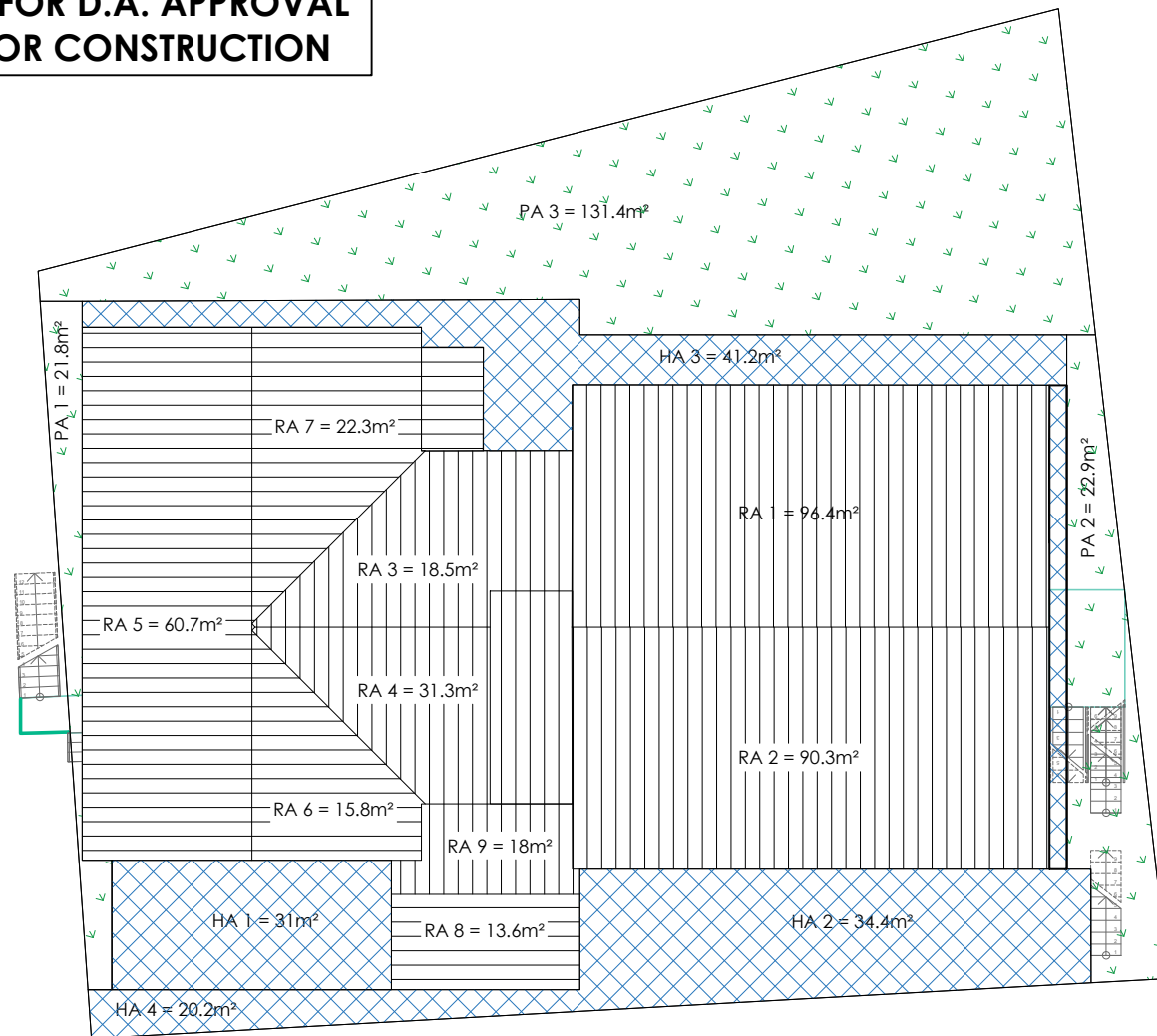


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DESIGN NOTE: GEOTECHNICAL REPORT 31441RHrpt2 Rev1 BY JK GEOTECHNICAL CONSULTANTS RECOMMENDS THAT NO GROUND WATER WAS ENCOUNTERED DURING TEST BOREHOLE EXCAVATION, ALTHOUGH NO EXTENSIVE GROUND WATER MONITORING HAS BEEN UNDERTAKEN.

ALLOWANCES HAVE BEEN MADE IN DESIGN TO INTERCEPT GROUNDWATER SEEPAGE AT ALL POSSIBLE DEPTHS AT WHICH IT COULD BE ENCOUNTERED.

SUB HORIZONTAL DRAINAGE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE GEOTECHNICAL ENGINEER SHALL BE DESIGNED TO INTERCEPT GROUNDWATER SEEPAGE ENCOUNTERED ABOVE CAVITY FGL.
SUBOIL PERFORATED DRAINAGE INSTALLED BEHIND THE RETAINING WALL SYSTEM IN FREE DRAINING AGGREGATE WILL INTERCEPT ANY GROUNDWATER SEEPAGE PRIOR TO TRACKING UNDER THE BUILDING

ALL NEW ROOF AREAS DRAIN VIA DRIPLINE DRAINAGE TO NEW HARDSTAND AREAS WHICH HAVE BEEN DESIGNED WITH CONCRETE SURFACE SPOON DRAINS OF SUFFICIENT CAPACITY TO CARRY THE EXPECTED FLOWS TO THE PROPOSED PIT AND PIPE SYSTEM (SEE DETAILS H03)

PERVIOUS AREA SURFACES SHALL BE DRESSED WITH POROUS HARDSCAPING MATERIAL. PERVIOUS AREA RUNOFF COEFFICIENT MULTIPLIER 0.18

EXCESS RAINFALL RUNOFF (SEE TABLES) SHALL BE CAPTURED IN DN100 SOCKED SUBSOIL PERFORATED DRAINS WITH 1:100 FALL TO THE NEAREST PIT.

Project: RAN Ski Lodge Extension

Location: Thredbo

Client: RAN

Engineer: Stephen Nelson

Roof Area (A_r): 366.9 m²

Paved Area (A_p): 126.8 m²

Pervious Area (A_p): 176.1 m²

Site Class: S

Site Description: Gravel, sand & Gravel, compact and offering high resistance to penetration when executed

General Method (Section 5.4 AS3500.1)

5.4.4 (a) Time of Concentration: 5 min

Rainfall Intensity: 126 mm/h 20 year ARI (5% AEP)

174 mm/h 100 year ARI (1% AEP)

5.4.6 Run-off coefficients:

$C_r = 1.00$ Roof Area

$C_i = 0.90$ Paved Area

$C_p = 0.15$ Pervious Area 20 year ARI

$C_p = 0.18$ Pervious Area 100 year ARI

$$C_p = m(0.0133^{10/60} - 0.233)$$

1 : 20 ARI Design Flow (Q_{20}): 17.79 L/s

1 : 100 ARI Design Flow (Q_{100}): 24.75 L/s

$$Q = \frac{(C_r A_r + C_i A_i + C_p A_p)^{1/3}}{3600}$$

Roof Areas	
Mark	Area (m ²)
RA1	96.4
RA2	90.3
RA3	18.5
RA4	31.3
RA5	60.7
RA6	15.8
RA7	22.3
RA8	13.6
RA9	18.0
Total:	366.9

Paved Areas	
Mark	Area (m ²)
HA1	31.0
HA2	34.4
HA3	41.2
HA4	20.2
Total:	126.8
Pervious Areas	
Mark	Area (m ²)
PA1	21.8
PA2	22.9
PA3	131.4
Total:	176.1

TOTAL SITE RUN OFF - OUTPUT TABLES

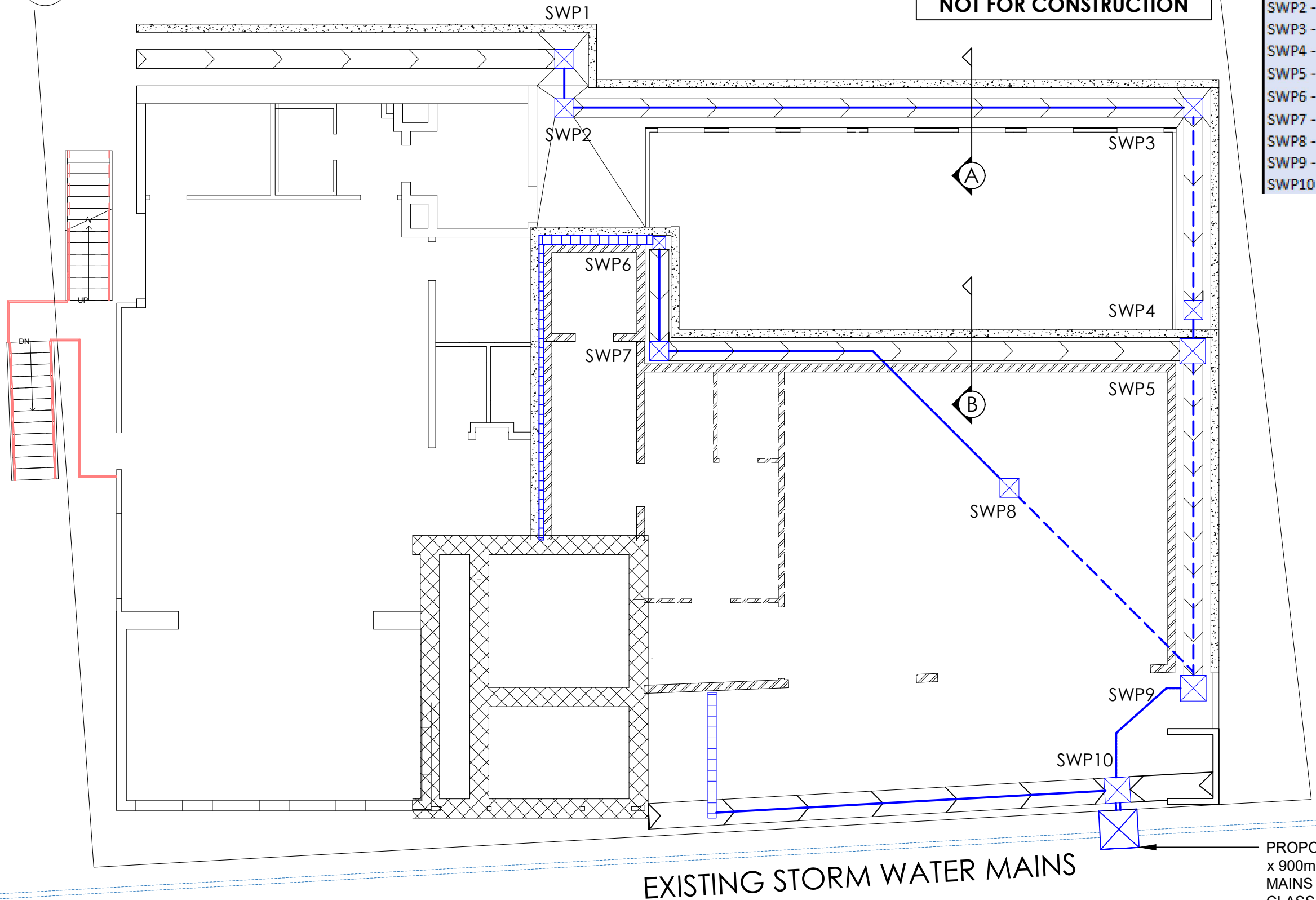
1 : 20 ARI		126 mm/h Rainfall Intensity	
Catchment	Area m ²	Runoff Coefficient	Design Flow L/s
Roof	366.9	1.00	12.84
Paving	126.8	0.90	3.99
Pervious	176.1	0.15	0.95

Total: 17.79

1 : 100 ARI		174 mm/h Rainfall Intensity	
Catchment	Area m ²	Runoff Coefficient	Design Flow L/s
Roof	366.9	1.00	17.73
Paving	126.8	0.90	5.52
Pervious	176.1	0.18	1.51

Total: 24.75

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STORMWATER PIPE	EXPECTED MAX FLOW	PROPOSED PIPE Ø
SWP2 - SWP3	2.19 l/s	DN100
SWP3 - SWP4	9.63 l/s	DN150
SWP4 - SWP5	9.65 l/s	DN150
SWP5 - SWP 9	9.65 l/s	DN150
SWP6 - SWP7	0.1 l/s	DN100
SWP7 - SWP8	0.3 l/s	DN100
SWP8 - SWP9	0.95 l/s	DN100
SWP9 - SWP10	21.2 l/s	DN225
SWP10 - DISCHARGE	21.2 l/s	DN225

SW SURFACE PIT SIZING	
	300 x 300mm
	450 x 450mm
	600 x 600mm
	900 x 900mm
	150mm SURFACE CHANNEL DRAIN

NOTE: ALL 600 AND 900mm PITS SHALL BE PRECAST CONCRETE CLASS A PITS. MINIMUM BASE BEARING CAPACITY 100kPa FROM 0 - 3.0M INVERT LEVEL.

OPEN CHANNEL DRAIN:
MIN. DIMENSION 150x40mm (6000mm²)
MINIMUM CHANNEL GRADIENT 1:100.
CHANNEL CAPACITY 264L/m @ 0.73m/s

EXISTING STORM WATER MAINS

PROPOSED NEW, IN LINE 900 x 900mm STORM WATER MAINS PIT.
CLASS D PIT WITH GATTIC STYLE LID COMPLIANT WITH AS3996 FOR COMMERCIAL LOADS.

H01

GROUND LEVEL STORM WATER MANAGEMENT PLAN

Scale 1:200

EXTERNAL WALL
OF GROUND
FLOOR

SERVICE AND
DRAINAGE CAVITY

GROUND
FLOOR SLAB

NAIL WALL SUBJECT TO
STRUCTURAL ENGINEERING
AND GEOTECHNICAL
REQUIREMENTS

POTENTIAL SEEPAGE INFLOW
SHALL BE MANAGED BY SUB
SURFACE DRAINAGE PIPES IN
ACCORDANCE WITH THE
SPECIFICATIONS OF THE
GEOTECHNICAL ENGINEER.

CAVITY DRAIN. MINIMUM
CROSS SECTION 6000mm²
(150x40mm), MINIMUM FALL 1:100

A
SO2

SECTION A. UPPER RETAINING
WALL DRAINAGE & SW CONTROL.

Scale 1:50

GROUND FLOOR SLABS OVER

EXTERNAL WALL
OF GARAGE

SERVICE AND
DRAINAGE CAVITY

GARAGE SLAB
ON GROUND

NAIL WALL SUBJECT TO
STRUCTURAL ENGINEERING
AND GEOTECHNICAL
REQUIREMENTS

POTENTIAL SEEPAGE INFLOW
SHALL BE MANAGED BY SUB
SURFACE DRAINAGE PIPES IN
ACCORDANCE WITH THE
SPECIFICATIONS OF THE
GEOTECHNICAL ENGINEER.

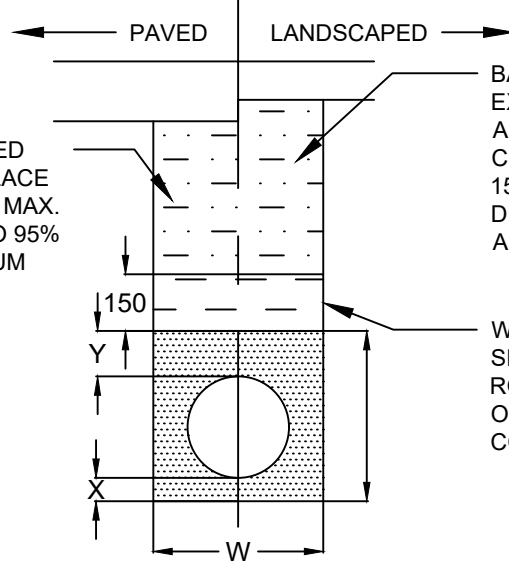
CAVITY DRAIN. MINIMUM
CROSS SECTION 6000mm²
(150x40mm), MINIMUM FALL 1:100

ROOF STORMWATER DRAINAGE DESIGN.

STORMWATER DRAINAGE DESIGN HAS BEEN CARRIED OUT IN
ACCORDANCE WITH AS/NZS3500.3-1990 STORMWATER
DRAINAGE AND AS/NZS3500.3.2-1998 STORMWATER DRAINAGE
ACCEPTABLE SOLUTIONS.

ROOF RUN OFF & PIPE CAPACITY CALCULATIONS HAVE
ALLOWED FOR THE ACCUMULATION OF MELTING SNOW TO
COINCIDE WITH A 1:100 ARI RAINFALL EVENT

TYPICAL PIPE LAYING DETAIL



BACKFILL CRUSHED
ROCK WETMIX, PLACE
AND COMPACT IN MAX.
150mm LAYERS TO 95%
MODIFIED MAXIMUM
DENSITY

BACKFILL WITH APPROVED
EXCAVATED MATERIAL OR
APPROVED ORDINARY FILL,
COMPACTED IN MAXIMUM
150mm LAYERS TO THE
DENSITY OF THE
ADJACENT SOIL.

WELL TAMPED INITIAL ZONES
SHALL BE 10mm CRUSHED
ROCK WELL TAMPED AND AT
OPTIMUM MOISTURE
CONTENT.

GENERAL NOTES

- THESE DOCUMENTS DETAIL THE DIAGRAMMATIC DESIGN INTENT OF HYDRAULIC SERVICES. THE CONTRACTOR IS SHALL SET OUT ALL WORK TO SUIT AS REQUIRED FOR SITE CONDITIONS.
- FINAL HYDRAULIC DESIGNS MAY BE ALTERED IN ACCORDANCE WITH DETAILED ARCHITECTURAL PLANS, STRUCTURAL ENGINEERS DETAILS AND THE RECOMMENDATIONS OF THE APPOINTED GEOTECHNICAL ENGINEER.
- SERVICES POSITIONS ARE INDICATIVE AND ALLOWANCES TO BE MADE ON SITE AS REQUIRED.
- ALL LEVELS AND SET OUT INFORMATION TO BE CONFIRMED PRIOR TO COMMENCEMENT OF WORKS. THESE DOCUMENTS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL INFORMATION.
- ALL PIPE WORK TO BE INSTALLED AS PER AS3500 AG601 AND LOCAL AUTHORITY REQUIREMENTS.
- CONTRACTOR TO PROVIDE ANY ADDITIONAL EXCAVATION, BACKFILL OF PIPES, FITTINGS AND ALL JUMP UPS TO AS3500 AND COUNCIL REQUIREMENTS INCLUDING THOSE TO BRANCH DRAINS.
- DRAINS TO BE SUPPORTED ON OR FROM SOLID GROUND. LOCATION AND DEPTH / INVERT LEVEL OF BRANCH SHALL BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF WORK.
- ALL STORM WATER DRAINAGE WORK SHALL BEEN UNDERTAKEN IN ACCORDANCE WITH AS 3500.1, THE BCA AND THE PROJECT DOCUMENTATION.
- MINIMUM PIPE COVER 300MM. PIPE MUST BE EMBEDDED IN 75MM AND COVERED BY 100MM OF CLEAN SANDY LOAM MATERIAL OR 10MM AGGREGATE.
- **MINIMUM PIPE GRADIENTS:**

PIPE SIZE	MIN GRADIENT
100MM	1:100
150MM	1:100
225MM	1:200

BEDDING HAUNCH AND OVERLAY ZONES
SHALL BE 10mm CRUSHED ROCK WELL
TAMPED AND AT OPTIMUM MOISTURE CONTENT.

PIPE DIA 'D'	W	X MIN	Y
100-150	300	75	75
225-300	600	75	75

MEGAFLOW 170 PROVIDES PLANAR
FLOW OF 25L/M AT 0.01 GRADIENT
AND 200KPA OF CONFINING
PRESSURE INSTALLED HORIZONTALLY

B
SO2

SECTION B. BASEMENT RETAINING
WALL DRAINAGE & SW CONTROL.

Scale 1:50

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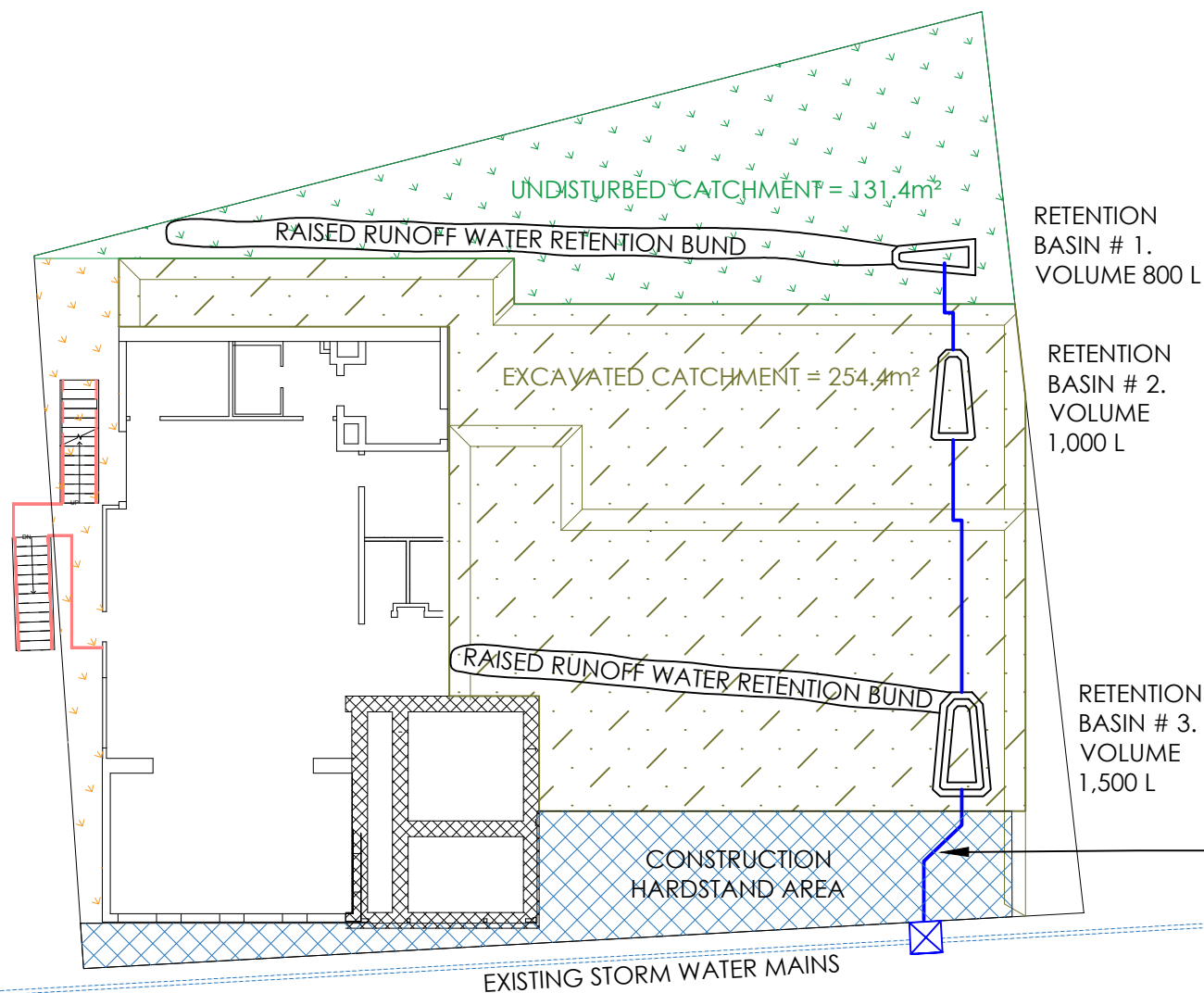
Project: NAVY LODGE THREDBO - SMP
32 BOBUCK LANE
THREDBO NSW 2625
Client: RAN THREDBO Ph.

Draftsman: PAUL LARKIN
Contact: 0429 071 387
Checked: TEA DATE: 12/02/24

Drawing Title:
STORM WATER CONTROL DETAILS AND NOTES
Drawing Number: H03 Revision: A Sheet 3 of 4

SIZE: A3
SCALE: 1 : 100

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DN100 uPVC DISCHARGE PIPE SET 500mm ABOVE THE BASE OF RETENTION BASIN # 3. DISCHARGE TO NEW 900 x 900 IN LINE STORM WATER MAINS PIT UNDER CONSULTATION WITH THE APPROPRIATE AUTHORITIES. SITE IS SERVICED BY AN EXISTING DN150 uPVC STORMWATER MAINS, DISCHARGE CAPABILITY OF 19.6L/s AT 1:100 GRADE

Detention Volume, m³ = 0.83 m³

Check: PASS

Detention Volume = (Q₂₀ - Q₅) × t_c × 0.06

Check: Q₁₀₀ - Q₂₀ + Q₅ ≤ Q₁₀₀

AASHTO (1991) Storage Volume Method

$$\frac{V_s}{V_r} = 1.29 \frac{\left(1 - \frac{Q_A}{Q_p}\right)^{0.153}}{\left(\frac{t_b}{t_p}\right)^{0.411}} \quad \text{where } t_b = 2t_p - \frac{0.05Q_p}{Q_p}$$

For Ø100 uPVC pipe, estimated maximum outflow = 1.1 L/s

For Ø100 uPVC discharge pipe, estimated maximum outflow = 1.1 L/s

For Ø150 uPVC mains inlet pipe, estimated discharge capacity = 19.6 L/s

- EXCAVATED SITE CATCHMENT AREA
- PERVIOUS CATCHMENT AREA
- PAVED AREA ADJACENT BOBUCK LANE, NOT CONTRIBUTING TO CATCHMENT
- UN TOUCHED SITE PERVIOUS AREA, NOT CONTRIBUTING TO CATCHMENT

1 : 20 ARI Design Flow (Q₂₀): 2.09 L/s
1 : 100 ARI Design Flow (Q₁₀₀): 3.30 L/s
1 : 5 ARI Design Flow (Q₅): 1.35 L/s
Overland flow length, L = 15 m
Overland flow roughness coefficient, N = 0.02
Rainfall intensity, i = 0.0021 m/min
Average overflow land slope, S = 2.22 ratio
Time of concentration, t_c = 4 min

$$Q = \frac{(C_r A_r + C_i A_i + C_p A_p)^{1/4}}{3600}$$

$$t_c = \frac{0.93 L^{0.6} N^{0.6}}{i^{0.4} S^{0.3}}$$

Detention Volume, m³ = 0.83 m³

Check: PASS

Detention Volume = (Q₂₀ - Q₅) × t_c × 0.06

Check: Q₁₀₀ - Q₂₀ + Q₅ ≤ Q₁₀₀

RECOMMENDATION: CONSIDERING THE SMALL VOLUME OF STORM WATER COLLECTED AND MINIMAL OUTFLOWS EXPECTED, AN UNLINED DETENTION SYSTEM IS CONSIDERED ADEQUATE AND THE RESIDUAL VOLUMES SHOULD BE ALLOWED TO PERCOLATE THROUGH THE EXCAVATED SOILS

CONSTRUCTION SITE RUN OFF - OUTPUT TABLES

1 : 20 ARI		126 mm/h Rainfall Intensity	
Catchment	Area m ²	Runoff Coefficient	Design Flow L/s
Undisturbed Catchment	131.4	0.15	0.71
Excavated Catchment	254.4	0.15	1.38

Total: 2.09

1 : 100 ARI		174 mm/h Rainfall Intensity	
Catchment	Area m ²	Runoff Coefficient	Design Flow L/s
Undisturbed Catchment	131.4	0.18	1.12
Excavated Catchment	254.4	0.18	2.17

Total: 3.30