PROJECT: SENIOR LIVING DEVELOPMENT

PLANSET: CONCEPT STORMWATER MANAGEMENT PLAN

CLIENT: BELROSE RB1 PTY LTD

DRAWING LIST		
DWG NO.	REV	DWG TITLE
GENERAL		
PS01-A000	C	COVER SHEET
CONSTRUCTION MANAGEMENT WORKS		
PS01-B300	C	SOIL & WATER MANAGEMENT PLAN
PS01-B310	B	SOIL & WATER MANAGEMENT DETAILS
PS01-B315	B	SEDIMENT BASIN CALCULATIONS
DRAINAGE WORKS		
PS01-E100	C	DRAINAGE PLAN
PS01-E200	B	DRAINAGE DETAILS
PS01-E600	C	ON SITE DETENTION CATCHMENT PLANS, MODELS & RESULTS
PS01-E700	C	WATER QUALITY CATCHMENT PLANS, MODEL & RESULTS

LOCALITY PLAN
NOT TO SCALE

LGA: NORTHERN BEACHES COUNCIL

171 FOREST WAY, BELROSE, NSW 2085
LOT 9 DP737255

GENERAL NOTES
1. THIS PLAN IS FOR DEVELOPMENT APPLICATION PURPOSE AND NOT FOR CONSTRUCTION. DESIGN TO BE REVIEWED AND UPDATED FOR CONSTRUCTION CERTIFICATE.
2. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH, AND THESE NOTES ARE TO BE READ IN CONJUNCTION WITH THE RELEVANT AUSTRALIAN STANDARDS, COUNCIL SPECIFICATIONS, AND ALL PROJECT CONSULTANT'S PLANS AND REPORTS.
3. INTERNAL SURVEY INFORMATION SHOWN BASED ON SURVEY INFORMATION PROVIDED BY S.J. DIXON SURVEYORS.
4. EXTERNAL SITE BOUNDARY BASED ON INFORMATION PROVIDED BY S.J. DIXON SURVEYORS.

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
C	**MINOR AMENDMENTS**	**18/07/2022**	**JS**	**BN**	**AVG**	**GT**
B	CHANGE IN ARCHITECT LAYOUT	19/10/2021	JS	BN	SA	GT
A	INITIAL RELEASE	24/06/2021	JS	BN	SA	

SCALE

GRID	DATUM	PROJECT MANAGER
---	---	GT

CLIENT: BELROSE RB1 PTY LTD

PROJECT NAME/PLANSET TITLE
MULTI UNIT RESIDENTIAL DEVELOPMENT
CONCEPT STORMWATER MANAGEMENT PLAN
171 FOREST WAY, BELROSE, NSW 2085

martens & Associates Pty Ltd
Consulting Engineers
Environment
Water
Geotechnical
Civil
Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

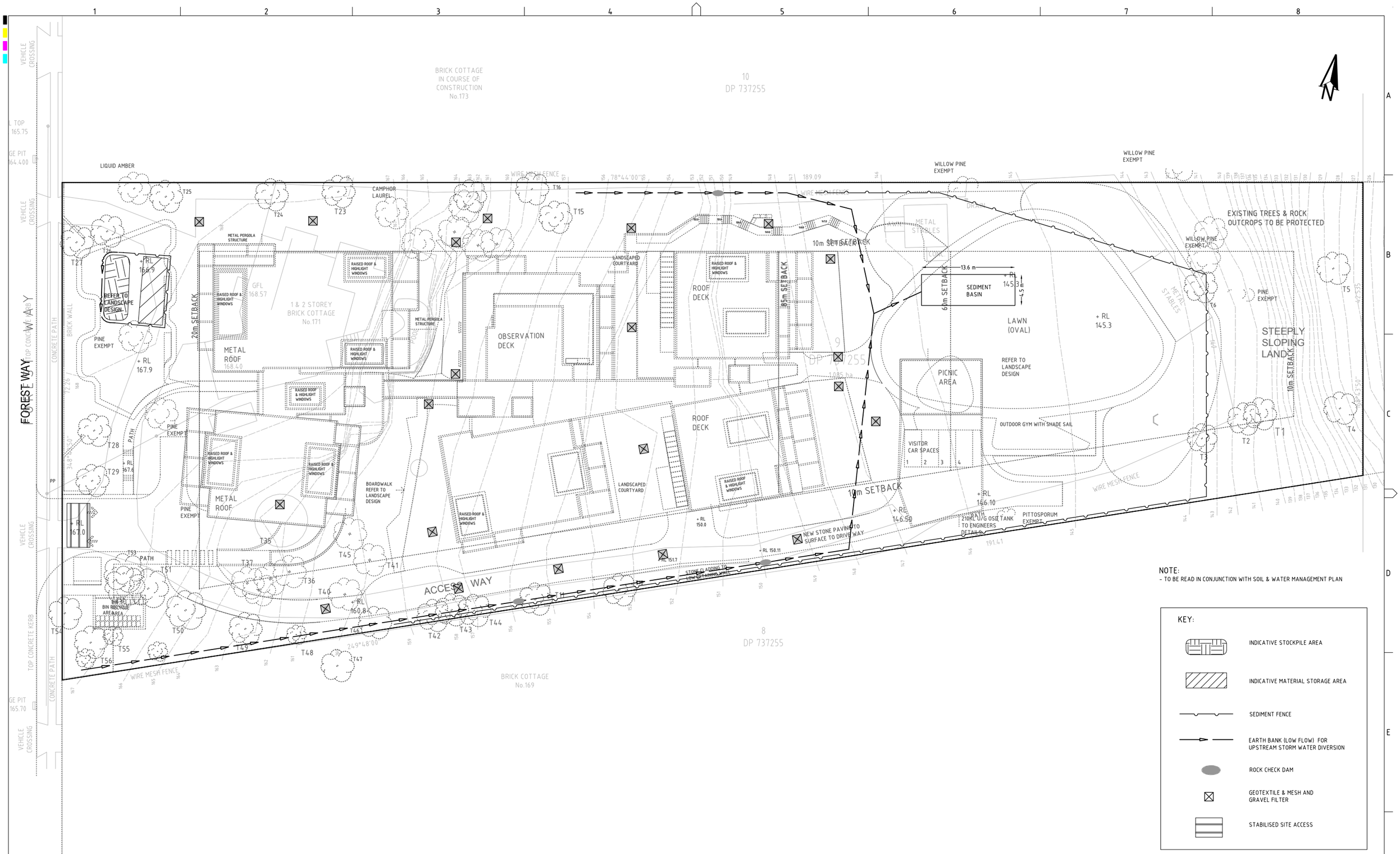
DRAWING TITLE: COVER SHEET

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108124	PS01	R04	PS01-A000	C

DRAWING ID: P2108124-PS01-R04-A000

PRINTED ---- USER: JSUAREZ

A1 / A3 LANDSCAPE (A1LC_v02.0.01)



NOTE:
- TO BE READ IN CONJUNCTION WITH SOIL & WATER MANAGEMENT PLAN

KEY:

- INDICATIVE STOCKPILE AREA
- INDICATIVE MATERIAL STORAGE AREA
- SEDIMENT FENCE
- EARTH BANK (LOW FLOW) FOR UPSTREAM STORM WATER DIVERSION
- ROCK CHECK DAM
- GEOTEXTILE & MESH AND GRAVEL FILTER
- STABILISED SITE ACCESS

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
C	**MINOR AMENDMENTS**	**18/07/2022**	**JS**	**BN**	**AVG**	**GT**
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SCALE
A1 (A3) 1:250 (1:500)
0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0 METRES

GRID	DATUM	PROJECT MANAGER
MGA	mAHD	GT

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DRAWING TITLE
SOIL & WATER MANAGEMENT PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108124	PS01	R04	PS01-B300	C

DRAWING ID: P2108124-PS01-R04-B300

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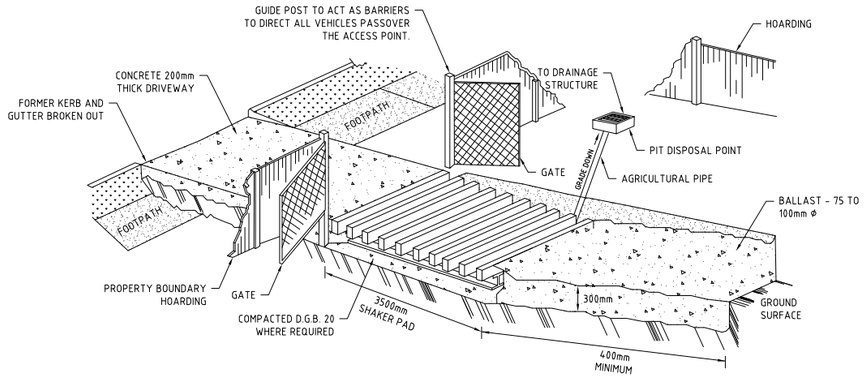
A1 / A3 LANDSCAPE (A1LC_v02.0.01)

STABILISED ACCESS POINT

TYPE II SAP

THE TYPE II SAP DESIGN IS MORE DEFINED IN THAT IT REQUIRES AN AREA OF BALLAST WITHIN THE SITE COMBINED WITH A SHAKER PAD; ADJACENT THE SHAKER PAD AND IN THE PUBLIC WAY IS A TEMPORARY (CONCRETE) VEHICULAR CROSSING. (SEE DIAGRAM)

STABILISED ACCESS POINT - TYPE 2



IN BOTH TYPE I AND TYPE II SAP'S, THE TEMPORARY VEHICULAR CROSSING MUST:

- CONNECT TO AN EXISTING GUTTER LAYBACK (WHERE THE KERB AND GUTTER EXIST) . IF A GUTTER LAYBACK DOES NOT EXIST THEN THE CONNECTION MUST BE MADE TO THE GUTTER BY REMOVING THE ADJCENT KERB SECTION ONLY.
- CONNECT TO A DISH CROSSING (WHERE KERB AND GUTTER DOES NOT EXIST). IF A DISH CROSSING DOES NOT EXIST, THEN IT MUST BE CONSTRUCTED IN ACCORDANCE WITH DETAILS CONTAINED IN COUNCIL'S ISSUED FOOTPATH CROSSING LEVELS.

IT SHOULD BE NOTED THAT THESE TYPES OF SAPS ARE CONSIDERED TO BE APPLICABLE FOR THE MAJORITY OF ACTIVITIES HOWEVER SOME SITES MAY REQUIRE SPECIAL CONSIDERATION.

SHAKER PAD (CATTLE GRID)

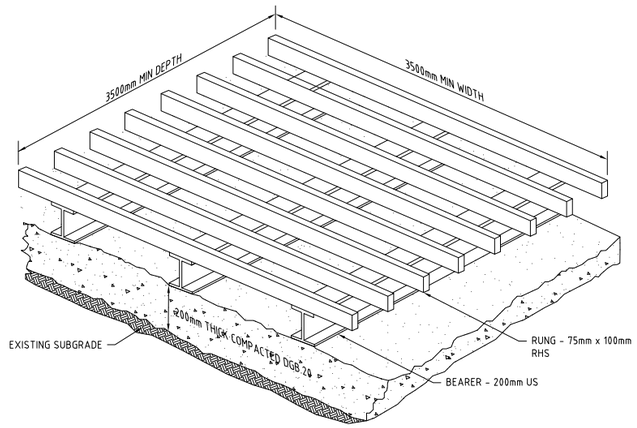
A CORRECTLY DESIGNED AND INSTALLED SHAKER PAD WILL ASSIST IN PREVENTING SEDIMENT TRANSFERE FROM A SITE. ANY STABILISED ACCESS POINT (SAP) CAN BE DESIGNED WITH A SHAKER PAD (COMPULSOPRY IN TYPE II SAP'S)

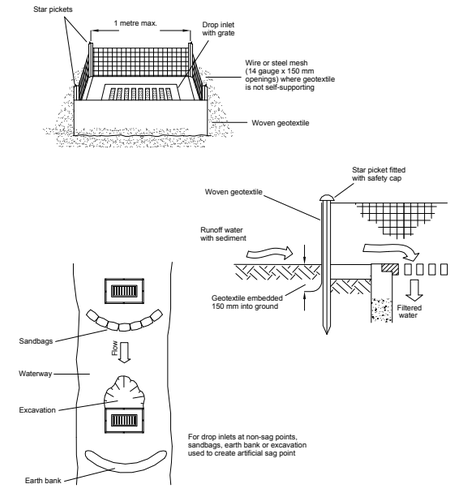
SHAKER PADS CAN BE DESIGNED AND CONSTRUCTED TO ENABLE RE-USE ON FUTURE PROJECTS.

THE SHAKER PAD:

- MUST BE DESIGNED AND CERTIFIED BY A PRACTICING STRUCTURAL ENGINEER. THE CERTIFIED DESIGN SHOULD BE SUBMITTED WITH THE RELEVENT APPLICATION.
- CAN BE CONSTRUCTED FROM ANY SUITABLE MATERIAL.
- MUST BE LOCATED ON A SUITABLY PREPARED AND COMPACTED SUB-GRADE/BASE MATERIAL.
- MUST BE SITUATED SUCH THAT THE RUNGS OF THE SHAKER PAD ARE LEVEL WITH THE ADJOINING NATURAL SURFACE.
- MUST BE A MINIMUM OF 3.5m IN LENGTH.
- MUST BE A MINIMUN OF 3.5m IN WIDTH.
- MUST HAVE CLEAR SPACING BETWEEN RUNGS OF 200 - 250mm.
- RUNGS MUST HAVE A MAXIMUM WIDTH (BEARING AREA) OF 75mm.
- MUST HAVE A MINIMUM CLEAR DEPTH OF 300mm IE FORM THE ROP OF THE RUNG TO THE FINISHED SUB-GRADE/BASE LEVEL.

THE SHAKER PAD MUST BE PROVIDED WITH SUITABLE BARRIERS AT THE SIDES TO ENSURE THAT ALL TYERS OF VEHICLES LEAVING THE SITE TRAVERSE THE DEVICE.

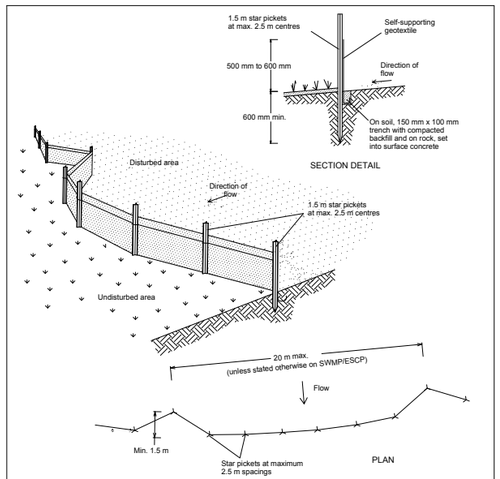




Construction Notes

1. Fabricate a sediment barrier made from geotextile or straw bales.
2. Follow Standard Drawing 6-7 and Standard Drawing 6-8 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.

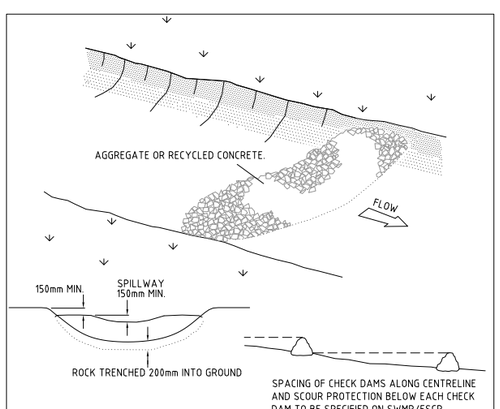
GEOTEXTILE INLET FILTER ☒ SD 6-12



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 catchment area of any one section. The catchment 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 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre 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 a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

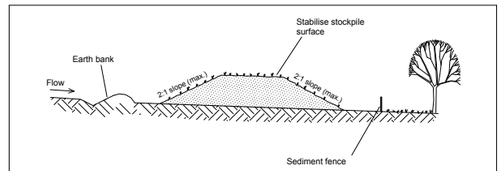
SEDIMENT FENCE SD 6-8



CONSTRUCTION NOTES

1. CHECK DAMS CAN BE BUILT WITH VARIOUS MATERIALS, INCLUDING ROCKS, LOGS, SANDBAGS AND STRAW BALES. THE MAINTENANCE PROGRAM SHOULD ENSURE THEIR INTEGRITY IS RETAINED, ESPECIALLY WHERE CONSTRUCTED WITH STRAW BALES. IN THE CASE OF BALES, THIS MIGHT REQUIRE THEIR REPLACEMENT EACH TWO TO FOUR MONTHS.
2. TRENCH THE CHECK DAM 200mm INTO THE GROUND ACROSS ITS WHOLE WIDTH. WHERE ROCK IS USED, FILL THE TRENCHES TO AT LEAST 100mm ABOVE THE GROUND SURFACE TO REDUCE THE RISK OF UNDERCUTTING.
3. NORMALLY, THEIR MAXIMUM HEIGHT SHOULD NOT EXCEED 600mm ABOVE THE GULLY FLOOR. THE CENTRE SHOULD ACT AS A SPILLWAY, BEING AT LEAST 150mm LOWER THAN THE OUTER EDGES.
4. SPACE THE DAMS SO THE TOE OF THE UPSTREAM DAM IS LEVEL WITH THE SPILLWAY OF THE NEXT DOWNSTREAM DAM.

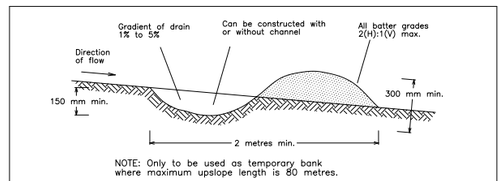
ROCK CHECK DAM SD 5-4



Construction Notes

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, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

STOCKPILES SD 4-1

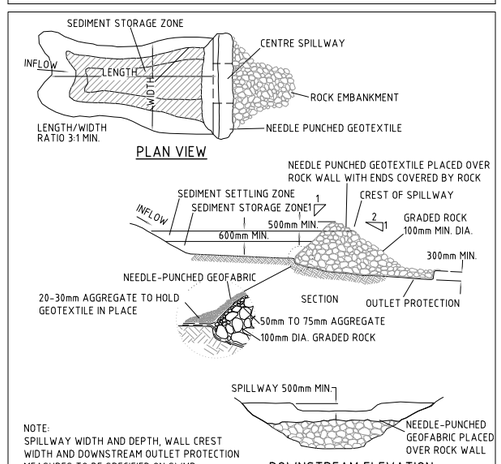


Construction Notes

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.

3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

EARTH BANK (LOW FLOW) SD 5-5



NOTE:
SPILLWAY WIDTH AND DEPTH, WALL CREST WIDTH AND DOWNSTREAM OUTLET PROTECTION MEASURES TO BE SPECIFIED ON SWMP.

CONSTRUCTION NOTES

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. EXCAVATE TO 300mm DEPTH FOR BASE OF THE DAM WALL.
3. LINE THE EXCAVATION WITH A NEEDLE-PUNCHED GEOTEXTILE ALLOWING SUFFICIENT TO LINE BELOW THE WALL, AND OVER THE UPSTREAM ROCK AND THE SPILLWAY TO 500mm BELOW THE SPILLWAY EXIT ON THE DOWNSTREAM FACE.
4. MAKE UP THE WALL PROFILE AND OUTLET PROTECTION WITH100mm (MIN.) DIAMETER GRADED ROCK. SPREAD A LAYER OF 50mm TO 75mm DIAMETER AGGREGATE OVER THE UPSTREAM BATTER FOR A MORE EVEN SURFACE, AND ADD 100mm TO 150mm OF 20mm TO 30mm GRAVEL OVER THE 50mm TO 75mm DIAMETER AGGREGATE.
5. LAY GEOTEXTILE OVER THE UPSTREAM BATTER AND THROUGH THE SPILLWAY, FIXING IN PLACE WITH 100mm ROCK.
6. PLACE A "FULL OF SEDIMENT" MARKER TO SHOW WHEN LESS THAN DESIGN CAPACITY OCCURS AND SEDIMENT REMOVAL IS REQUIRED.
7. REPLACE THE UPSTREAM GEOTEXTILE LAYER EACH TIME SEDIMENT IS REMOVED

ROCK SEDIMENT BASIN SD 6-1
(APPLIES TO 'TYPE C' SOILS ONLY)

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
B	MINOR AMENDMENTS	18/07/2022	JS	BN	AVG	GT
A	INITIAL RELEASE	24/06/2021	JS	BN	SA	

SCALE

GRID	DATUM	PROJECT MANAGER
MGA	mAHD	GT

CLIENT
BELROSE RB1 PTY LTD

PROJECT NAME/PLANSET TITLE
MULTI UNIT RESIDENTIAL DEVELOPMENT
CONCEPT STORMWATER MANAGEMENT PLAN
171 FOREST WAY, BELROSE, NSW 2085

martens & Associates Pty Ltd
Consulting Engineers
Environment
Water
Geotechnical
Civil
Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE
SOIL & WATER MANAGEMENT DETAILS

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108124	PS01	R04	PS01-B310	B

DRAWING ID: P2108124-PS01-R04-B310

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A1 / A3 LANDSCAPE (A1LC_v02.0.01)

Note: These "Detailed Calculation" spreadsheets relate only to high erosion hazard lands as identified in figure 4.6 or where the designer chooses to use the RUSLE to size sediment basins. The "Standard Calculation" spreadsheets should be used on low erosion hazard lands as identified by figure 4.6 and where the designer chooses not to run the RUSLE in calculations.

1. Site Data Sheet

Site Name: P2008124

Site Location: 171 Forest Way, Belrose NSW 2085

Precinct: N/A

Description of Site: Somersby (so): Sydney Soil Landscape

Site area	Site						Remarks
	CAT 1						
Total catchment area (ha)	1.09						
Disturbed catchment area (ha)	0.77						
Soil analysis							
% sand (fraction 0.02 to 2.00 mm	70						Soil texture should be assessed through mechanical dispersion only. Dispersing agents (e.g. Calgon) should not be used
% silt (fraction 0.002 to 0.02 mm)	10						
% clay (fraction finer than 0.002 mm)	20						
Dispersion percentage	15.0						E.g. enter 10 for dispersion of 10%
% of whole soil dispersible	3.75						See Section 6.3.3(e)
Soil Texture Group	C						See Section 6.3.3(c), (d) and (e)
Rainfall data							
Design rainfall depth (days)	7						See Sections 6.3.4 (d) and (e)
Design rainfall depth (percentile)	80						See Sections 6.3.4 (f) and (g)
x-day, y-percentile rainfall event	36.8						See Section 6.3.4 (h)
Rainfall intensity: 2-year, 6-hour storm	10.6						See IFD chart for the site
RUSLE Factors							
Rainfall erosivity (*R*-factor)	2460						Automatic calculation from above data
Soil erodibility (*K*-factor)	0.027						RUSLE data can be obtained from Appendixes A, B and C
Slope length (m)	100						
Slope gradient (%)	13.5						
Length/gradient (*LS*-factor)	5.1475						
Erosion control practice (*P*-factor)	1.3						
Ground cover (*C*-factor)	1						
Calculations							
Soil loss (t/ha/yr)	444						
Soil Loss Class	4						See Section 4.4.2(b)
Soil loss (m^3/ha/yr)	342						
Sediment basin storage volume, m^3	45						See Sections 6.3.4(i) and 6.3.5 (e)

2. Storm Flow Calculations

Peak flow is given by the Rational Formula:

$$Qy = 0.00278 \times C_{10} \times F_Y \times I_{y,tc} \times A$$

where:
- Q_y is peak flow rate (m^3/sec) of average recurrence interval (ARI) of "Y" years
- C_{10} is the runoff coefficient (dimensionless) for ARI of 10 years. Rural runoff coefficients are given in Volume 2, figure 5 of Pilgrim (1998), while urban runoff coefficients are given in Volume 1, Book VIII, figure 1.13 of Pilgrim (1998) and construction runoff coefficients are given in Appendix F
- F_y is a frequency factor for "Y" years. Rural values are given in Volume 1, Book IV, Table 1.1 of Pilgrim (1998) while urban coefficients are given in Volume 1, Book VIII, Table 1.6 of Pilgrim (1998)
- A 's the catchment area in hectares (ha)
- $I_{y,tc}$ is the average rainfall intensity (mm/hr) for an ARI of "Y" years and a design duration of "tc" (minutes or hours)

Time of concentration (t_c) = $0.76 \times (A/100)^{0.38}$ hrs (Volume 1, Book IV of Pilgrim, 1998)

Note: For urban catchments the time of concentration should be determined by more precise calculations or reduced by a factor of 50 per cent.

Peak flow calculations, 1

Site	A (ha)	tc (mins)	Rainfall intensity, I, mm/hr						C_{10}
			$1_{yr,tc}$	$5_{yr,tc}$	$10_{yr,tc}$	$20_{yr,tc}$	$50_{yr,tc}$	$100_{yr,tc}$	
CAT 1	1.09	8	88.75	143.5	160.5	183.5	213	235.5	0.9

Peak flow calculations, 2

ARI (yrs)	Frequency factor (F_y)	Peak flows						Comment
		CAT 1 (m^3/s)	(m^3/s)	(m^3/s)	(m^3/s)	5 (m^3/s)	($m3$/s)	
1 yr,tc	0.8	0.194						
5 yr,tc	0.95	0.372						
10 yr,tc	1	0.438						
20 yr,tc	1.05	0.525						
50 yr,tc	1.15	0.668						
100 yr,tc	1.2	0.771						

3. Volume of Sediment Basins: *Type C* Soils

Basin volume = settling zone volume + sediment storage volume

Settling Zone Volume

The settling zone volume for *Type C* soils is calculated to provide capacity to allow the design particle (e.g. 0.02 mm in diameter) to settle in the peak flow expected from the design storm (e.g. 0.25-year ARI). The volume of the basin's settling zone (V) can be determined as a function of the basin's surface area and depth to allow for particles to settle. Peak flow/discharge for the 0.25-year, ARI storm is given by the Rational Formula:

$$Q_{tc,0.25} = 0.5 \times [0.00278 \times C10 \times Fy \times I\,1yr,tc \times A] \text{ (m3/sec)}$$

where:
- $Q_{tc,0.25}$ = flow rate (m^3/sec) for the 0.25 ARI storm event
- C_{10} = runoff coefficient (dimensionless for ARI of 10 years)
- F_y = frequency factor for 1 year ARI storm
- $I_{1yr,tc}$ = average rainfall intensity (mm/hr) for the 1-year ARI storm
- A = area of catchment in hectares (ha)

Basin surface area (A) = area factor x $Q_{tc,0.25}$ m2

Particle settling velocities under ideal conditions (Section 6.3.5(e))

Particle Size	Area Factor
0.100	170
0.050	635
0.020	4100

Volume of settling zone = basin surface area x depth (Section 6.3.5(e)(ii))

Sediment Storage Zone Volume

In the detailed calculation on Soil Loss Classes 1 to 4 lands, the sediment storage zone can be taken as 100 percent of the settling zone capacity. Alternately designers can design the zone to store the 2-month soil loss as calculated by the RUSLE (Section 6.3.5(e)(iv)). However, on Soil Loss Classes 5, 6 and 7 lands, the zone must contain the 2-month soil loss as calculated by the RUSLE (Section 6.3.5(e)(v)).

Place an "X" in the box below to show the sediment storage zone design parameters used here:

	100% of settling zone capacity,
X	2 months soil loss calculated by RUSLE

Total Basin Volume

Site	$Q_{tc,0.25}$ (m^3/s)	Area factor	Basin surface area (m^2)	Depth of settling zone (m)	Settling zone volume (m^3)	Sediment storage volume (m^3)	Total basin volume (m^3)	Basin shape		
								L:W Ratio	Length (m)	Width (m)
CAT 1	0.097	635	61	0.6	37	45	82	3	13.6	4.5

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SCALE

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A1 / A3 LANDSCAPE (A1LC_v02.0.01)

GRID: MGA | DATUM: mAHD | PROJECT MANAGER: GT

CLIENT: BELROSE RB1 PTY LTD

PROJECT NAME/PLANSET TITLE: MULTI UNIT RESIDENTIAL DEVELOPMENT
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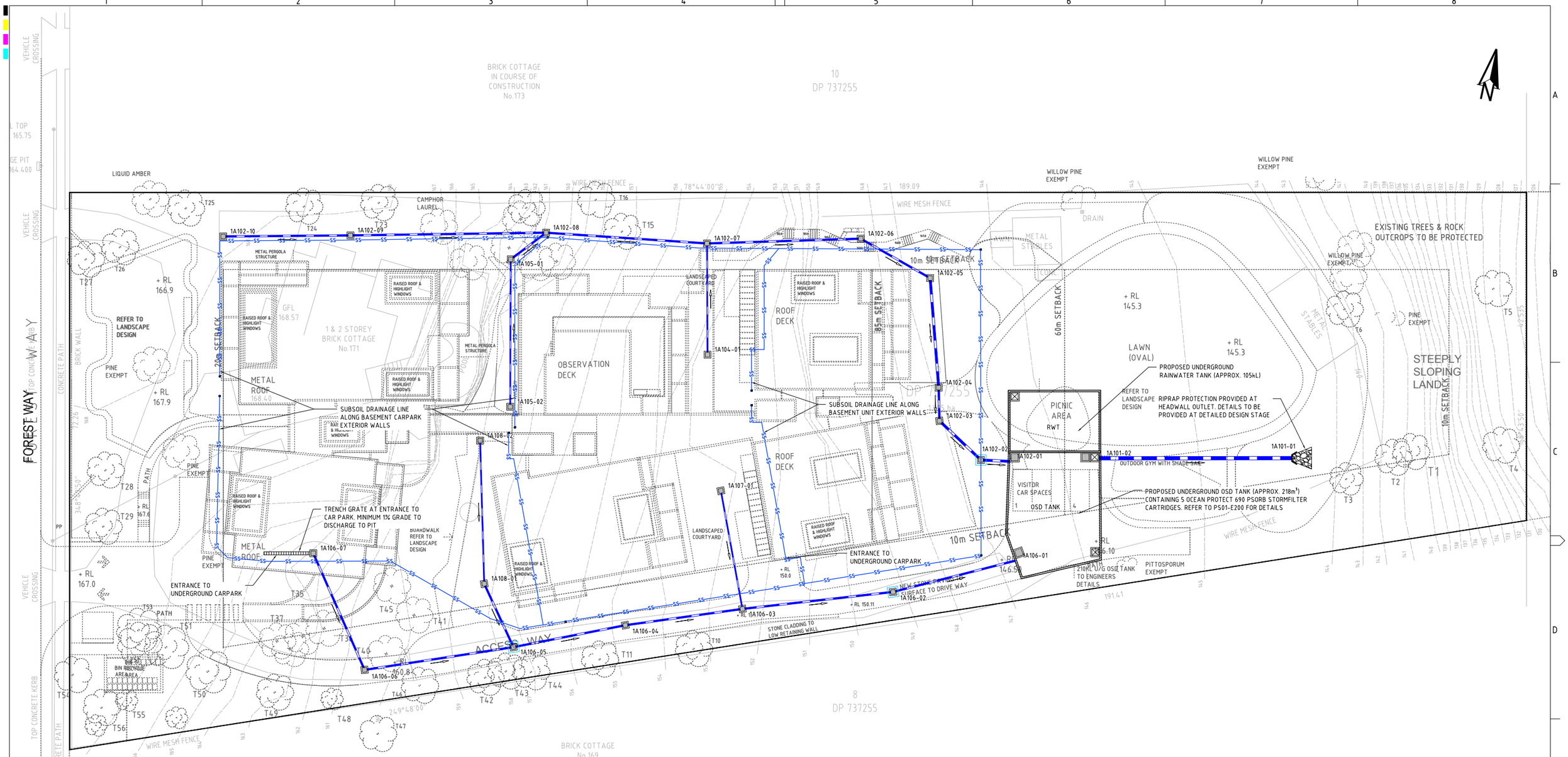
DRAWING TITLE: SEDIMENT BASIN CALCULATIONS

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108124	PS01	R04	PS01-B315	B

DRAWING ID: P2108124-PS01-R04-B315



KEY

- STORMWATER PIPELINE
- SURFACE INLET PIT WITH TYPICAL OCEAN GUARD
- SURFACE INLET PIT
- HEADWALL
- FLOW DIRECTION
- SITE BOUNDARY
- SUB-SOIL DRAINAGE PIPE
- SUB-SOIL DRAINAGE FLUSH

GENERAL NOTES

1. ALL ROOFWATER TO BE CONNECTED TO UNDERGROUND RAINWATER TANK TO BE COMPLETED BY OTHERS AT DETAILED DESIGN STAGE. ROOFWATER TO BE CONVEYED BY A SEPARATE PIPELINE.
2. CONCEPT DESIGN ONLY FOR ALL PIT AND PIPE LOCATIONS. CONFIRMATION OF FINAL PIPE SIZES AND PIT LOCATIONS TO BE COMPLETED AT DETAILED DESIGN STAGE.
3. ARCHITECTURAL LAYOUT PROVIDED BY BARRY RUSH & ASSOCIATES ARCHITECTS DATED 17.09.2021

DEVELOPMENT APPLICATION

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C	MINOR AMENDMENTS	18/07/2022	JS	BN	AVG	GT
B	CHANGE IN ARCHITECT LAYOUT	19/10/2021	JS	BN	SA	GT
A	INITIAL RELEASE	24/06/2021	JS	BN	SA	

SCALE: 0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0 22.5 25.0 METRES
A1 (A3) 1:250 (1:500)

GRID	DATUM	PROJECT MANAGER
MGA	mAHD	GT

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All measurements in millimetres unless otherwise specified.

CLIENT: BELROSE RB1 PTY LTD

PROJECT NAME/PLANSET TITLE
MULTI UNIT RESIDENTIAL DEVELOPMENT
CONCEPT STORMWATER MANAGEMENT PLAN
171 FOREST WAY, BELROSE, NSW 2085

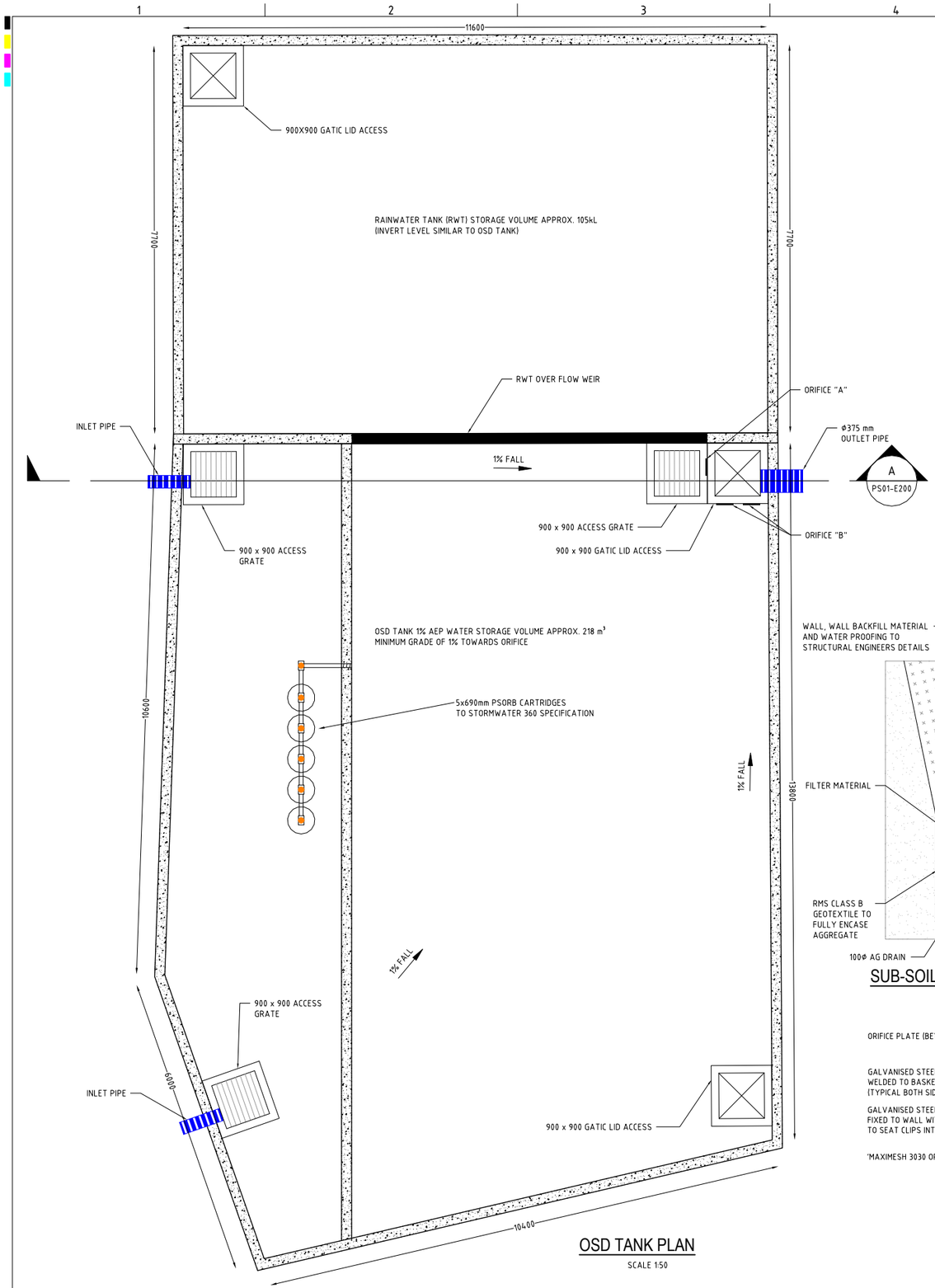
martens & Associates Pty Ltd
Consulting Engineers
Environment
Water
Geotechnical
Civil
Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE: DRAINAGE PLAN

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108124	PS01	R04	PS01-E100	C

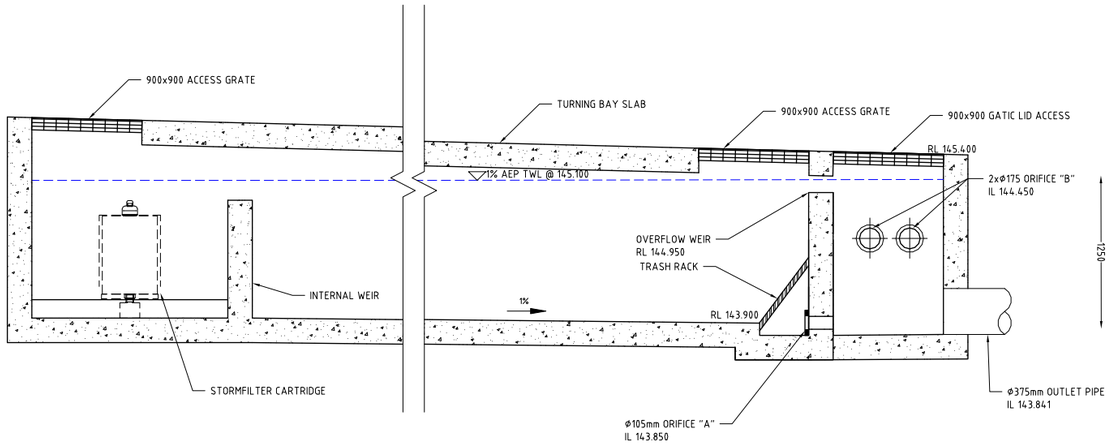
DRAWING ID: P2108124-PS01-R04-E100

PRINTED ---- USER: JSUAREZ
A1 / A3 LANDSCAPE (A1LC_v02.0.01)



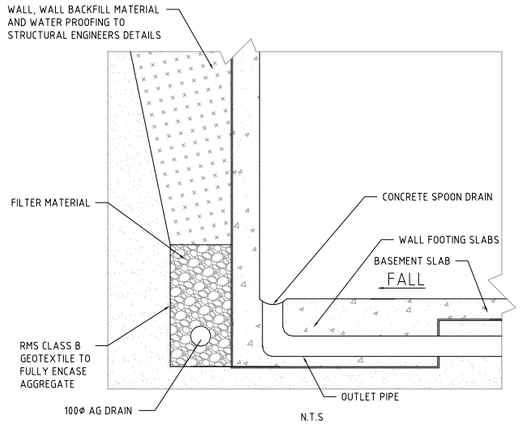
OSD TANK PLAN

SCALE 1:50



SECTION A: OSD & STORMFILTER CHAMBER

NOT TO SCALE

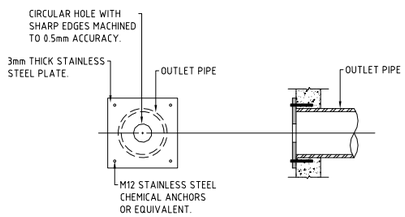


N.T.S

SUB-SOIL DRAINAGE TRENCH TYPICAL SECTION

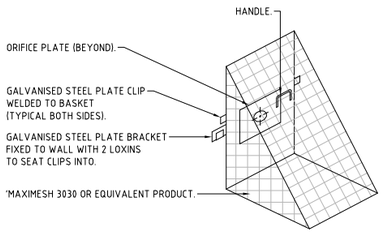
CONFINED SPACE WARNING SIGN

NOT TO SCALE



ORIFICE PLATE DETAIL

NOT TO SCALE



TRASH SCREEN DETAIL

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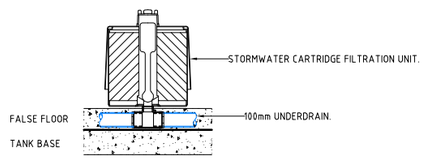
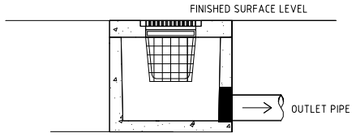


STORMFILTER CARTRIDGE DETAIL

NOT TO SCALE



TYPICAL OCEANGUARD CONFIGURATION INSIDE SURFACE INLET PIT

NOT TO SCALE

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
B	MINOR AMENDMENTS	18/07/2022	JS	BN	AVG	GT
A	INITIAL RELEASE	24/06/2021	JS	BN	SA	

SCALE: A1 (A3) 1:50 (1:100) — 0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 METRES

GRID	DATUM	PROJECT MANAGER
---	---	GT

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CLIENT: BELROSE RB1 PTY LTD

PROJECT NAME/PLANSET TITLE: MULTI UNIT RESIDENTIAL DEVELOPMENT
CONCEPT STORMWATER MANAGEMENT PLAN
171 FOREST WAY, BELROSE, NSW 2085

martens & Associates Pty Ltd
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Environment
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Geotechnical
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Suite 201, 20 George St, Hornsby, NSW 2077 Australia Phone: (02) 9476 9999 Fax: (02) 9476 8767
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE: DRAINAGE DETAILS

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108124	PS01	R04	PS01-E200	B

DRAWING ID: P2108124-PS01-R04-E200

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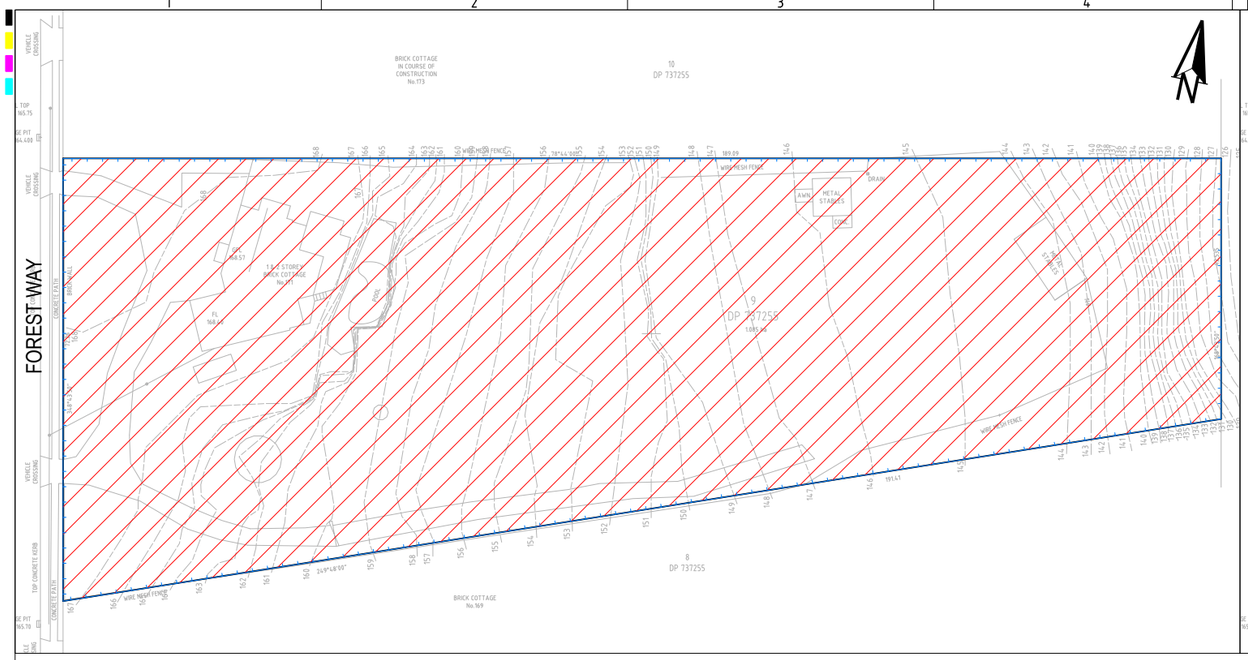
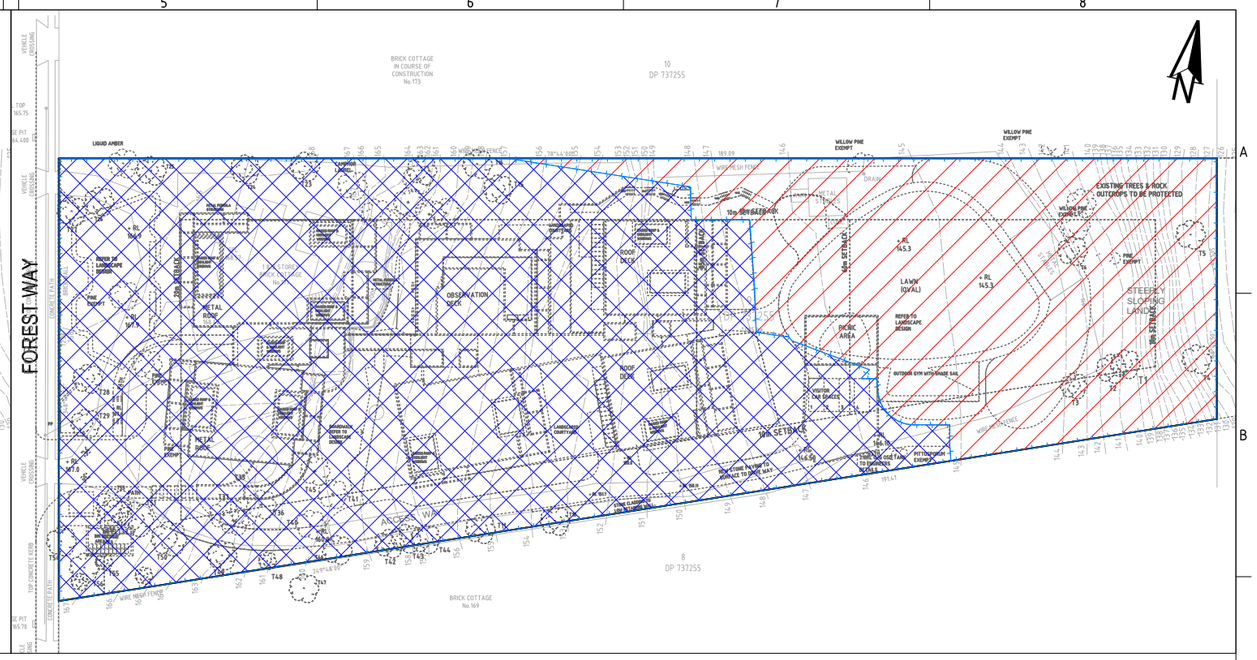
A1 / A3 LANDSCAPE (A1LC_v02.0.01)



OSD CATCHMENT PLAN (PRE-DEVELOPMENT)

SCALE 1:500



OSD CATCHMENT PLAN (POST-DEVELOPMENT)

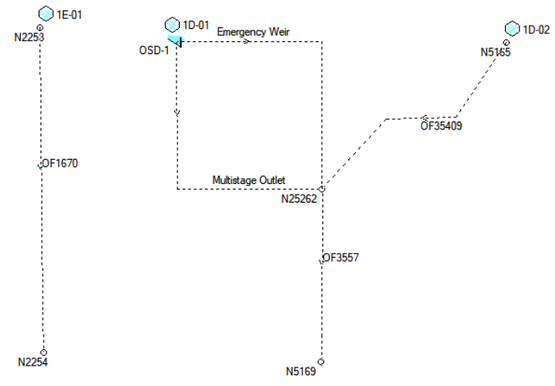
SCALE 1:500

PRE DEVELOPMENT CATCHMENT DETAILS (P2008021DRN01V02)

KEY	DRAINS NODE	AREA (ha)	% PAVED
	1.00E-01	1.09	14%
	TOTAL AREA	1.09	= 100% OF TOTAL AREA
	TOTAL IMPERVIOUS AREA	0.15	= 14% OF TOTAL AREA
	TOTAL PERVIOUS AREA	0.93	= 86% OF TOTAL AREA

POST DEVELOPMENT CATCHMENT DETAILS (P2008021DRN01V02)

KEY	DRAINS NODE	AREA (ha)	% PAVED
	1D-01	0.75	47%
	1D-02	0.33	36%
	TOTAL AREA	1.09	= 100% OF TOTAL AREA
	TOTAL IMPERVIOUS AREA	0.47	= 43% OF TOTAL AREA
	TOTAL PERVIOUS AREA	0.61	= 57% OF TOTAL AREA



DRAINS LAYOUT (P2108124DRN01V02)

DRAINS OSD MODELLING RESULTS (P2108124DRN01V02)

	20% AEP PEAK FLOWS			0.2 EY PEAK FLOWS			10% AEP PEAK FLOWS			5% AEP PEAK FLOWS			2% AEP PEAK FLOWS			1% AEP PEAK FLOWS		
Duration	Pre	Post	Difference	Pre	Post	Difference	Pre	Post	Difference	Pre	Post	Difference	Pre	Post	Difference	Pre	Post	Difference
10 min	0.167	0.083	0.084	0.175	0.085	0.09	0.241	0.241	0.107	0.314	0.15	0.164	0.416	0.206	0.21	0.496	0.245	0.251
15 min	0.202	0.087	0.115	0.208	0.09	0.118	0.269	0.269	0.141	0.334	0.181	0.153	0.42	0.225	0.195	0.495	0.336	0.159
20 min	0.189	0.1	0.089	0.196	0.107	0.089	0.266	0.266	0.148	0.328	0.183	0.145	0.398	0.276	0.122	0.466	0.385	0.081
25 min	0.19	0.102	0.088	0.196	0.107	0.089	0.249	0.249	0.136	0.311	0.169	0.142	0.399	0.295	0.104	0.462	0.385	0.077
30 min	0.176	0.105	0.071	0.185	0.111	0.074	0.225	0.225	0.143	0.282	0.174	0.108	0.353	0.249	0.104	0.413	0.32	0.093
45 min	0.194	0.116	0.078	0.203	0.121	0.082	0.18	0.18	0.142	0.234	0.171	0.063	0.328	0.263	0.065	0.383	0.332	0.051
1 hour	0.155	0.116	0.039	0.16	0.119	0.041	0.251	0.251	0.149	0.3	0.184	0.116	0.281	0.237	0.044	0.326	0.31	0.016
1.5 hou	0.119	0.096	0.023	0.127	0.099	0.028	0.155	0.155	0.124	0.2	0.155	0.045	0.253	0.181	0.072	0.298	0.262	0.036
2 hour	0.148	0.107	0.041	0.153	0.109	0.044	0.169	0.169	0.116	0.21	0.141	0.069	0.251	0.22	0.031	0.291	0.256	0.035
3 hour	0.088	0.074	0.014	0.091	0.077	0.014	0.127	0.127	0.098	0.153	0.127	0.026	0.181	0.155	0.026	0.21	0.181	0.029
4.5 hou	0.073	0.072	0.001	0.075	0.075	0	0.094	0.094	0.088	0.114	0.103	0.011	0.186	0.14	0.046	0.221	0.157	0.064

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
C	**MINOR AMENDMENTS**	**18/07/2022**	**JS**	**BN**	**AVG**	**GT**
B	CHANGE IN ARCHITECT LAYOUT	19/10/2021	JS	BN	SA	GT
A	INITIAL RELEASE	24/06/2021	JS	BN	SA	

PRINTED ---- USER: JSUAREZ

A1 / A3 LANDSCAPE (A1LC_v02.0.01)

SCALE
0 5 10 15 20 25 30 35 40 45 50 METRES
A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
MGA	mAHD	GT

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CLIENT

BELROSE RB1 PTY LTD

PROJECT NAME/PLANSET TITLE

MULTI UNIT RESIDENTIAL DEVELOPMENT

CONCEPT STORMWATER MANAGEMENT PLAN

171 FOREST WAY, BELROSE, NSW 2085

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Civil
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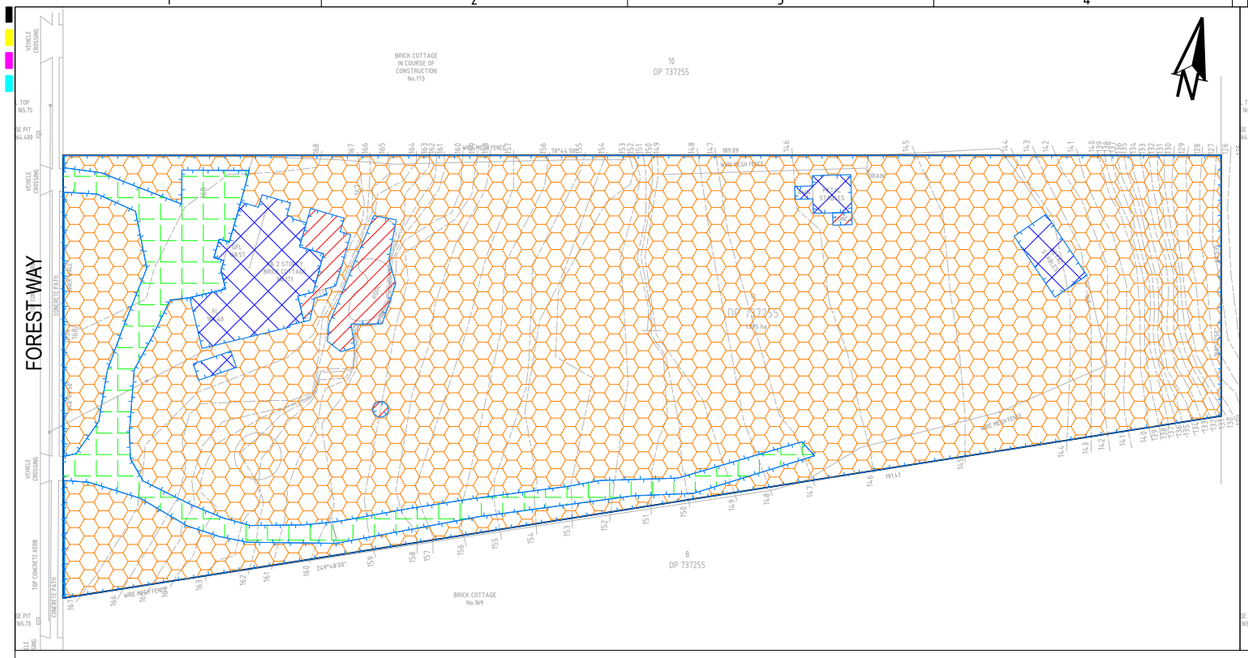
Email: mail@martens.com.au Internet: www.martens.com.au

DRAWING TITLE

ON SITE DETENTION CATCHMENT PLANS, MODELS & RESULTS

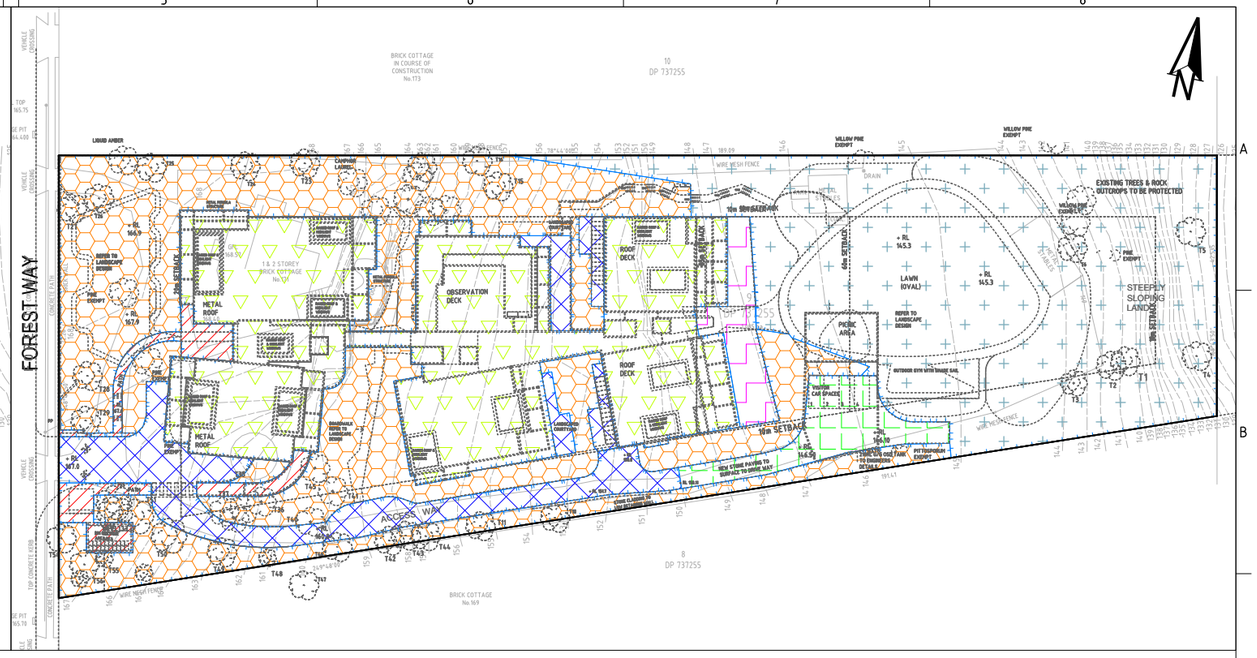
PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108124	PS01	R04	PS01-E600	C

DRAWING ID: P2108124-PS01-R04-E600



MUSIC MODELLING CATCHMENT PLAN (PRE-DEVELOPMENT)

SCALE 1:500



MUSIC MODELLING CATCHMENT PLAN (POST-DEVELOPMENT)

SCALE 1:500

PRE DEVELOPMENT MUSIC CATCHMENT DETAILS (P2008124MUS01V02)

KEY	MUSIC NODE	AREA (ha)	% EFFECTVE IMPERVIOUS AREA
	1.00E-01	0.93	0%
	1.00E-02	0.09	100%
	1.00E-03	0.02	100%
	1.00E-04	0.05	100%
	TOTAL AREA	1.09	= 100% OF TOTAL AREA
	TOTAL IMPERVIOUS AREA	0.16	= 14% OF TOTAL AREA
	TOTAL PERVIOUS AREA	0.93	= 86% OF TOTAL AREA

POST DEVELOPMENT MUSIC CATCHMENT DETAILS (P2008124MUS01V02)

KEY	MUSIC NODE	AREA (ha)	% EFFECTVE IMPERVIOUS AREA
	1D-01	0.33	0%
	1D-02	0.06	100%
	1D-03	0.03	100%
	1D-04	0.04	100%
	1D-05	0.27	100%
	1D-06	0.33	0%
	1D-07	0.02	100%
	TOTAL AREA	1.09	= 100% OF TOTAL AREA
	TOTAL IMPERVIOUS AREA	0.42	= 39% OF TOTAL AREA
	TOTAL PERVIOUS AREA	0.66	= 61% OF TOTAL AREA

MUSIC MODELLING RESULTS FOR WATER QUANTITY (P2108124MUS02V02)

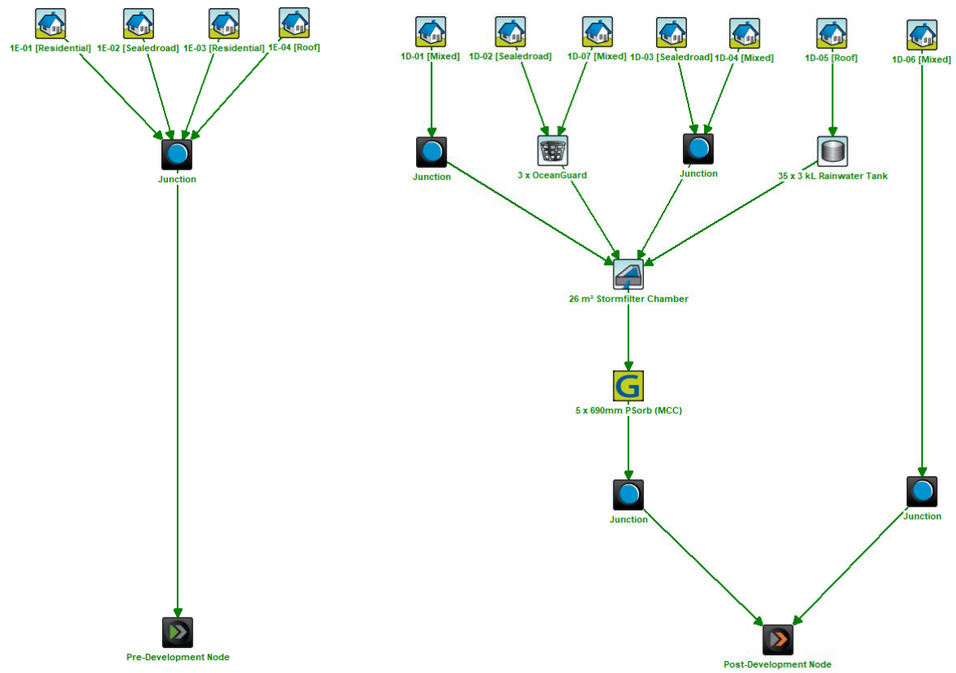
PARAMETER	PRE-DEVELOPMENT	POST-DEVELOPMENT	VOLUMETRIC RUNOFF COEFFICIENT
FLOW (ML/yr)	5.51	5.87	1.07
NO. STORM EVENTS/YEAR	187	176	-

MUSIC MODELLING RESULTS FOR WATER QUALITY PRE VS POST DEVELOPMENT (P2108124MUS01V02)

PARAMETER	PRE-DEVELOPMENT	POST-DEVELOPMENT	% CHANGE
TOTAL SUSPENDED SOLIDS (kg/yr)	468	89.6	-80.9%
TOTAL PHOSPHORUS (kg/yr)	1.29	0.48	-62.8%
TOTAL NITROGEN (kg/yr)	8.99	6.41	-28.7%

MUSIC MODELLING RESULTS FOR WATER QUALITY TARGETS (P2108124MUS01V02)

PARAMETER	SOURCES	RESIDUAL LOAD	% REDUCTION
TOTAL SUSPENDED SOLIDS (kg/yr)	603	89.6	85.1%
TOTAL PHOSPHORUS (kg/yr)	1.67	0.48	71.3%
TOTAL NITROGEN (kg/yr)	14.5	6.41	55.8%



MUSIC LAYOUT (P2108124MUS01V02 / P2108124MUS02V02)

DEVELOPMENT APPLICATION

REV	DESCRIPTION	DATE	DRAWN	DESIGNED	CHECKED	APPRVD
C	MINOR AMENDMENTS	18/07/2022	JS	BN	AVG	GT
B	CHANGE IN ARCHITECT LAYOUT	19/10/2021	JS	BN	SA	GT
A	INITIAL RELEASE	24/06/2021	JS	BN	SA	

SCALE: 0 5 10 15 20 25 30 35 40 45 50 METRES — A1 (A3) 1:500 (1:1,000)

GRID	DATUM	PROJECT MANAGER
MGA	mAHD	GT

CLIENT: BELROSE RB1 PTY LTD

PROJECT NAME/PLANSET TITLE: MULTI UNIT RESIDENTIAL DEVELOPMENT
CONCEPT STORMWATER MANAGEMENT PLAN
171 FOREST WAY, BELROSE, NSW 2085

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DRAWING TITLE: WATER QUALITY CATCHMENT PLANS, MODELS & RESULTS

PROJECT NO.	PLANSET NO.	RELEASE NO.	DRAWING NO.	REVISION
P2108124	PS01	R04	PS01-E700	C

DRAWING ID: P2108124-PS01-R04-E700

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A1 / A3 LANDSCAPE (A1LC_v02.0.01)