

ON SITE DETENTION - TRIANGULAR HYDROGRAPHS

Rainfall Grid Reference : JAMBEROO R
Catchment Area (m^2) : 14751
Impervious Area Pre Dev (%) : 1
Impervious Area Post Dev (%) : 4
Draining Through OSD (%) : 100
Gutter Flow (mins) : 0.0

Length (m) Slope (%) Roughness
226.0 30.00 0.150

ARI (yrs)	Pre-Development Tc(min)	C	I	Qpre L/s	Post Development Tc(min)	C	I	Qout(L/s)	Basin Vol(m^3)	Limiting Q used
1	14	0.57	83	191	5	0.57	125	191.4	29.7	
2	12	0.60	115	276	5	0.61	160	276.3	35.0	
5	11	0.67	152	415	5	0.68	199	415.0	40.1	
10	10	0.71	177	502	5	0.71	222	501.5	42.1	
20	10	0.74	203	617	5	0.75	252	617.2	44.6	
50	9	0.81	245	906	5	0.82	291	806.1	48.8	
100	9	0.85	271	944	5	0.85	320	944.1	50.5	

RARE OUTPUT NEW TOP DAM FOR OSD

BOTTOM DAM OSD CALCULATIONS

% through OSD = 100%

OSD area (area of dam) = 3628 m^2

Increase in 5yr Vol = 121 m^3

Increase in 100yr Vol = 123 m^3

See flood study document for full catchment details and calcs

Height of 100 yr increase = 123/3628 = 33.9mm (35mm)
A 100mm freeboard will also be provided.

Therefore the dam banks will be raised by 0.135m and a new weir will be designed and detailed at the CC stage.

NEW TOP DAM OSD CALCULATIONS

A new dam will be constructed and a weir provided for the 100yr volume and flow. The dam will act as an OSD for the top portion of the dam

% through OSD = 100%

OSD area = 243 m^2

100yr Vol = 50.5 m^3

100yr Q = 944.1 L/s

100yr Height = 0.356 m

100yr Weir Calculations

100yr Weir depth = 0.356 m

100yr Weir length = $Q/1.7d^{1.5}$
= 1.137 m

PRELIMINARY GROSS POLLUTANT TRAP SIZING

All gross pollutant traps will be Rocla CDS units. See attached brochure for product details. Preliminary sizing has been based on catchment area and will be confirmed at the CC stage by Rocla.

GPT 1:

- Catchment area = 9,644 ha

- CDS unit no. = CDS1012

JIM'S DAM OSD CALCULATIONS

Volume of dam being removed for new carpark = 930 m^3

Increase in Jim's Dam banks for this volume = $930/3418 = 272.1\text{mm}$ (275mm)

% through OSD = 100%

OSD area (area of dam) = 3418 m^2

Increase in 5yr Vol = 2194 m^3

Increase in 100yr Vol = 4086 m^3

See flood study document for full catchment details and calcs

Height of 100 yr increase = $4086/3418 = 1196\text{mm}$ (1200mm)
A 500mm freeboard will also be provided.

Therefore the dam banks will be raised by a total of 1.700m.

Broad Crested Weir Calc (100yr)

$Q = 1.704LH^{3/2}$

Q = Pre developed outflow of eastern catchment -
Post developed stormwater collected by sub-catchment 1G
= 28.80 - (29.662-29.448)
= 28.58 m^3/s

H = 1.200m

Solving for L

$L = Q/1.704H^{3/2}$

= 12.759m (12.800m)

Check 5yr

H = 0.645m

L = 12.800m

Solving for Q

$Q = 1.704LH^{3/2}$

= 11.30 m^3/s (OK <13.91m^3/s)

Therefore a broad crested weir will be constructed 12.80m wide x 1.700m deep.

File Line No. 0

I 2yr 1hr	52.00
I 2yr 12hr	11.25
I 2yr 72hr	4.00
I 50yr 1hr	118.00
I 50yr 12hr	27.50
I 50yr 72hr	9.70
F2	4.28
F50	15.80
G	0.00
C10	100.00
Zone	1.00
Annual Rain	900.00
PMP Co-eff.	0.66
Zone	B
Elevation	B
State	NSW
Terrain	S

INPUT DATA

See Kangaroo Island Stormwater Drainage Layout

See Carpark Stormwater Drainage Layout

CONCEPT DRAINAGE MASTERPLAN

SCALE - 1:2000

NOTES:

- Set out all buildings and driveways from Architectural Plans.

- Any pipe not specified shall be 100mm dia. at a minimum grade of 1.00%

LEGEND.

- - - = New Stormwater drainage pipes for Kangaroo Island
- - - = New Stormwater drainage pipes for Overflow Carpark
- - - = Existing Stormwater drainage pipes
- ← $Q = 1.46 \text{ l/s} = 1 \text{ in } 20\text{Yr}$ flowrates.
- = Grated inlet pits

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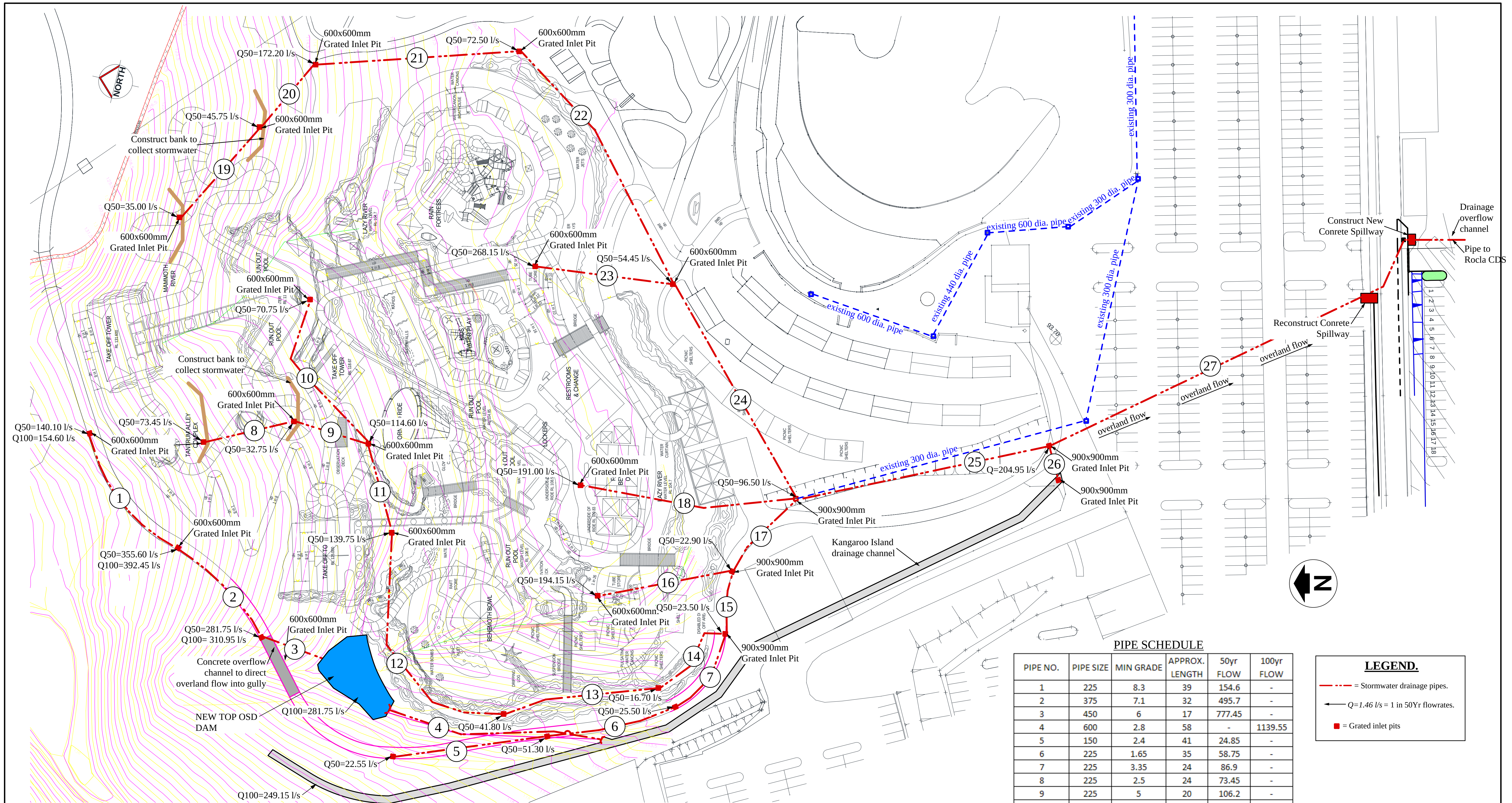
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Proposed Water Park Extensions.
Stormwater Drainage.
For: Mr. Eddy.
At: Jamberro Recreation Park.

REVISIONS:

Date: 29/6/10	Designed: G.M.	Job Number: 20050096.18-GME
Drawn: S.D.	Checked:	Scale: As Shown
		Sheet 1 of 5



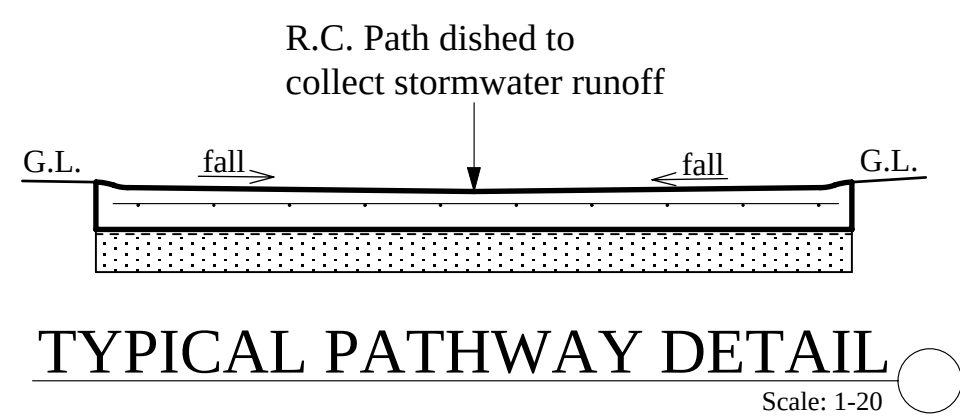
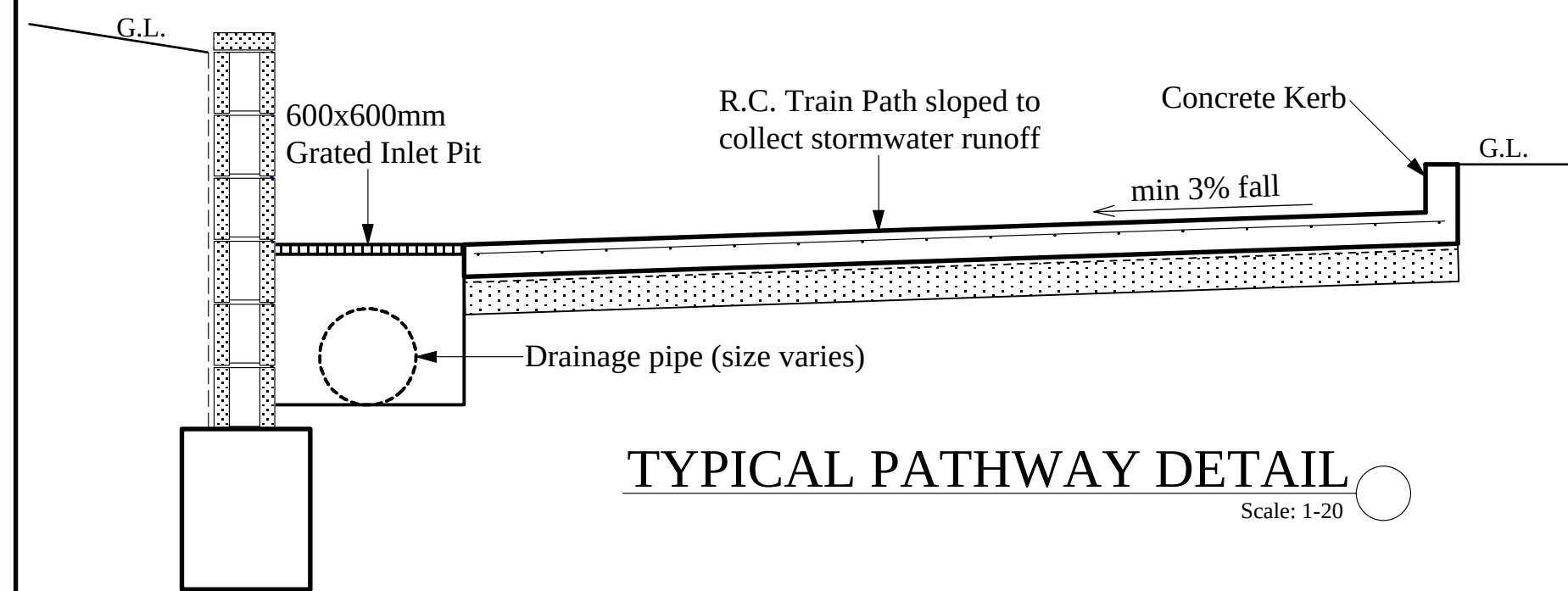
NOTE: Detailed pipe layout & sizing for drainage of area bounded by the lazy river will be completed at cc stage.

KANGAROO ISLAND CONCEPT STORMWATER DRAINAGE LAYOUT

SCALE - 1:500

NOTES:

- Set out all buildings and driveways from Architectural Plans.
- Any pipe not specified shall be 100mm dia. at a minimum grade of 1.00%
- All pipes for Kangaroo Island have been design for the 1 in 50yr storm event.



PIPE SCHEDULE

PIPE NO.	PIPE SIZE	MIN GRADE	APPROX. LENGTH	50yr FLOW	100yr FLOW
1	225	8.3	39	154.6	-
2	375	7.1	32	495.7	-
3	450	6	17	777.45	-
4	600	2.8	58	-	1139.55
5	150	2.4	41	24.85	-
6	225	1.65	35	58.75	-
7	225	3.35	24	86.9	-
8	225	2.5	24	73.45	-
9	225	5	20	106.2	-
10	225	2.25	42	70.75	-
11	375	2.4	24	291.55	-
12	375	5.55	68	431.3	-
13	450	2.25	41	473.1	-
14	450	2.65	25	491.5	-
15	450	3.55	16	604.35	-
16	300	3.7	36	194.15	-
17	450	7.1	26	821.4	-
18	300	3.7	57	191	-
19	150	4.75	32	35	-
20	225	2.85	22	80.75	-
21	300	6.2	54	252.95	-
22	375	2.9	75	325.45	-
23	375	2	37	268.15	-
24	450	4.35	66	648.05	-
25	600	6.7	69	1766.95	-
26	600	3.7	9	-	1388.7
27 Pipe	675	5.5	112	-	2300
27 Overland	-	5	-	-	1257.6

LEGEND.

- - - = Stormwater drainage pipes.
- ← $Q=1.46 \text{ l/s} = 1 \text{ in } 50\text{Yr flowrates.}$
- = Grated inlet pits

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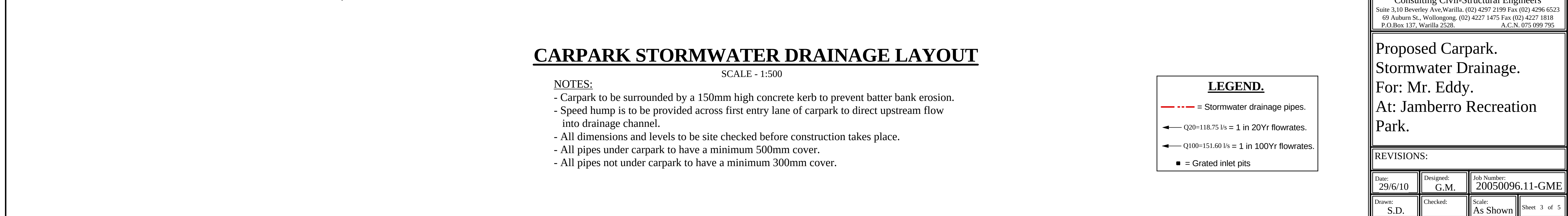
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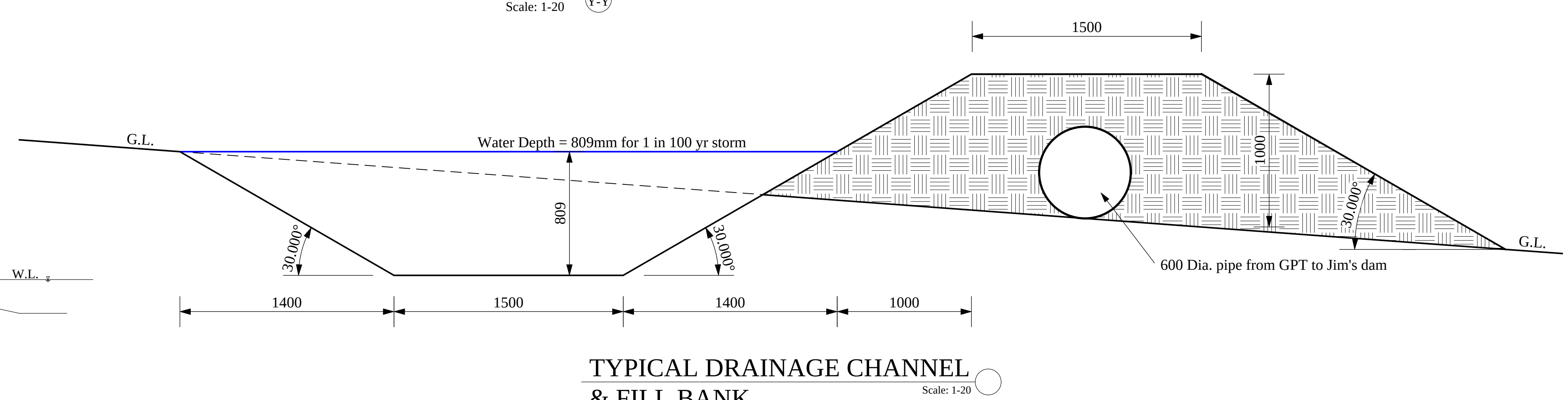
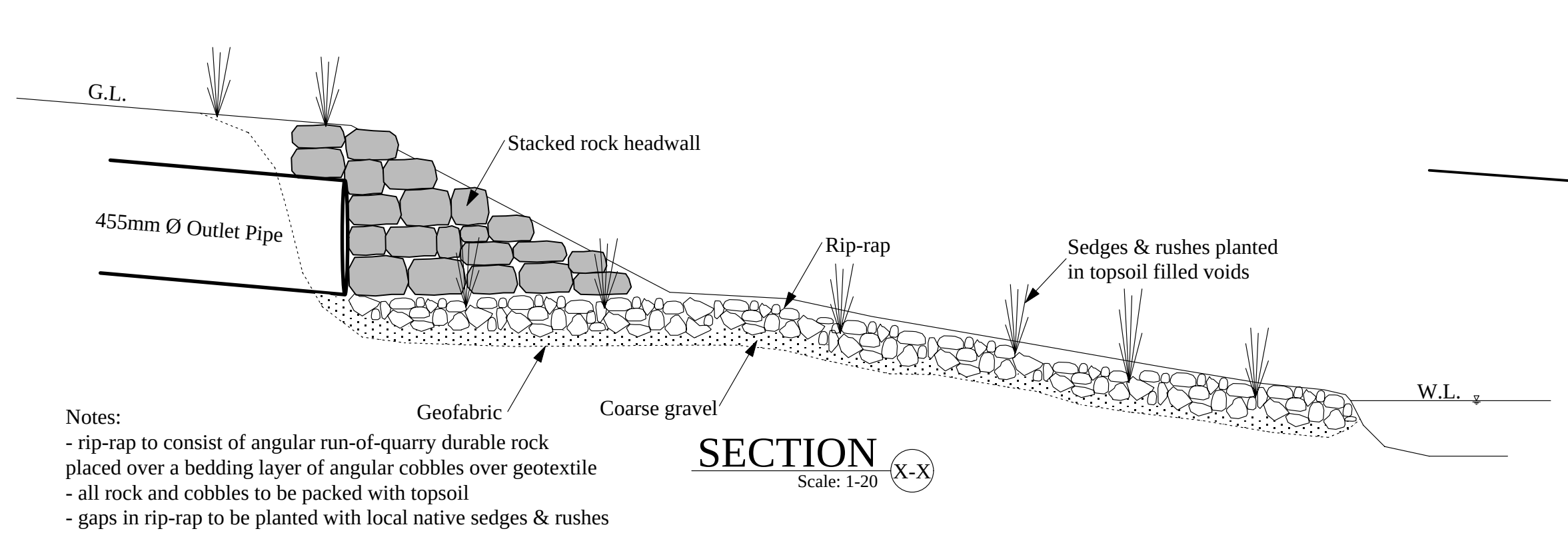
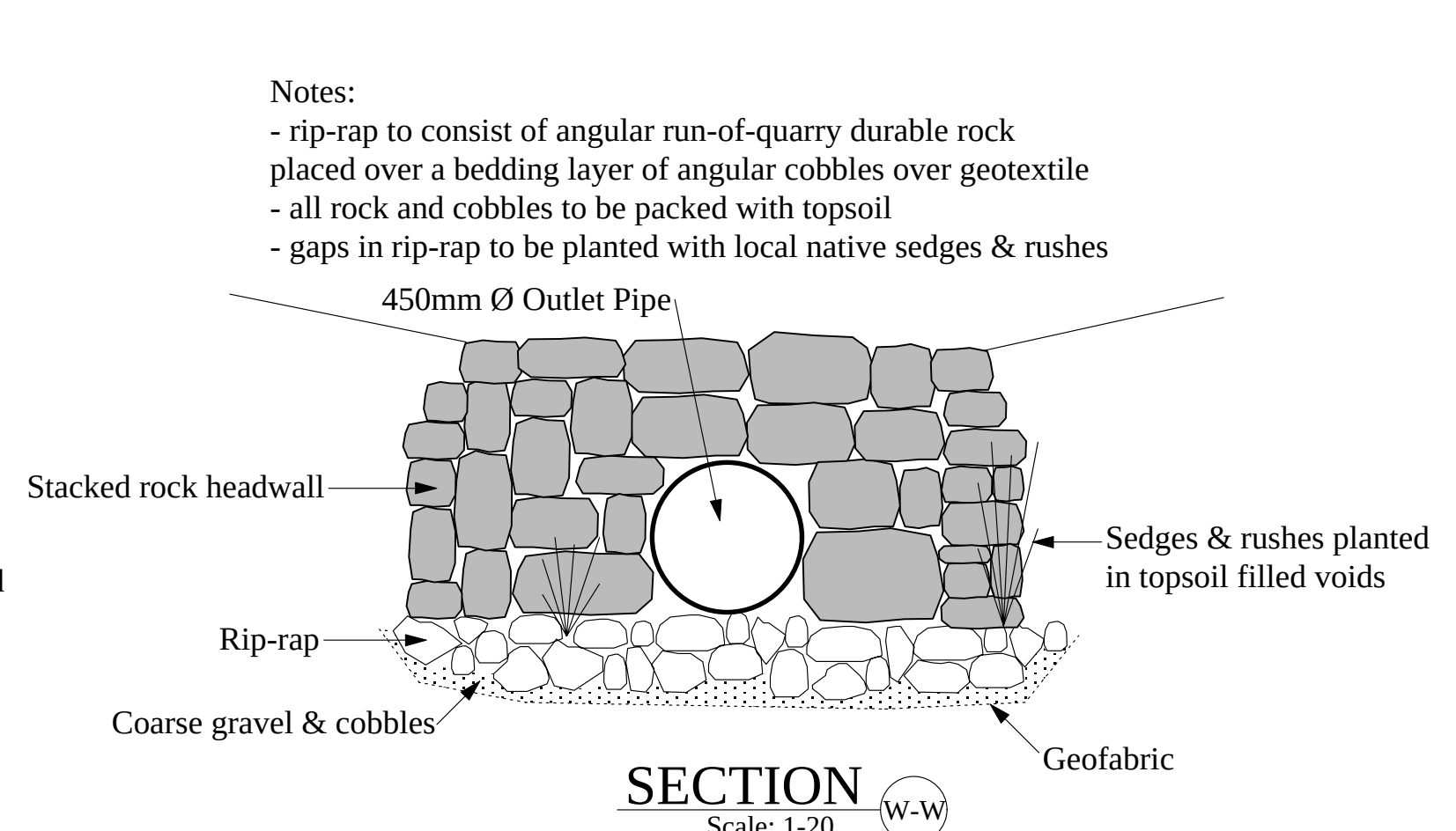
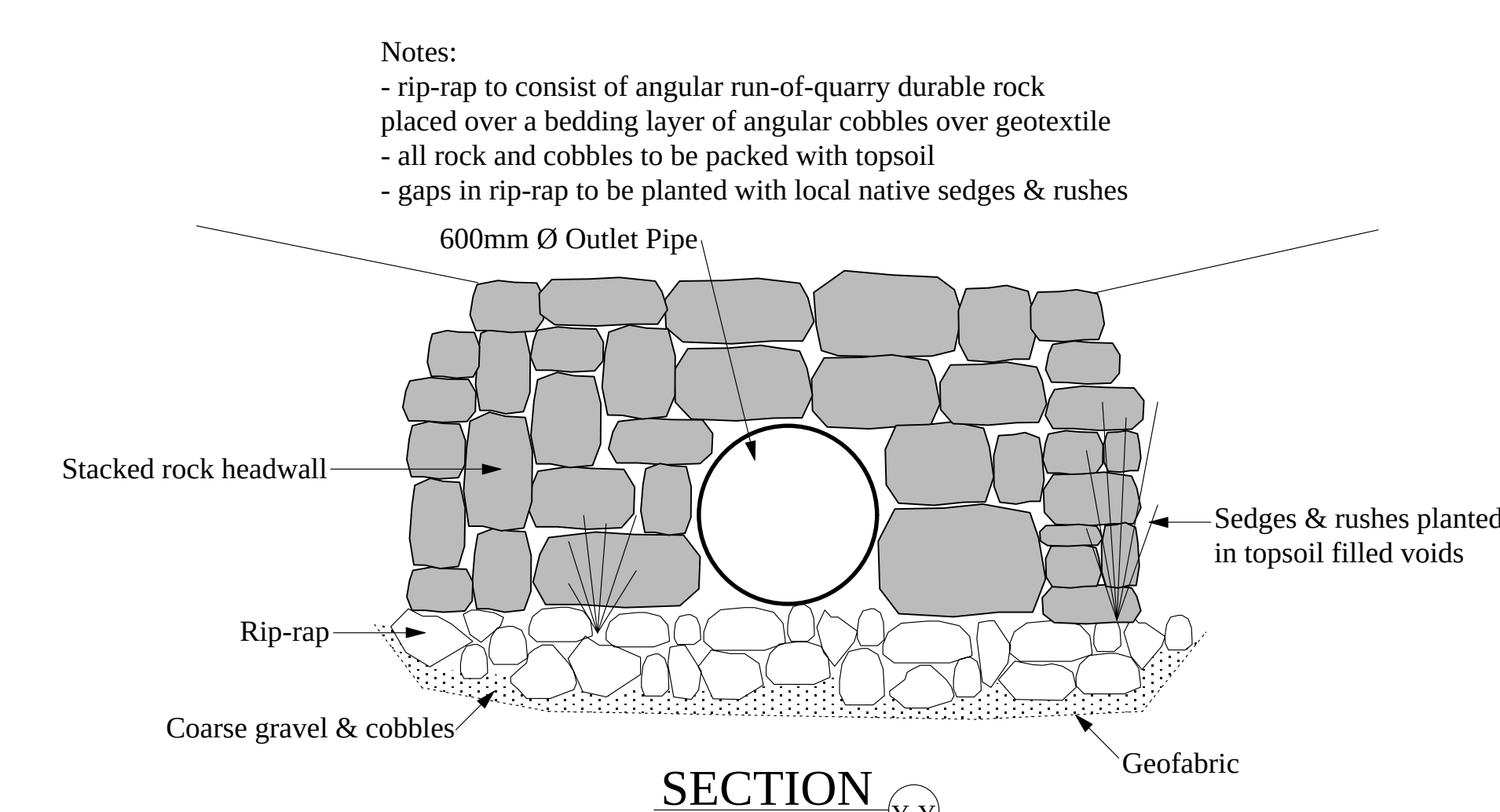
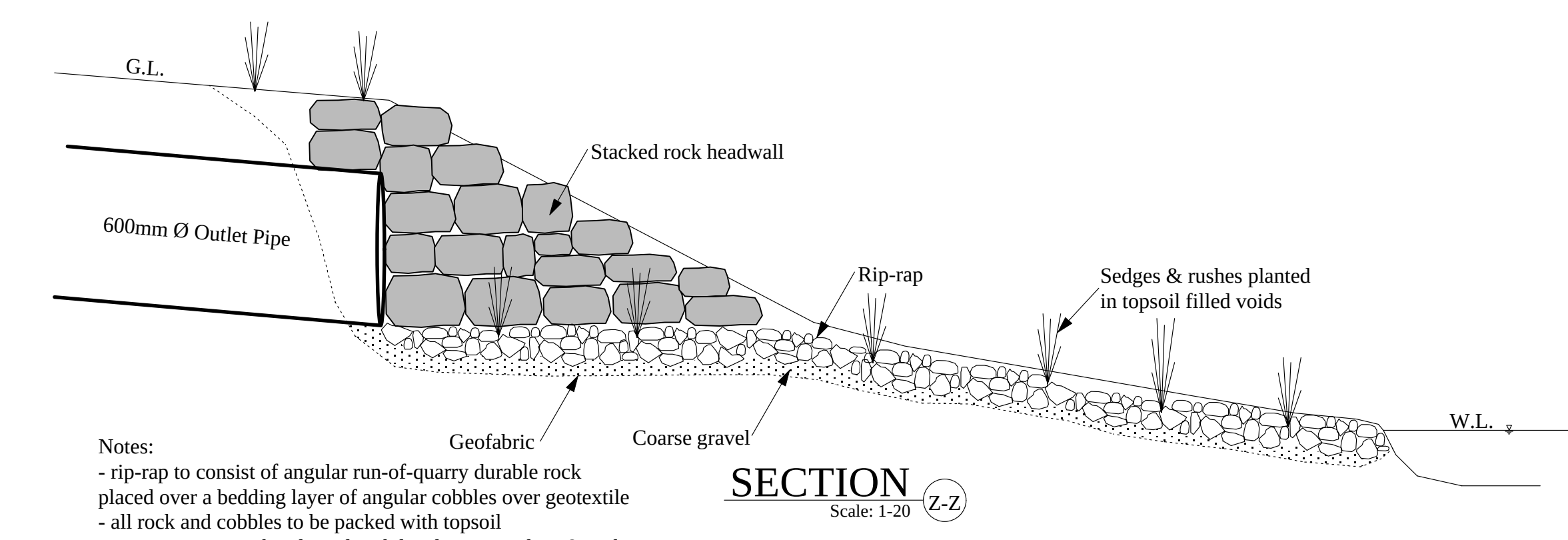
NOTES:

- Stormwater pipes 26-39 have been designed for the 1 in 100yr storm to ensure the majority of the new parking area is directed to Jim's Dam which is be modified to act as an OSD above the existing storage level.



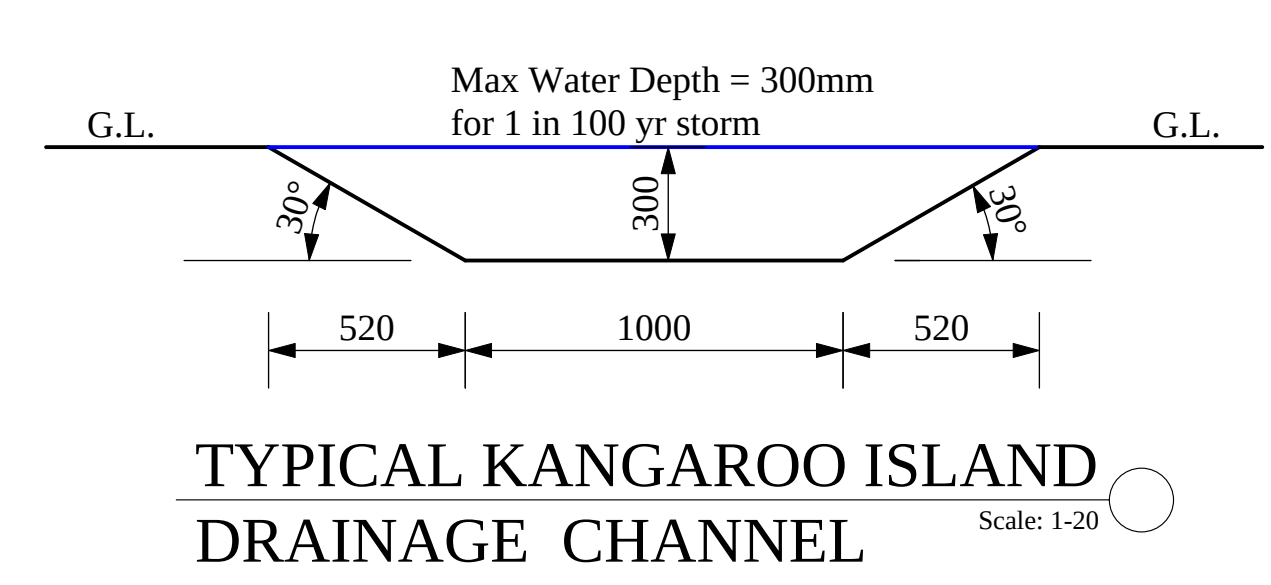
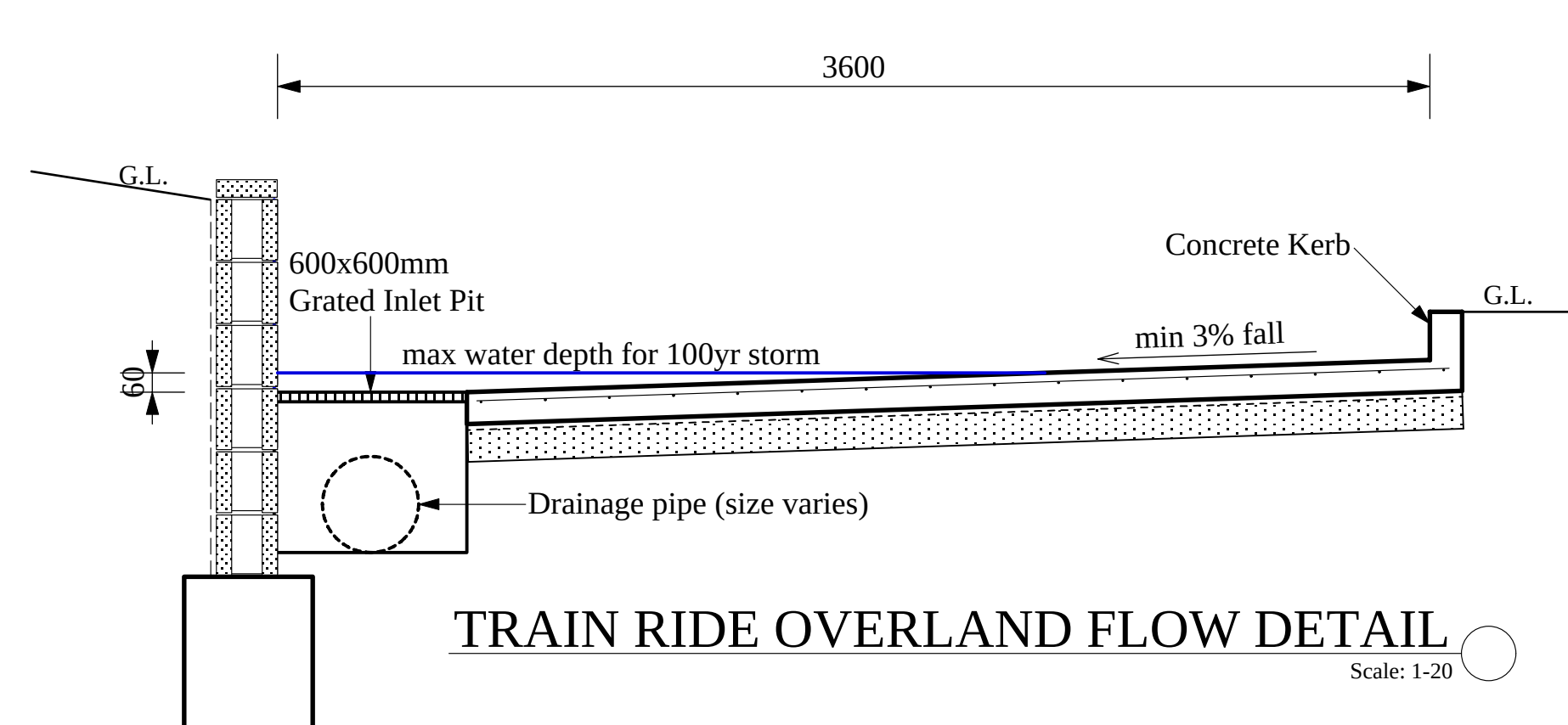
Proposed Carpark.
Stormwater Drainage.
For: Mr. Eddy.
At: Jamberro Recreation
Park.

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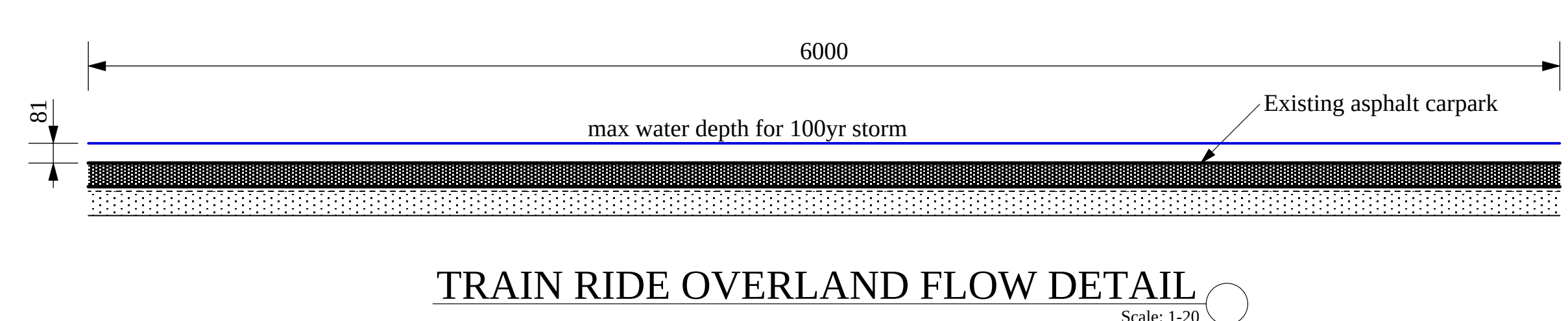
TRAIN RIDE OVERLAND FLOW PATH CALCULATIONS

- Worst case is train ride path behind existing bay view huts.
- 50yr flow = 1766.95 L/s (pipe designed to take this flow)
- Overland flow = 100 yr - 50 yr = 1949.95 L/s - 1766.95 L/s = 183 L/s
- $Q = A \times (((A/P)^{2/3})/n) \times S^{0.5}$
- $n=0.015$, $S=0.07$, $Q=183$ L/s, see flow depth cross section.
- depth of flow = 60.2mm
- velocity = 1.6883 m/s
- depth x velocity = 0.1017
- limiting stability for a child with 0.0602m water depth = 0.173
- $0.1017 < 0.173$. Therefore overland flow on the train ride path is safe for pedestrians in all storms up to and including the 100 yr storm.



EXISTING CARPARK OVERLAND FLOW PATH CALCULATIONS

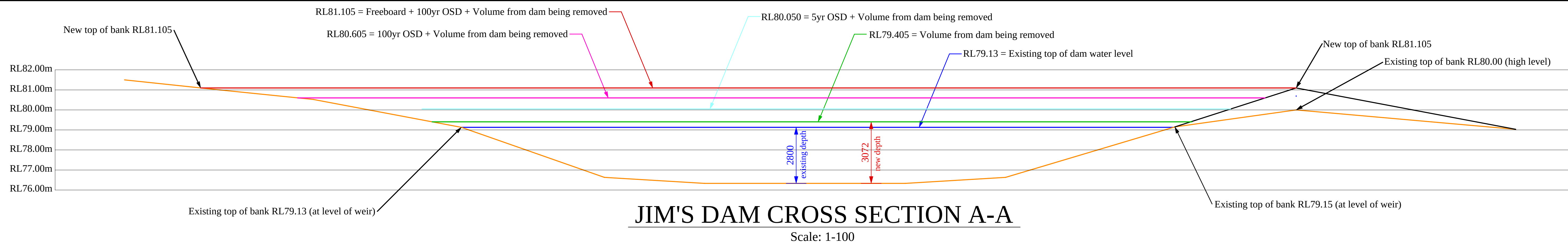
- Assume flow path is 6m wide
- 100yr flow = 3557.60 L/s
- Flow in pipe = 2300 L/s (675 Dia. @ 5.5% grade)
- Overland flow = 100 yr - pipe flow = 3557.60 L/s - 2300 L/s = 1257.60 L/s
- $Q = A \times (((A/P)^{2/3})/n) \times S^{0.5}$
- $n=0.016$, $S=0.05$, $Q=1257.60$ L/s, see flow depth cross section.
- depth of flow = 81mm
- velocity = 2.59 m/s
- depth x velocity = 0.2096
- limiting stability for a child with 0.081m water depth = 0.21
- $0.2096 < 0.21$. Therefore overland flow path across existing carpark is safe for pedestrians in all storms up to and including the 100 yr storm.



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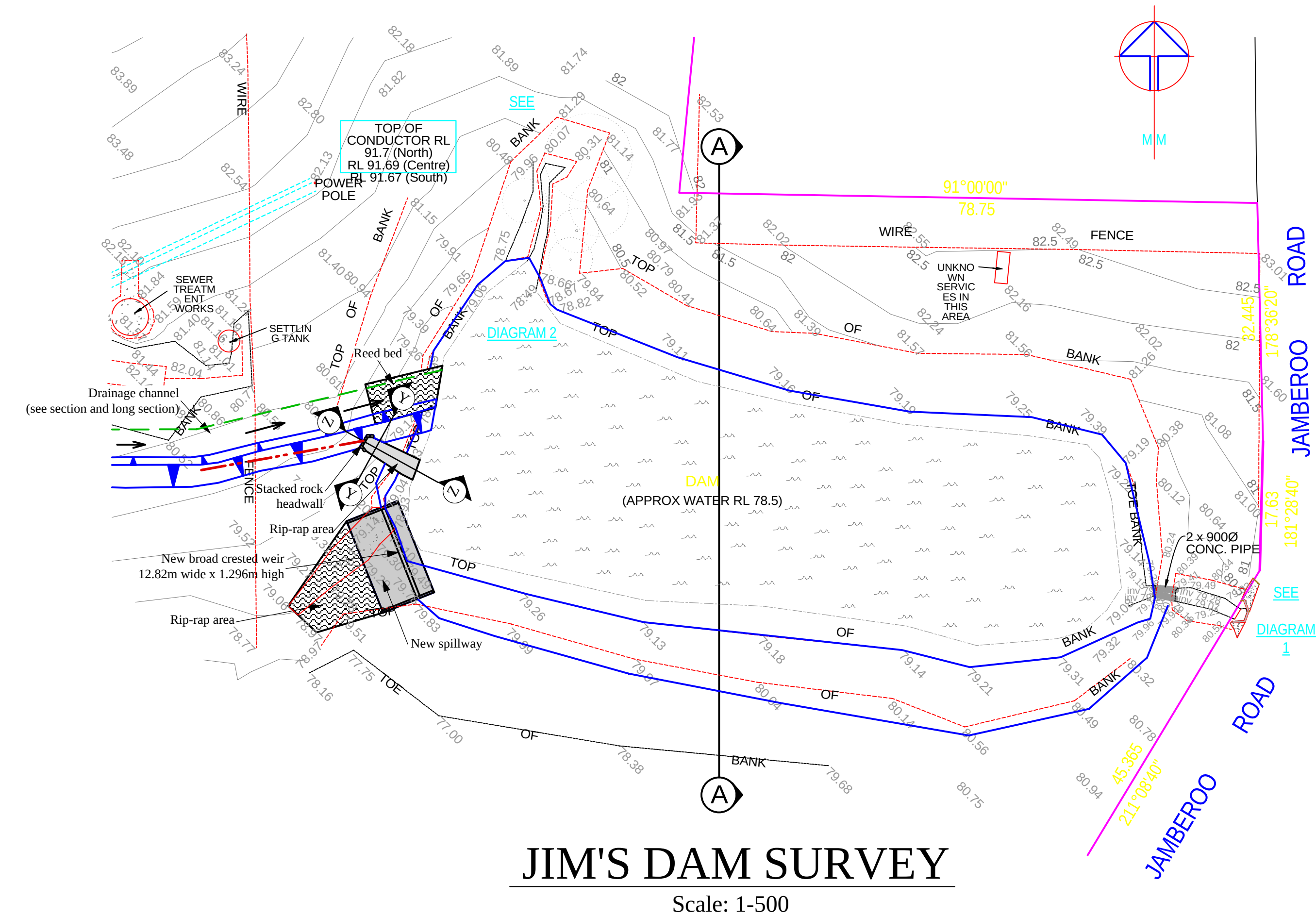
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KANGAROO ISLAND DRAINAGE CHANNEL CALCULATIONS

- Channel dimensions see typical kangaroo island drainage channel cross section
- Flow $Q = 1388.7 \text{ L/s}$
- Channel slope = 7%
- $Q = A \times (((A/P)^{2/3})/n) \times S^{0.5}$
- $n=0.03, S=0.07, Q=1388.7 \text{ L/s}$
- depth of flow = 300mm

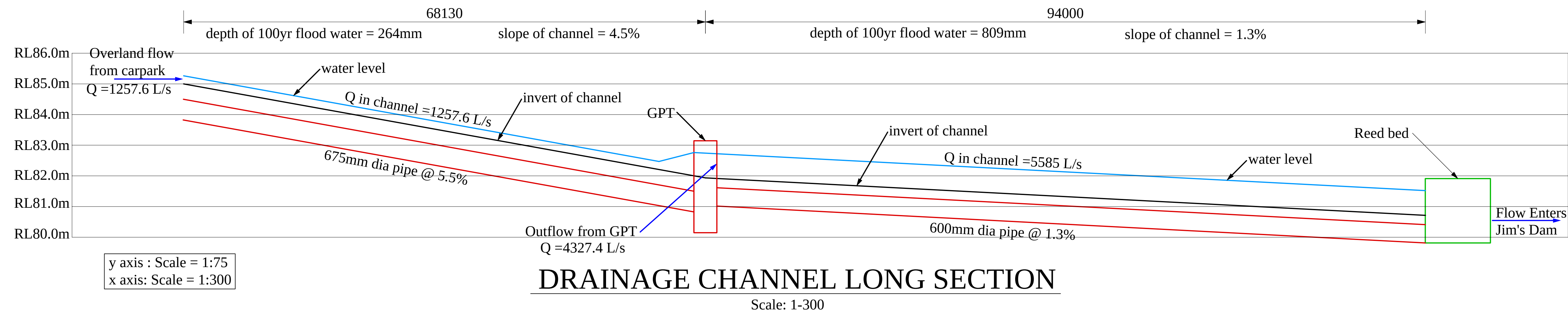
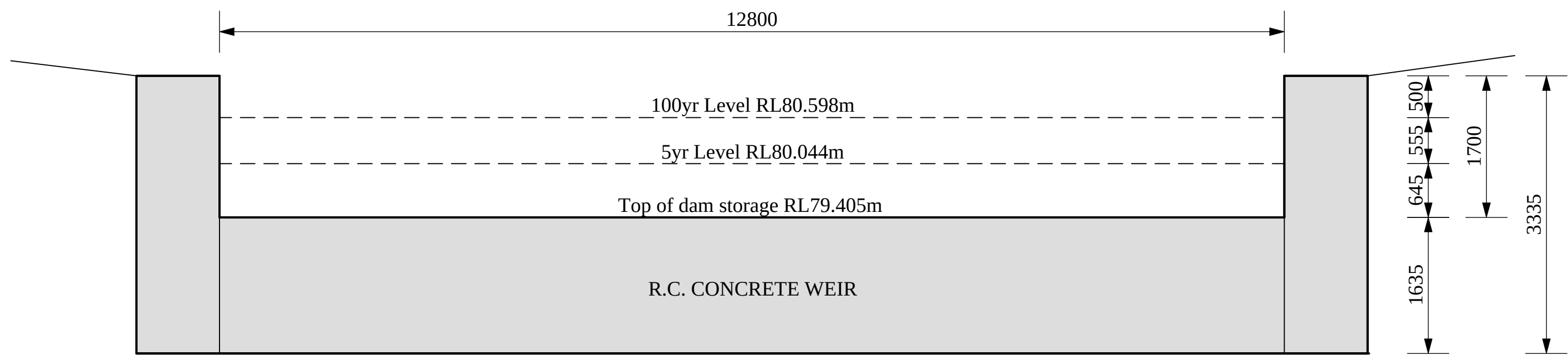


**DRAINAGE CHANNEL CALCULATIONS -
EDGE OF ROAD CARPARK TO GPT**

- Channel dimensions see typical drainage channel cross section
- Flow $Q = 1257.6 \text{ L/s}$
- Channel slope = 4.5%
- $Q = A \times (((A/P)^{2/3})/n) \times S^{0.5}$
- $n=0.03, S=0.045, Q=1257.6 \text{ L/s}$
- depth of flow = 264mm

**DRAINAGE CHANNEL CALCULATIONS -
GPT TO JIM'S DAM**

- Channel dimensions see typical drainage channel cross section
- Flow $Q = 5585 \text{ L/s}$
- Channel slope = 1.3%
- $Q = A \times (((A/P)^{2/3})/n) \times S^{0.5}$
- $n=0.03, S=0.013, Q=5585 \text{ L/s}$
- depth of flow = 809mm



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