20m ² |
| • AVERAGE DEPTH | 1.280m | 1.4m |
| • STORAGE VOLUME (MIN) | 11.00m ³ | 1.5m ³ |
| • T.W.L | RL 157.60 | RL 157.70 |



CORNERS: SQUARE
 COLOUR: ETCHED AND FILLED BLACK LEGEND ON NATURAL SILVER BACKGROUND
 MATERIAL: ALUMINIUM 0.9mm MILL

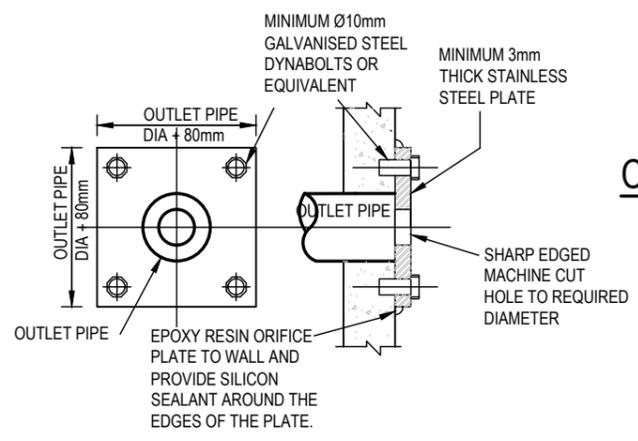
OSD PLAQUE
NTS

COMBINED BELOW GROUND RWT / OSD TANK 2
1:40 @ A3



TYPICAL WARNING SIGN

EVERY EXTERNAL SUPPLY OUTLET FROM RAINWATER RE-USE TANK TO BE LABELED WITH METALLIC WARNING SIGN



ORIFICE PLATE DETAIL
NTS



CONFINED SPACE DANGER SIGN

COLOURS: "DANGER" AND BACKGROUND - WHITE
 ELLIPTICAL AREA - RED
 RECTANGLE CONTAINING ELLIPSE - RED
 OTHER LETTERING AND BORDER - BLACK

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 C) THE SIGN SHALL BE MANUFACTURED FROM COLOUR BONDED ALUMINIUM OR POLYPROPYLENE.
 D) SIGN SHALL BE AFFIXED USING SCREWS AT EACH CORNER OF THE SIGN.

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CLIENT
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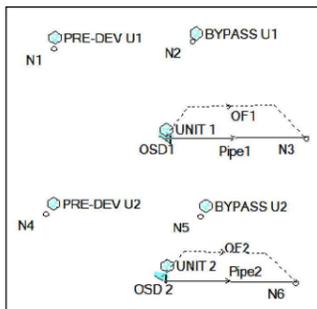
ARCHITECT
 RJK ARCHITECTS

DRAWING TITLE
UNIT 2 - COMBINED RWT/OSD TANK

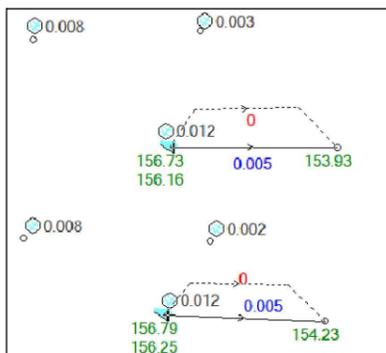
PROPOSED DUPLEX
 Lot 1, No. 79 ASHWORTH AVENUE,
 BELROSE

| REVISION | DRAWN | DESCRIPTION | DATE |
|----------|-------|-------------------|------------|
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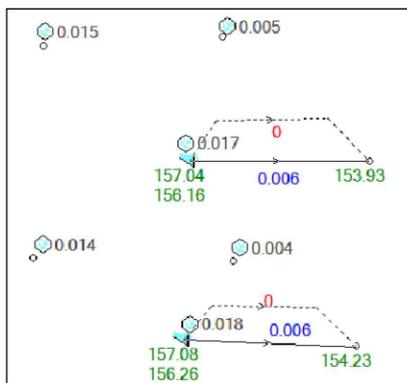
| DESIGNED BY | No. IN SET |
|--------------|-------------|
| EW | 12 |
| SCALE - SIZE | REVISION |
| 1:40 - A3 | B |
| JOB NUMBER | DRAWING No. |
| 240392_SW | D8 |



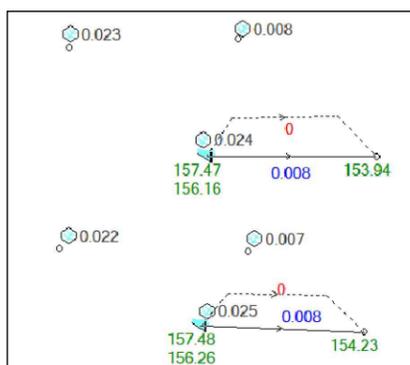
DRAINS MODEL LAYOUT



DRAINS MODEL RESULTS - 20% AEP



DRAINS MODEL RESULTS - 5% AEP



DRAINS MODEL RESULTS - 1% AEP

| 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 | Boil-down lid | Part Full Shock Loss | Inflow Hydrograph | Pt is | Internal Width (mm) | Inflow Misalign Pond Depth (m) | Minor Safe Pond Depth (m) | Major Safe Pond Depth (m) | |
| N1 | Node | | | 0 | | | | 0 | | 240 | -103.333 | | 4 | No | | | | | | |
| N2 | Node | | | 0 | | | | 0 | | 383.333 | -96.667 | | 7 | No | | | | | | |
| N3 | Node | | | | | 154.4 | | 0 | | 501 | -196 | | 25 | No | | | | | | |
| N4 | Node | | | | | | | 0 | | 231.657 | -273.333 | | 17250 | No | | | | | | |
| N5 | Node | | | | | | | 0 | | 391.657 | -275.833 | | 17256 | No | | | | | | |
| N6 | Node | | | | | 154.7 | | 0 | | 490.509 | -344.676 | | 25542 | No | | | | | | |

| DETENTION BASIN DETAILS | | | | | | | | | | | | | | | | | |
|-------------------------|-------|--------------------------|------------|---|----------|-----------|-----------|---------|---|---------|----------|----------|---------------|--|--|--|--|
| Name | Elev | Surf. Area Not Used (ha) | Outlet Typ | K | Dia (mm) | Centre RL | Pt Family | Pt Type | x | y | HED | Crest RL | Crest Leng id | | | | |
| OSD1 | 156 | 1 | Orifice | | 56 | 156.2 | | | | 357 | -196 | No | 12 | | | | |
| OSD2 | 156.1 | 1 | Orifice | | 58 | 156.3 | | | | 352.199 | -339.468 | No | 26549 | | | | |

| 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 (%) | Paved Rough | Grass Rough | Supp Rough | Lag Time or Factor | Gutter Length (m) | Gutter Slope (%) | Cutter Flow Factor | Rainfall Multiplier |
| PRE-DEV U1 | N1 | 0.056 | 0 | 100 | 0 | 5 | 12 | 2 | | | | | | | | | | | 0 | | | 1 |
| BYPASS U1 | N2 | 0.002 | 0 | 100 | 0 | 5 | 12 | 2 | | | | | | | | | | | 0 | | | 1 |
| UNIT 1 | OSD1 | 0.038 | 86 | 14 | 0 | 5 | 9 | 2 | | | | | | | | | | | 0 | | | 1 |
| PRE-DEV U2 | N4 | 0.0534 | 0 | 100 | 0 | 5 | 12 | 2 | | | | | | | | | | | 0 | | | 1 |
| BYPASS U2 | N5 | 0.0162 | 0 | 100 | 0 | 5 | 12 | 2 | | | | | | | | | | | 0 | | | 1 |
| UNIT 2 | OSD2 | 0.0372 | 86 | 14 | 0 | 5 | 9 | 2 | | | | | | | | | | | 0 | | | 1 |

| PIPE DETAILS | | | | | | | | | | | | | | | | | | | | |
|--------------|------|----|------------|-----------|-----------|-----------|-----------|----------|-----------|-------|-------|-----------|----------|--------|---------|-------|---------|--------|---------|--|
| Name | From | To | Length (m) | U/SIL (m) | D/SIL (m) | Slope (%) | Type | Dia (mm) | I.D. (mm) | Rough | Pipes | No. Pipes | Chg From | At Chg | Chg (m) | R (m) | Chg (m) | RL (m) | etc (m) | |
| Pipe1 | OSD1 | N3 | 20 | 156.125 | 153.9 | 11.13 | uPVC, not | 150 | 154 | 0.012 | New | 1 | OSD1 | | 0 | | | | | |
| Pipe2 | OSD2 | N6 | 13 | 156.225 | 154.2 | 15.58 | uPVC, not | 150 | 154 | 0.012 | New | 1 | OSD2 | | 0 | | | | | |

| OVERFLOW ROUTE DETAILS | | | | | | | | | | | | | | | | | |
|------------------------|------|----|-------------------|-----------------|------------------|---------------|---------------|----------------------|----------------------|--------------------|---------------|---------------------------|-------|-------|-------|------------|--|
| Name | From | To | Travel Time (min) | Spill Level (m) | Crest Length (m) | Weir Coeff. C | Cross Section | Safe Depth Major (m) | Safe Depth Minor (m) | Safe Depth Div (m) | Bed Slope (%) | D/S Area Contributing (%) | id | U/SIL | D/SIL | Length (m) | |
| OF1 | OSD1 | N3 | 0.1 | 157.6 | 1 | 1.6 | 4 m wide | 0.3 | 0.15 | 0.4 | 17.78 | 0 | 21167 | 157.6 | 154.4 | 18 | |
| OF2 | OSD2 | N6 | 0.1 | 157.6 | 1 | 1.6 | 4 m wide | 0.3 | 0.15 | 0.4 | 24.62 | 1 | 26570 | 157.6 | 154.7 | 13 | |

DRAINS MODEL DATA

| PIT/ NODE DETAILS | | | | | | |
|-------------------|---------|--------------|-------------------------|---------------------------------|----------|------------|
| Name | Max HGL | Max Pond HGL | Max Surf. Flow (cu.m/s) | Max Pond Min Freeboard (cu.m/s) | Overflow | Constraint |
| N3 | 153.93 | | 0 | | | |
| N6 | 154.23 | | 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 |
| PRE-DEV U1 | 0.008 | 0 | 0.008 | 5 | 12 | | 2.20% AEP, 20 min burst, Storm 5 |
| BYPASS U1 | 0.003 | 0 | 0.003 | 5 | 12 | | 2.20% AEP, 20 min burst, Storm 5 |
| UNIT 1 | 0.012 | 0.012 | 0 | 5 | 9 | | 2.20% AEP, 5 min burst, Storm 1 |
| PRE-DEV U2 | 0.008 | 0 | 0.008 | 5 | 12 | | 2.20% AEP, 20 min burst, Storm 5 |
| BYPASS U2 | 0.002 | 0 | 0.002 | 5 | 12 | | 2.20% AEP, 20 min burst, Storm 5 |
| UNIT 2 | 0.012 | 0.012 | 0 | 5 | 9 | | 2.20% AEP, 5 min burst, Storm 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 | | |
| Pipe1 | 0.005 | 1.93 | 156.466 | 153.93 | 20% AEP, 25 min burst, Storm 6 | | |
| Pipe2 | 0.005 | 2.2 | 156.528 | 154.228 | 20% AEP, 25 min burst, Storm 6 | | |

| OVERFLOW ROUTE DETAILS | | | | | | | |
|------------------------|----------------|--------------------|--------------------|--------|-------|---------|-----------|
| Name | Max Q (cu.m/s) | U/S Max Q (cu.m/s) | D/S Max Q (cu.m/s) | Safe Q | Max D | Max D/V | Max Width |
| OF1 | 0 | 0 | 1.307 | 0 | 0 | 0 | 0 |
| OF2 | 0 | 0 | 1.292 | 0 | 0 | 0 | 0 |

| DETENTION BASIN DETAILS | | | | | |
|-------------------------|--------|---------|-------------|-----------------|------------------|
| Name | Max WL | Min Vol | Max Q Total | Max Q Low Level | Max Q High Level |
| OSD1 | 156.73 | 4.7 | 0.005 | 0.005 | 0 |
| OSD2 | 156.79 | 4.9 | 0.005 | 0.005 | 0 |

DRAINS MODEL RESULTS - 20% AEP

| PIT/ NODE DETAILS | | | | | | |
|-------------------|---------|--------------|-------------------------|---------------------------------|----------|------------|
| Name | Max HGL | Max Pond HGL | Max Surf. Flow (cu.m/s) | Max Pond Min Freeboard (cu.m/s) | Overflow | Constraint |
| N3 | 153.93 | | 0 | | | |
| N6 | 154.23 | | 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 |
| PRE-DEV U1 | 0.015 | 0 | 0.015 | 5 | 12 | | 2.5% AEP, 15 min burst, Storm 8 |
| BYPASS U1 | 0.005 | 0 | 0.005 | 5 | 12 | | 2.5% AEP, 15 min burst, Storm 8 |
| UNIT 1 | 0.017 | 0.016 | 0.001 | 5 | 9 | | 2.5% AEP, 5 min burst, Storm 1 |
| PRE-DEV U2 | 0.014 | 0 | 0.014 | 5 | 12 | | 2.5% AEP, 15 min burst, Storm 9 |
| BYPASS U2 | 0.004 | 0 | 0.004 | 5 | 12 | | 2.5% AEP, 15 min burst, Storm 9 |
| UNIT 2 | 0.018 | 0.017 | 0.001 | 5 | 9 | | 2.5% AEP, 5 min burst, Storm 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 | | |
| Pipe1 | 0.006 | 2.06 | 156.747 | 153.934 | 5% AEP, 30 min burst, Storm 8 | | |
| Pipe2 | 0.006 | 2.34 | 156.788 | 154.232 | 5% AEP, 30 min burst, Storm 8 | | |

| OVERFLOW ROUTE DETAILS | | | | | | | |
|------------------------|----------------|--------------------|--------------------|--------|-------|---------|-----------|
| Name | Max Q (cu.m/s) | U/S Max Q (cu.m/s) | D/S Max Q (cu.m/s) | Safe Q | Max D | Max D/V | Max Width |
| OF1 | 0 | 0 | 1.307 | 0 | 0 | 0 | 0 |
| OF2 | 0 | 0 | 1.292 | 0 | 0 | 0 | 0 |

| DETENTION BASIN DETAILS | | | | | |
|-------------------------|--------|---------|-------------|-----------------|------------------|
| Name | Max WL | Min Vol | Max Q Total | Max Q Low Level | Max Q High Level |
| OSD1 | 157.04 | 7.4 | 0.006 | 0.006 | 0 |
| OSD2 | 157.08 | 7.6 | 0.006 | 0.006 | 0 |

DRAINS MODEL RESULTS - 5% AEP

| PIT/ NODE DETAILS | | | | | | |
|-------------------|---------|--------------|-------------------------|---------------------------------|----------|------------|
| Name | Max HGL | Max Pond HGL | Max Surf. Flow (cu.m/s) | Max Pond Min Freeboard (cu.m/s) | Overflow | Constraint |
| N3 | 153.94 | | 0 | | | |
| N6 | 154.23 | | 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 |
| PRE-DEV U1 | 0.023 | 0 | 0.023 | 5 | 12 | | 2.1% AEP, 15 min burst, Storm 8 |
| BYPASS U1 | 0.008 | 0 | 0.008 | 5 | 12 | | 2.1% AEP, 15 min burst, Storm 8 |
| UNIT 1 | 0.024 | 0.023 | 0.001 | 5 | 9 | | 2.1% AEP, 5 min burst, Storm 1 |
| PRE-DEV U2 | 0.022 | 0 | 0.022 | 5 | 12 | | 2.1% AEP, 15 min burst, Storm 8 |
| BYPASS U2 | 0.007 | 0 | 0.007 | 5 | 12 | | 2.1% AEP, 15 min burst, Storm 8 |
| UNIT 2 | 0.025 | 0.023 | 0.001 | 5 | 9 | | 2.1% AEP, 5 min burst, Storm 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 | | |
| Pipe1 | 0.008 | 2.18 | 157.141 | 153.937 | 1% AEP, 25 min burst, Storm 9 | | |
| Pipe2 | 0.008 | 2.48 | 157.151 | 154.235 | 1% AEP, 25 min burst, Storm 9 | | |

| OVERFLOW ROUTE DETAILS | | | | | | | |
|------------------------|----------------|--------------------|--------------------|--------|-------|---------|-----------|
| Name | Max Q (cu.m/s) | U/S Max Q (cu.m/s) | D/S Max Q (cu.m/s) | Safe Q | Max D | Max D/V | Max Width |
| OF1 | 0 | 0 | 1.307 | 0 | 0 | 0 | 0 |
| OF2 | 0 | 0 | 1.292 | 0 | 0 | 0 | 0 |

| DETENTION BASIN DETAILS | | | | | |
|-------------------------|--------|---------|-------------|-----------------|------------------|
| Name | Max WL | Min Vol | Max Q Total | Max Q Low Level | Max Q High Level |
| OSD1 | 157.47 | 10.63 | 0.008 | 0.008 | 0 |
| OSD2 | 157.48 | 11 | 0.008 | 0.008 | 0 |

DRAINS MODEL RESULTS - 1% AEP



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ARCHITECT
RJK ARCHITECTS

DRAWING TITLE
'OSD' DRAINS MODELLING DATA & RESULTS

PROPOSED DUPLEX
Lot 1, No. 79 ASHWORTH AVENUE,
BELROSE

| REVISION | DRAWN | DESCRIPTION | DATE |
|----------|-------|-------------------|------------|
| A | EW | PRELIMINARY ISSUE | 01.04.2025 |
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| EW | 12 |
| SCALE - SIZE | REVISION |
| NTS | B |
| JOB NUMBER | DRAWING No. |
| 240392_SW | D9 |

EAVES GUTTER AND DOWN PIPE DESIGN TO AS/NZS 3500.3: 2021

| | | |
|--|--------------|-------------------|
| Horizontal catchment area | Ah = 68 | sq.m |
| Roof Average slope | S = 11 | degrees |
| Intensity ARI 20 (AEP 5%)(5 min) | I = 205 | mm/hr |
| Is Gutter slope steeper than 1:500 ? | No | |
| Down pipe size selected | dia = 100 | mm |
| Cross referencing From Table 3.5.2 and Fig 3.5.4(A)or(B) | | |
| Theoretical number of DPs required | Tnum = 1.62 | |
| Selected Number of Down pipes | n = 2 | |
| from AS3500 Table 3.4.3.2, C'ment Area Multiplier | f = 1.1 | |
| Roof Area allowing for slope | Ac = Ah*f | = 74.8 sq.m |
| Catchment Area per DP | A = Ac/n | = 37.4 sq.m |
| Flow/DP | q = I*A/3600 | = 2.13 litres/sec |
| from AS/NZS 3500 fig 3.5.4(B), Gutter Area | | = 9025 sq.mm |
| Gutter Area rounded to nearest 100sq.mm | | = 9000 sq.mm |
| From AS/NZS 3500 Table 3.5.2, Down Pipe size | | = 100 mm |
| Down Pipe size selected | | = 100 mm |
| Summary | | |
| This catchment requires :- number of DPs | = 2 | |
| Downpipe size | = 100 | mm |
| minimum eaves gutter cross sectional Area | = 9025 | sq.mm |

Notes: Catchment area of each DP to be roughly similar size.
Length of any gutter draining to a downpipe to be not longer than 12m.(NCCvol2).

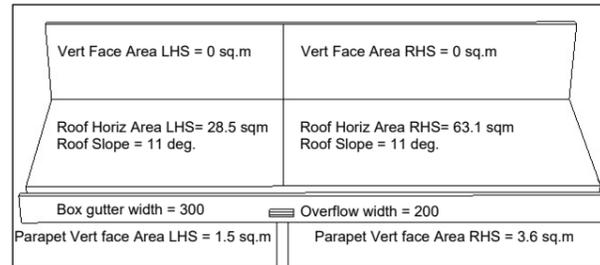
EAVES GUTTER CALCULATIONS

BOX GUTTER AND RAIN WATER HEAD DESIGN TO AS/NZS 3500.3:2021
BOX GUTTER 1

| | | |
|--|----------------|-------------------|
| Design Storm Intensity | I = 276 | mm/hr |
| Horizontal catchment area | Ah = 86.7 | sq.m |
| Roof slope | S = 11 | degrees |
| Vertical Area | Av = Ah*tan(S) | = 16.85 sq.m |
| from eqn 3.4.3.2(1), Catchment Area | Ac = Ah+0.5*Av | = 95.1 sq.m |
| Flow | Q = I*Ac/3600 | = 7.29 Litres/sec |
| From AS/NZS 3500.3 Fig H1 (Interpolating where necessary) | | |
| Using :- Gutter Slope | 1 in 100 | |
| and Gutter Width | W = 300 | mm |
| from AS/NZS 3500.3 fig H1 Minimum Gutter Depth | d = 118 | mm |
| from AS/NZS 3500.3 fig H1 gutter depth at 1:200 | d = 125 | mm |
| Rain Water Head Calculations | | |
| Selected down pipe size | = 100 | mm |
| From AS/NZS 3500.3 fig H3, Rain water head Depth | = 200 | mm |
| From AS/NZS 3500.3 fig H3, Rain water head Length at slope 1:200 | = 117 | mm |
| Rain water Head Length increased to fit the DP - new Length | = 120 | mm |
| Rain water Head Width | = 300 | mm |
| Summary | | |
| Down Pipe Size | = 100 | mm |
| Box Gutter Width | = 300 | mm |
| Box gutter minimum Depth | = 118 | mm |
| Rain Water Head Depth | = 200 | mm |
| Rain Water Head Length | = 120 | mm |
| Rain Water Head Width | = 300 | mm |

BOX GUTTER #1 CALCULATIONS

BOX GUTTER AND SIDE OVERFLOW DESIGN TO AS/NZS 3500.3:2021
BOX GUTTER 2



Catchment areas and sizes as per diagram above

| | | |
|--|---------------------------|--------------|
| Design Storm Intensity (ARI 100) | I = 276 | mm/hr |
| Calculate Vertical areas. | | |
| Roof Slope LHS = 11 deg Therefore Area Vertical rise | = roof Area*tan(Slope) | = 6 sq.m |
| | = 28.5*tan(11) | = 6 sq.m |
| Total vert area LHS = roof rise + vert face = 6+0 | | |
| Roof Slope RHS= 11 deg Therefore Area Vertical rise | = roofArea*tan(Slope) | = 13 sq.m |
| | = 63.1*tan(11) | = 13 sq.m |
| Total vert area RHS = roof rise + vert face = 13+0 | | |
| Calculate LHS catchment area for each wind direction | | |
| Ac = Ah + 1/2(Av facing wind - Av causing rain shadow) | | |
| wind from front | Acf = (28.5+ 0.5*(6-1.5)) | = 30.75 sq.m |
| wind from back | AcB = (28.5+ 0.5*(1.5-6)) | = 26.25 sq.m |

Calculate RHS catchment area for each wind direction
Ac = Ah + 1/2(Av facing wind - Av causing rain shadow)
wind from front

$$Acf = (63.1 + 0.5*(13-3.6)) = 67.8 \text{ sq.m}$$

$$AcB = (63.1 + 0.5*(3.6-13)) = 58.4 \text{ sq.m}$$

wind from back

Find worst case and design Box gutter for that condition
Largest catchment area = RHS with wind from front
Design Flow = 276 x 67.8/3600 therefore from Fig H6(a)

$$ca = 67.8 \text{ sq.m}$$

$$Q = 5.2 \text{ L/s}$$

$$l_{oc} = 32 \text{ mm}$$

$$d_{oc} = 103 \text{ mm}$$

$$BGd = 165 \text{ mm}$$

From Fig H6(b) Overflow (spitter) depth
Box gutter depth from Fig H5 $d_{oc} + (d_{oc} + 30)$

Sump Design

Total catchment area
Therefore Flow in sump = Ca x 276 / 3600
Downpipe Dia
from Fig H4 Sump Depth
From Code sump length = overflow width + 2* l_{oc}

$$Ca = 30.75 + 67.8 \text{ sq.m}$$

$$Qs = 7.5 \text{ L/s}$$

$$Dia = 100 \text{ mm}$$

$$SD = 241 \text{ mm}$$

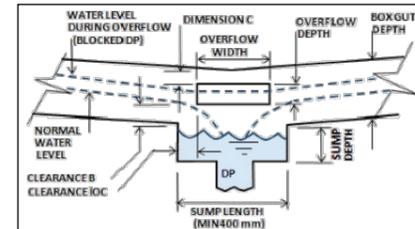
$$SL = 200 + 2*32 \text{ mm}$$

$$= 264 \text{ mm}$$

$$= 400 \text{ mm}$$

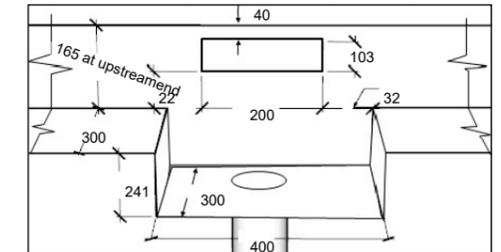
Sump length is less than Code min of 400 therefore sump length = 400 mm

Clearances



From Code clearance B, (Height of spitter above base of box gutter) = $0.7 * l_{oc}$ = 22 mm
Dimension C (freeboard above spitter)=BG depth-B-Overflow depth = 40 mm

Diagrammatic, Code required minimum sizes. (Not to scale)



DP Dia 100

Summary (minimum required sizes)

| | | |
|------------------------------------|-------|----|
| Box Gutter width | = 300 | mm |
| Box Gutter depth (at upstream end) | = 165 | mm |
| Overflow (spitter) width | = 200 | mm |
| Overflow (spitter) depth | = 103 | mm |
| Sump depth | = 241 | mm |
| Sump width | = 300 | mm |
| Sump length | = 400 | mm |
| clearance l_{oc} | = 32 | mm |
| clearance B | = 22 | mm |
| Dimension C | = 40 | mm |
| Downpipe Dia. | = 100 | mm |

BOX GUTTER #2 CALCULATIONS



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DRAWING TITLE
ROOF GUTTER CALCULATIONS
PROPOSED DUPLEX
Lot 1, No. 79 ASHWORTH AVENUE,
BELROSE

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DUST CONTROL:

• NOTE: DURING EXCAVATION, DEMOLITION AND CONSTRUCTION, ADEQUATE MEASURES SHALL BE TAKEN TO PREVENT DUST FROM AFFECTING THE AMENITY OF THE NEIGHBORHOOD.

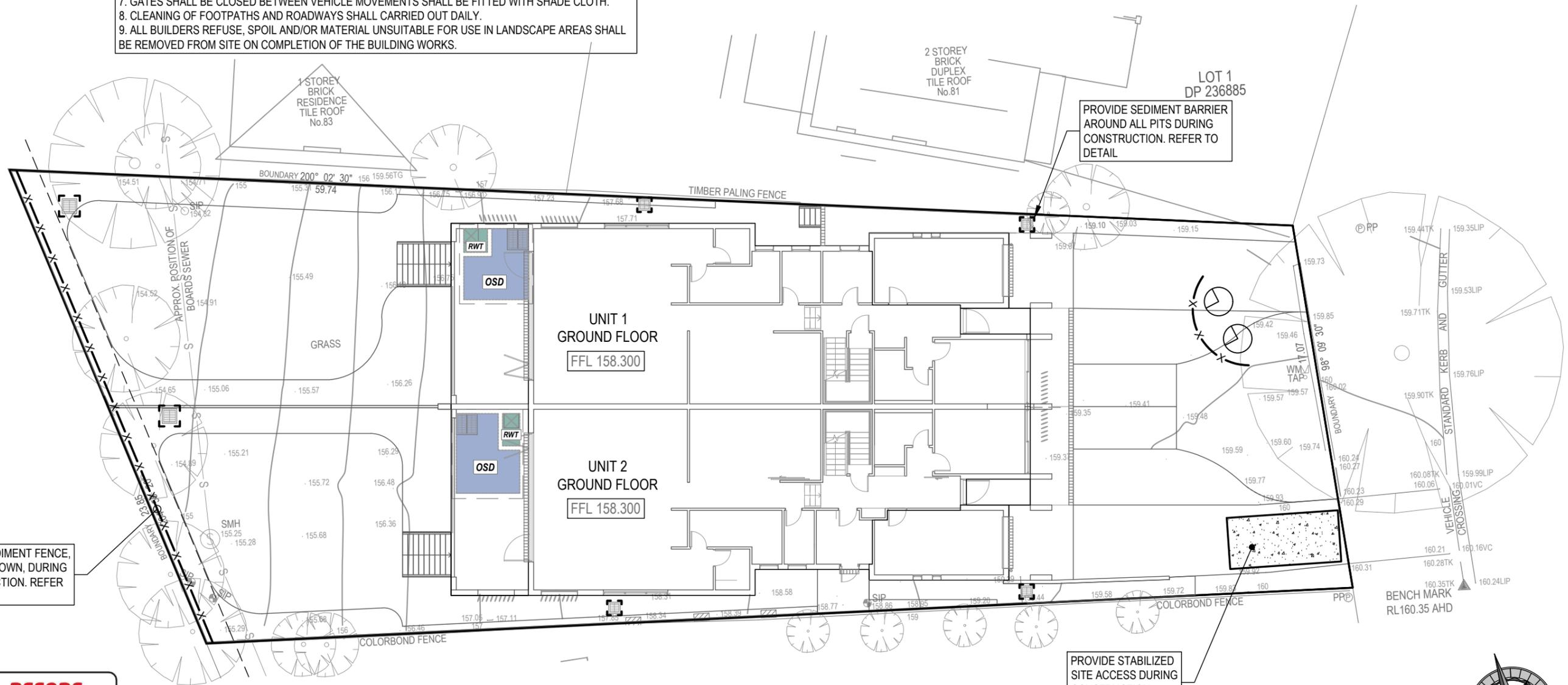
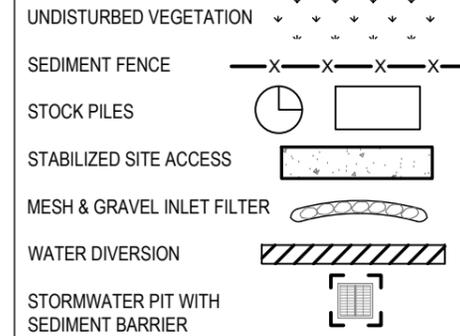
THE FOLLOWING MEASURES MUST BE ADOPTED:

1. PHYSICAL BARRIERS SHALL BE ERECTED AT RIGHT ANGLES TO PREVENT WIND DIRECTION OR SHALL BE PLACED AROUND OR OVER DUST SOURCES TO PREVENT WIND OR ACTIVITY FROM GENERATING DUST.
2. EARTHWORKS AND SCHEDULING ACTIVITIES SHALL BE MANAGED TO COINCIDE WITH THE NEXT STAGE OF DEVELOPMENT TO MINIMISE THE AMOUNT OF TIME THE SITE IS LEFT TO CUT OR EXPOSED.
3. ALL MATERIALS SHALL BE STORED OR STOCKPILED AT THE BEST LOCATIONS.
4. THE GROUND SURFACE SHOULD BE DAMPENED SLIGHTLY TO PREVENT DUST FROM BECOMING AIRBORNE BUT SHOULD NOT BE WET TO THE EXTENT THAT RUN-OFF OCCURS.
5. ALL VEHICLES CARRYING SOIL OR RUBBLE TO OR FROM THE SITE SHALL AT ALL TIMES BE COVERED TO PREVENT THE ESCAPE OF DUST.
6. ALL EQUIPMENT WHEELS SHALL BE WASHED BEFORE EXISTING THE SITE USING MANUAL OR AUTOMATED SPRAYERS AND DRIVE - THROUGH WASHING BAYS.
7. GATES SHALL BE CLOSED BETWEEN VEHICLE MOVEMENTS SHALL BE FITTED WITH SHADE CLOTH.
8. CLEANING OF FOOTPATHS AND ROADWAYS SHALL CARRIED OUT DAILY.
9. ALL BUILDERS REFUSE, SPOIL AND/OR MATERIAL UNSUITABLE FOR USE IN LANDSCAPE AREAS SHALL BE REMOVED FROM SITE ON COMPLETION OF THE BUILDING WORKS.

NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE INSPECTED AND MAINTAINED DAILY BY SITE MANAGER IN ACCORDANCE WITH COUNCIL REQUIREMENTS.
2. ALL STOCKPILES TO BE CLEAR FROM DRAINS, GUTTERS AND FOOTPATHS.
3. DRAINAGE IS TO BE CONNECTED TO STORMWATER SYSTEM AS SOON AS POSSIBLE.
4. ROADS AND FOOTPATH TO BE SWEEPED DAILY AS REQUIRED BY COUNCIL.
5. IF YOU DO NOT COMPLY WITH COUNCIL REQUIREMENTS & DOCUMENTATION, YOU MAY BE LIABLE TO PROSECUTION FROM GOVERNMENT AUTHORITIES .

LEGEND:



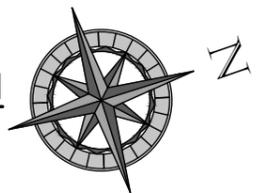
ERECT SEDIMENT FENCE, WHERE SHOWN, DURING CONSTRUCTION. REFER TO DETAIL

PROVIDE STABILIZED SITE ACCESS DURING CONSTRUCTION. REFER TO DETAIL

PROVIDE SEDIMENT BARRIER AROUND ALL PITS DURING CONSTRUCTION. REFER TO DETAIL



SEDIMENT CONTROL PLAN
1:200 - A3



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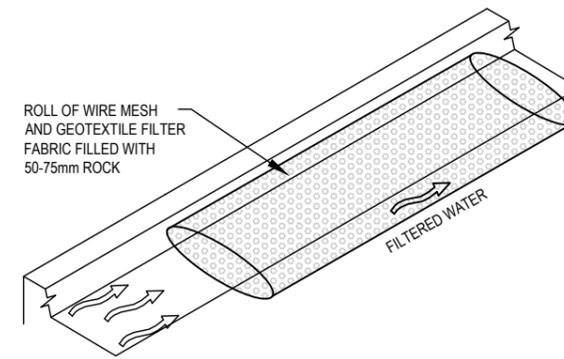
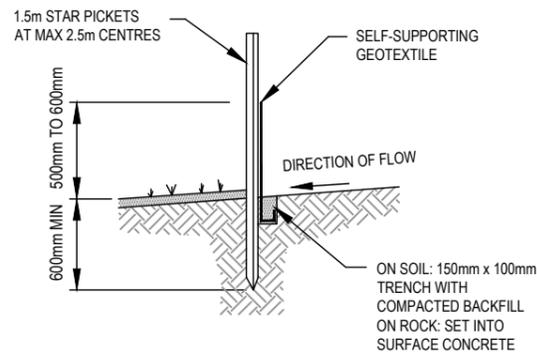
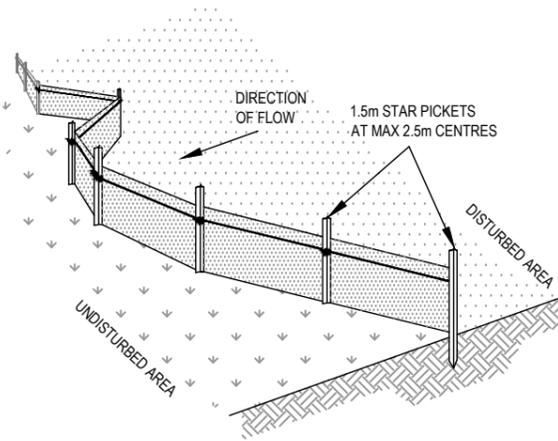
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RJK ARCHITECTS

DRAWING TITLE
SEDIMENT CONTROL PLAN

PROPOSED DUPLEX
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MESH AND GRAVEL FILTER

NTS

CONSTRUCTION NOTES:

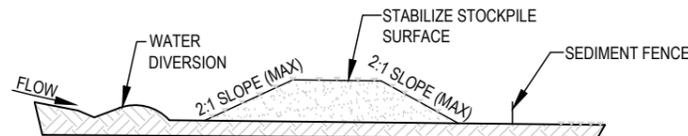
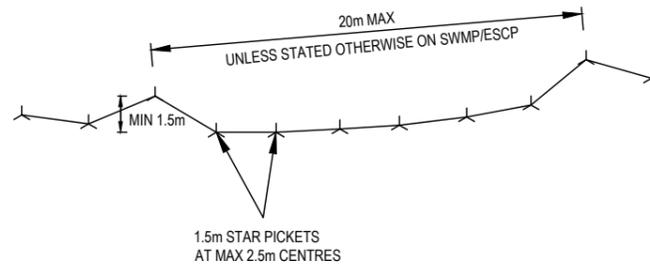
1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm(h) x 400mm(w).
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

SEDIMENT FENCE DETAIL

NTS

CONSTRUCTION NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENTS AREA OF ANY ONE SECTION. THE CATCHMENTS AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10 YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND AT 2.5m INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

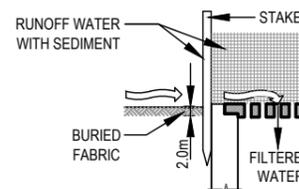


STOCKPILE

NTS

NOTE:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILIZE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (LOW FLOW) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES ON THE DOWNSLOPE.

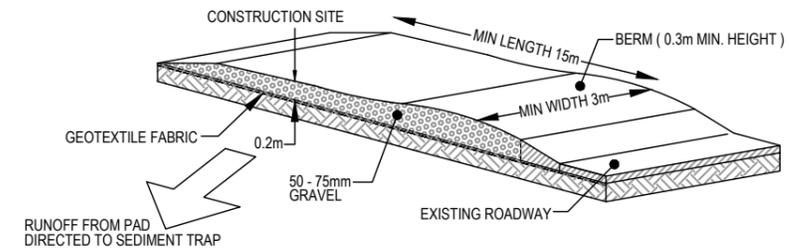


SEDIMENT BARRIER AROUND PIT

NTS

CONSTRUCTION NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STRAW FILTER AND SEDIMENT FENCE FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.



STABILIZED SITE ACCESS

NTS

CONSTRUCTION NOTES:

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASED OR 30mm AGGREGATE
4. ENSURE THE STRUCTURE IS AT LEAST 15m LONG OR TO BUILD ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILIZED ACCESS, CONSTRUCT A HUMP IN THE STABILIZED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.



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DRAWING TITLE

SEDIMENT DETAILS

PROPOSED DUPLEX

Lot 1, No. 79 ASHWORTH AVENUE,
BELROSE

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