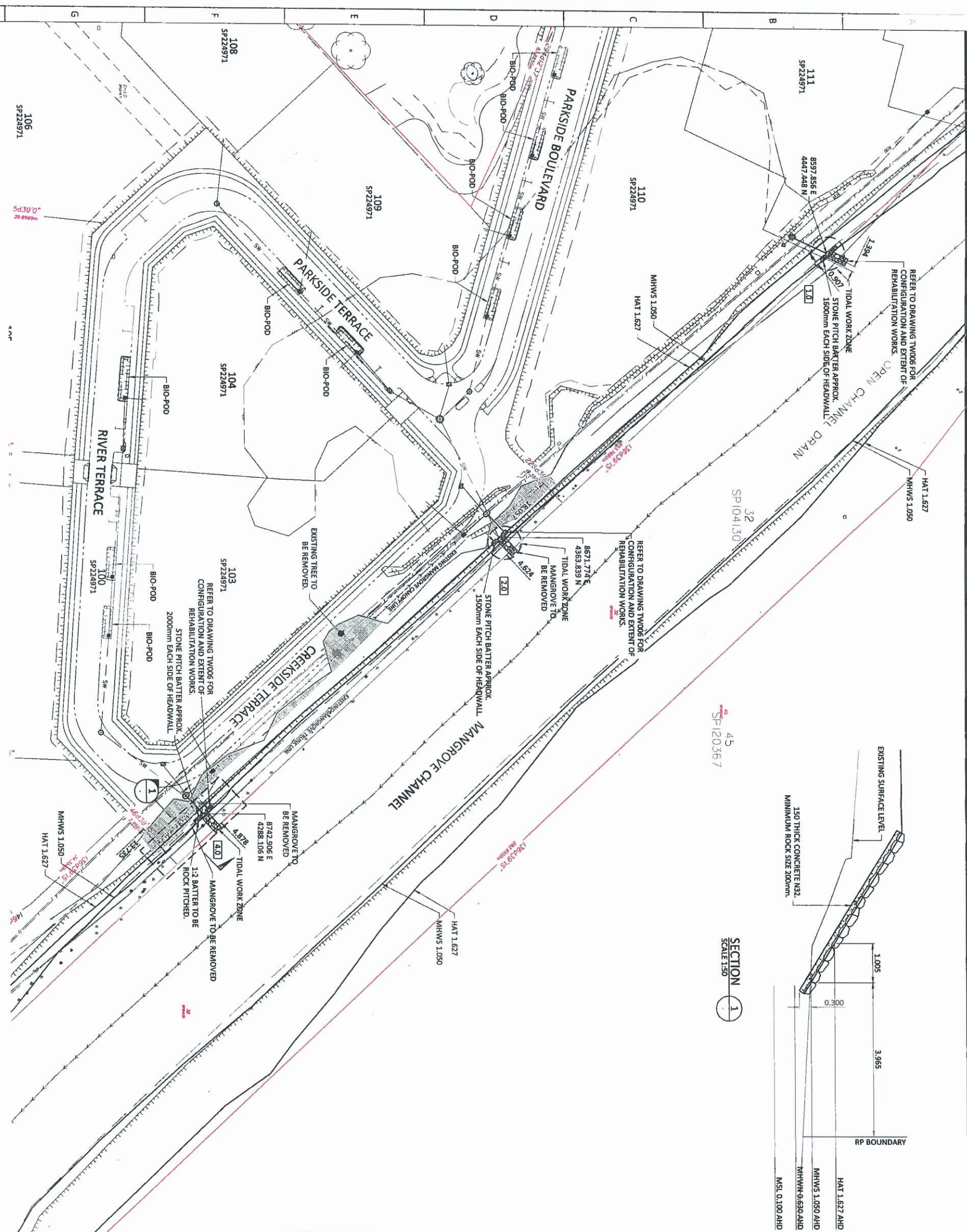


SECTION 1
SCALE 1:50

- LEGEND**
- | | |
|-------------------------|-------------------------|
| EXISTING | PROPOSED |
| PROPERTY BOUNDARY | PROPERTY BOUNDARY |
| DRAINAGE | DRAINAGE |
| ROOFWATER DRAINAGE | ROOFWATER DRAINAGE |
| TABLE DRAIN | TABLE DRAIN |
| MANGROVE LINE | MANGROVE LINE |
| TIDE LEVELS | TIDE LEVELS |
| STONE PITCHING | STONE PITCHING |
| MANGROVES TO BE TRIMMED | MANGROVES TO BE TRIMMED |
| MANGROVES TRUNK SURVEY | MANGROVES TRUNK SURVEY |



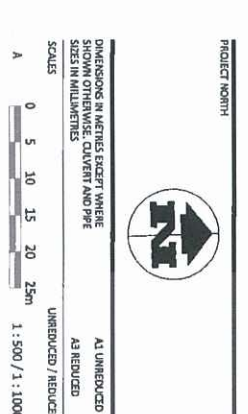
SITE PLAN
SCALE A

NOTE:
TIDAL LEVELS SOURCED FROM MARITIME SAFETY QLD - SEMIDIURNAL TIDAL PLAINES 2011. LOCATION OF MEASURE IS CAIRNCROSS DOCK. (LATITUDE SOUTH, 27 27, LONGITUDE EAST, 153 05).

NOTE:
STORMWATER OUTLETS ARE DESIGNED IN ACCORDANCE WITH BRISBANE CITY COUNCIL AND QUDM REQUIREMENTS.

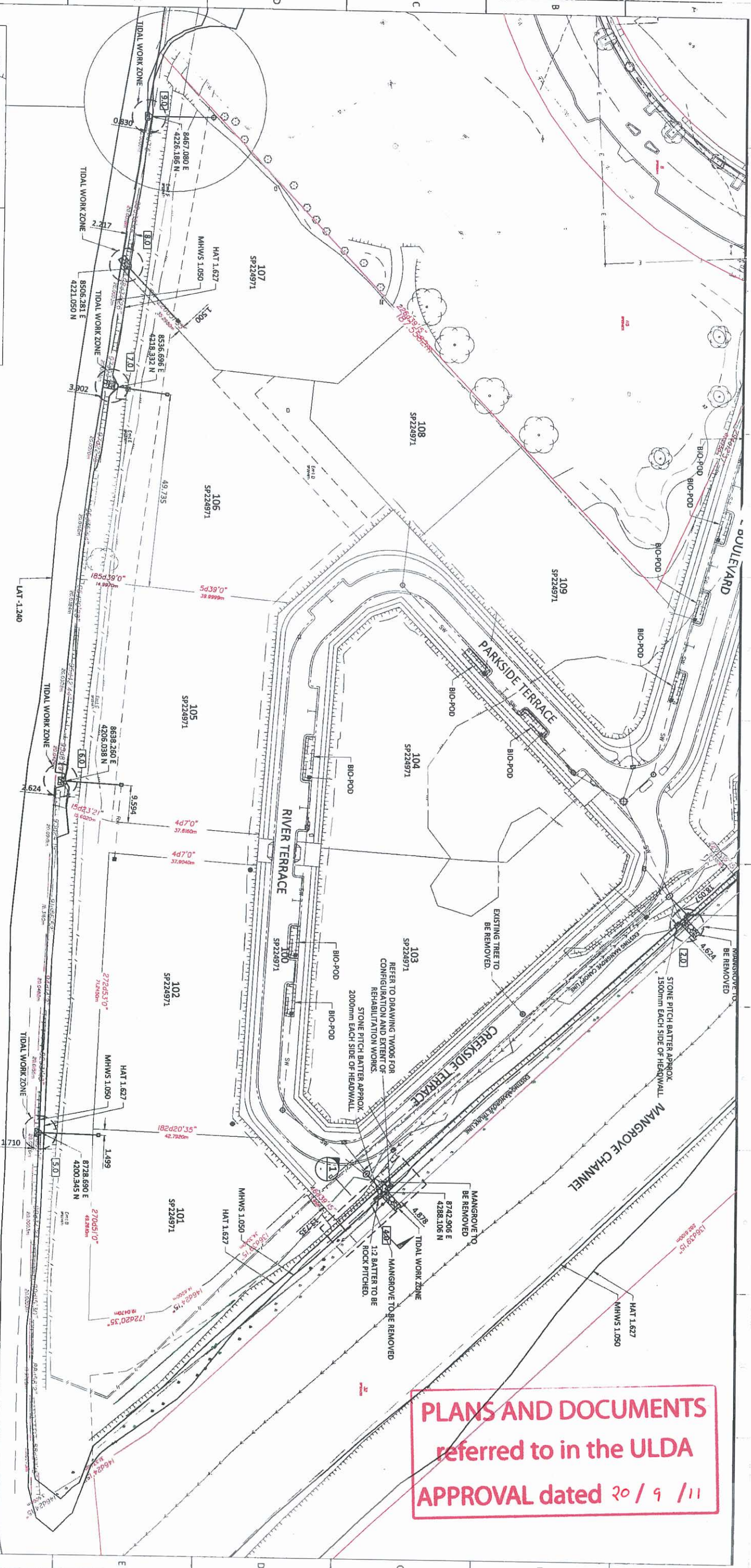
SURVEY CONTROL:	
PSM: 77618	
LEVEL: RL 4.114 AHD	
LOCATION: UNKNOWN	
R.P. DESCRIPTION	
LOTS 100 - 112 ON SP724971	
PARISH OF TOOMBUL	

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 20 / 9 / 11



BORNHORST + WARD CONSULTING ENGINEERS CIVIL AND STRUCTURAL Level 4, 67 Astor Terrace, Spring Hill, QLD 4000	
APPROVED	CHECKED
DATE 30/8	DATE 30/8
ASSOCIATED CONSULTANTS	
PH: 3234 8338 PH: 3234 8338 PH: 3234 8338 PH: 3234 8338 PH: 3234 8338	
DATE 30/8	DATE 30/8
PROJECT	SUBJECT
LOT 100 - NORTHSHORE HAMILTON AUSTRALAND WORKS	TIDAL WORKS MANGROVE CHANNEL
CLIENT	PROJECT NO.
URBAN LAND DEVELOPMENT AUTHORITY	10169B
	DRAWING NO.
	TW002
	REVISION
	D

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 20 / 9 / 11



LEGEND

EXISTING

- PROPERTY BOUNDARY
- DRAINAGE
- ROOFWATER DRAINAGE
- TABLE DRAIN
- MANGROVE LINE
- TIDE LEVELS
- STONE PITCHING
- MANGROVES TRUNK SURVEY

PROPOSED

- PROPERTY BOUNDARY
- DRAINAGE
- ROOFWATER DRAINAGE
- TABLE DRAIN
- MANGROVE LINE
- TIDE LEVELS
- STONE PITCHING
- MANGROVES TRUNK SURVEY

SITE PLAN SCALE A

NOTE:
TIDAL LEVELS SOURCED FROM MARITIME SAFETY QLD
SEMI-DIURNAL TIDAL PLAINES 2011, LOCATION OF
(LATITUDE SOUTH, 27 27, LONGITUDE EAST, 153 05).

NOTE:
STORMWATER OUTLETS ARE DESIGNED IN
ACCORDANCE WITH BRISBANE CITY
COUNCIL AND QUDM REQUIREMENTS.

SURVEY CONTROL:

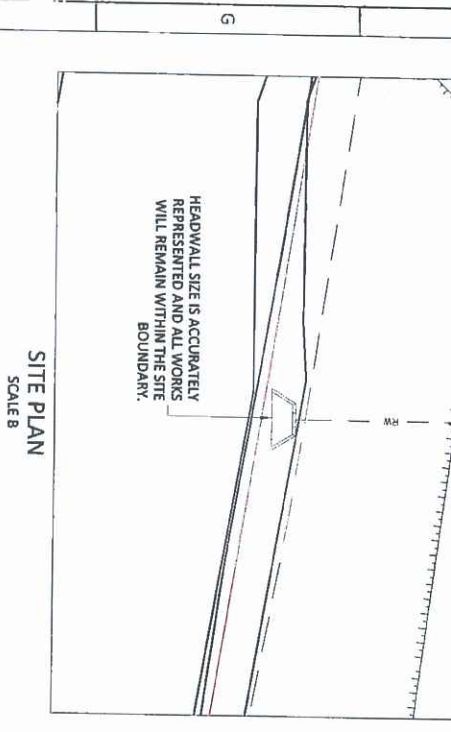
PSM: 77618
LEVEL: RL 4.114 AHD
LOCATION: UNKNOWN
R.P. DESCRIPTION
LOTS 100 - 111 ON SP224971
PARISH OF TOOMBUL

PROJECT NORTH

STATES

0 1.0 2.0 3.0 4.0 5.0m
1:300 / 1:200

SITE PLAN
SCALE B



REVISIONS

REV	DATE	AMENDMENT
D	30.08.11	RE-ISSUE FOR APPROVAL
C	12.08.11	RE-ISSUE FOR APPROVAL
B	28.06.11	REVISED ISSUE FOR APPROVAL
A	23.03.11	ISSUE FOR APPROVAL

ASSOCIATED CONSULTANTS

LAND PARTNERS
PH: 3842 3000
FAX: 3842 3000
WWW.LANDPARTNERS.COM.AU

CONSULTING ENGINEERS
PH: 3842 3000
FAX: 3842 3000
WWW.CONSULTINGENGINEERS.COM.AU

APPROVED
DATE: 30/8/11

CHECKED
DATE: 30/8/11

CLIENT
URBAN LAND
DEVELOPMENT
AUTHORITY

PROJECT
LOT 100 -
NORTHSHORE HAMILTON
AUSTRALAND WORKS

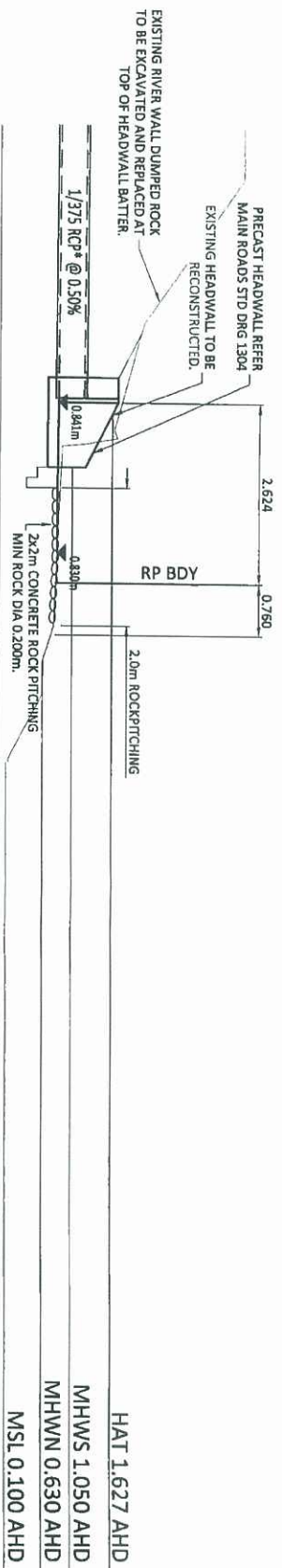
SUBJECT
TIDAL WORKS BRISBANE
RIVER

PROJECT No.
10169B

DRAWING No.
TW003

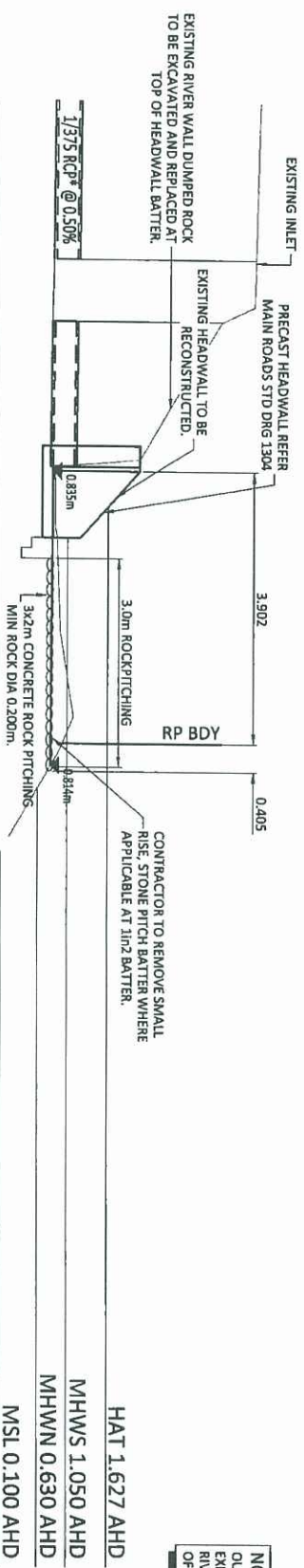
REVISION
D

COMPILOUT B - This document is not valid until it has been signed and sealed in accordance with the provisions of the relevant legislation.				
REV.	DATE	APPROVAL / ISSUE	DES.	CHECK
C	30.08.11	RE-ISSUE FOR APPROVAL		
D	31.08.11	RE-ISSUE FOR APPROVAL		
B	28.06.11	REVISED ISSUE FOR APPROVAL		
A	23.03.11	ISSUE FOR APPROVAL		
			DES.	CHECK
			CHK	APP
ASSOCIATED CONSULTANTS				
RPS GROUP PH: 3845 3200				
ROBIN RUSSELL & ASSOCIATES PH: 3375 5555				
LCCTEL PH: 5451 6906				
APA GROUP PH: 3126 9538				
SOL. SURVEYS PH: 3369 6200				
APPROVED				
CHECKED				
BORNHORST & WARD				
BORNHORST & WARD Pty Ltd Brisbane Australia Phone (07) 3013 4699 Facsimile (07) 3013 4611 mail@bornhorstward.com.au www.bornhorstward.com.au A/CN 1023139-1 A/N 181030139-1				
CONSULTING ENGINEERS				
CIVIL AND STRUCTURAL				
Level 4, 67 Astor Terrace, Spring Hill, QLD 4000				
CLIENT				
URBAN LAND				
DEVELOPMENT				
AUTHORITY				
PROJECT				
LOT 100 -				
NORTHSHORE HAMILTON				
AUSTRALAND WORKS				
SUBJECT				
STORMWATER OUTLET				
DETAILS SHEET 2 OF 2				
PROJECT NO.				
10169B				
DRAWING NO.				
TW005				
REVISION				
D				



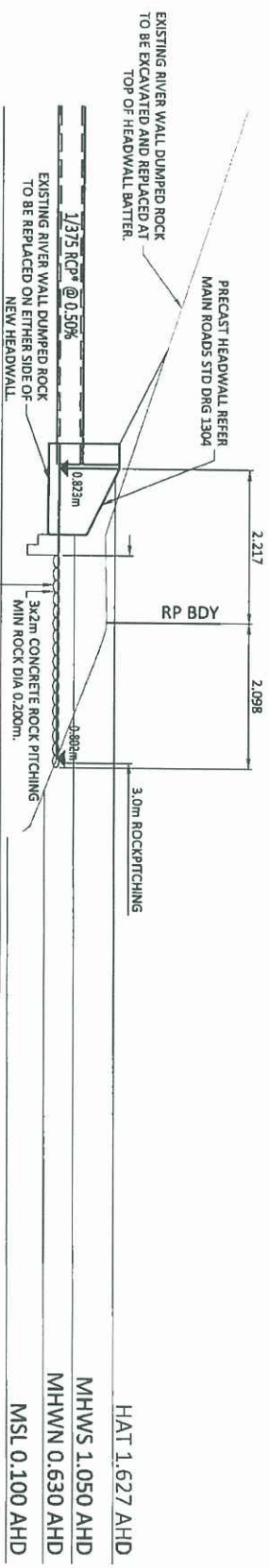
OUTLET DETAIL SECTION

HAT 1.627 AHD
MHWS 1.050 AHD
MHWN 0.630 AHD
MSL 0.100 AHD
LWN -0.450 AHD
LAT -1.240 AHD



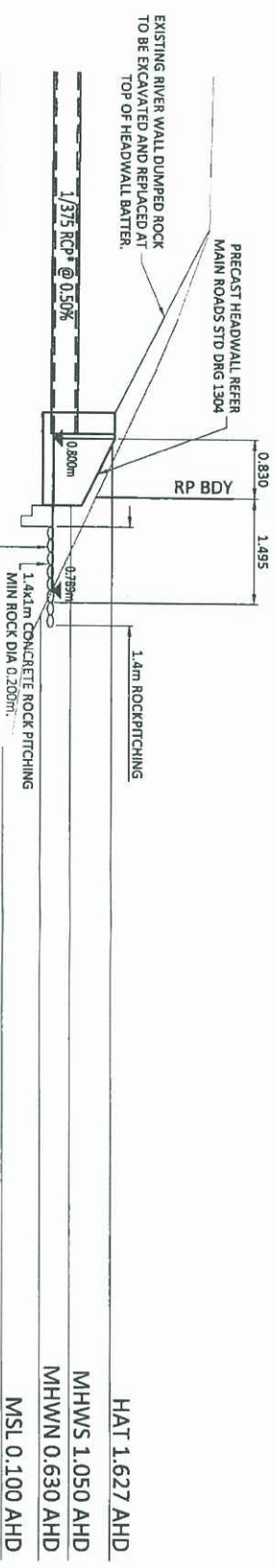
OUTLET DETAIL SECTION

HAT 1.627 AHD
MHWS 1.050 AHD
MHWN 0.630 AHD
MSL 0.100 AHD
MLWN -0.450 AHD
LAT -1.240 AHD



OUTLET DETAIL SECTION

HAT 1.627 AHD
MHWS 1.050 AHD
MHWN 0.630 AHD
MSL 0.100 AHD
MLWN -0.450 AHD
LAT -1.240 AHD



OUTLET PROJECTION DETAIL.

OUTLET DETAIL SECTION 9.0

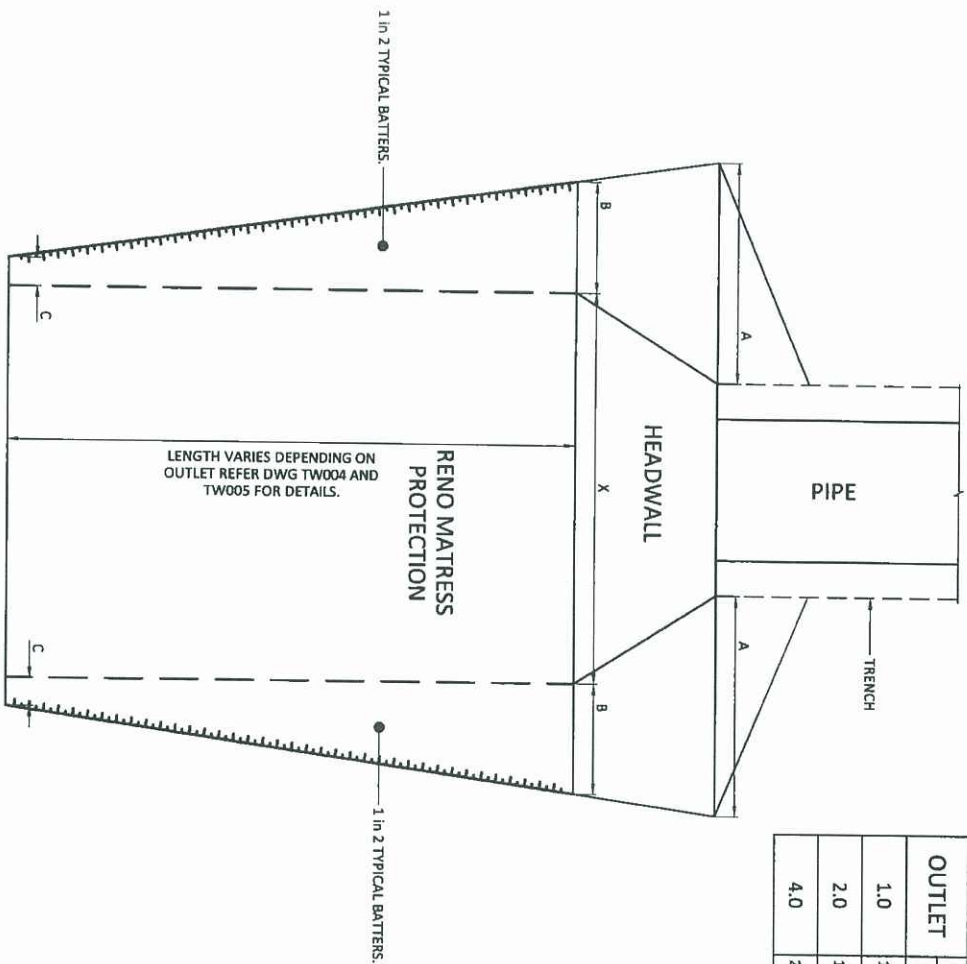
HAT 1.627 AHD
MHWS 1.050 AHD
MHWN 0.630 AHD
MSL 0.100 AHD
MLWN -0.450 AHD
LAT -1.240 AHD

NOTE:
OUTLETS ARE AT THE SAME LOCATION/POSITION AS EXISTING DRAINAGE STRUCTURES INTO BRISBANE RIVER ON OUTLETS 6.0 AND 7.0. REPLACE CONDITION OF EXISTING HEADWALL AND MAKE NEW.

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 20 / 9 / 11

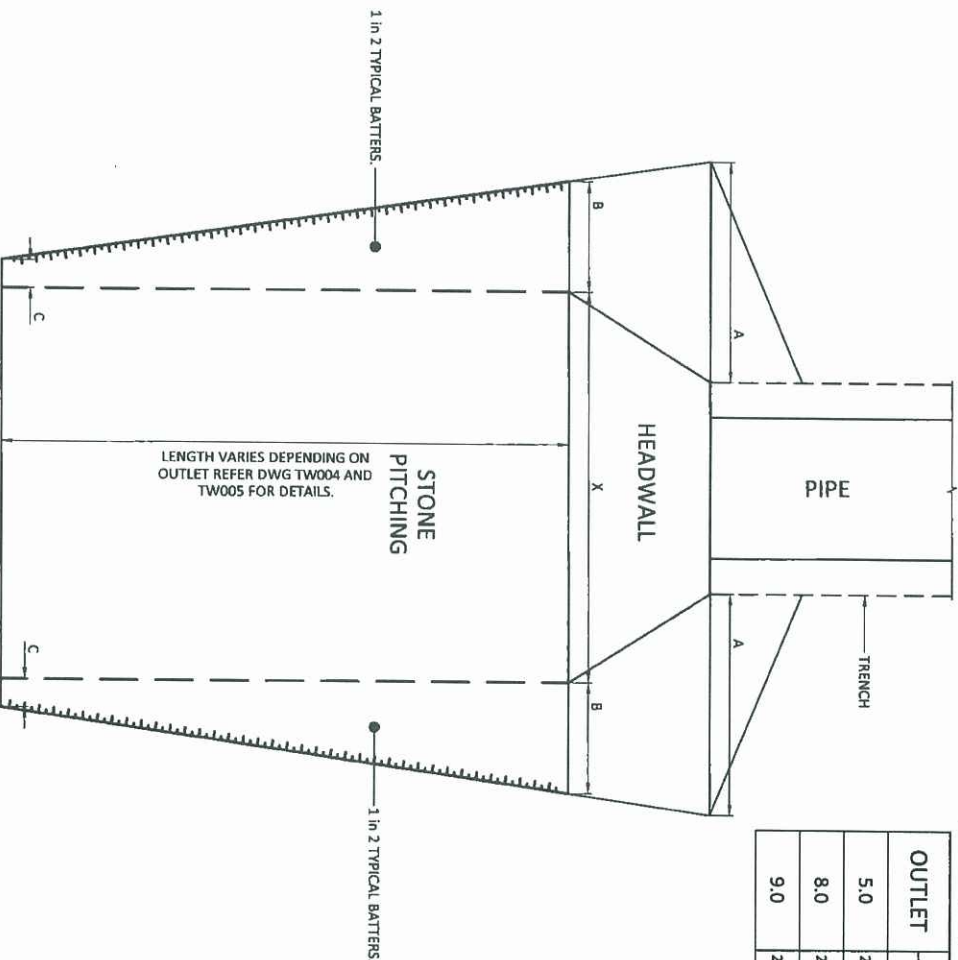
OUTLETS DETAILS DIMENSIONS TABLE

OUTLET	DIMENSIONS(mm)			
	A	B	C	X
1.0	1600mm	1000mm	300mm	975mm
2.0	1000mm	800mm	300mm	800mm
4.0	2000mm	1000mm	300mm	600mm



OUTLETS DETAILS DIMENSIONS TABLE

OUTLET	DIMENSIONS(mm)			
	A	B	C	X
5.0	2200mm	1200mm	100mm	800mm
8.0	2400mm	1600mm	100mm	600mm
9.0	2600mm	1200mm	100mm	600mm



PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 20 / 9 / 11

TYPICAL MANGROVE CHANNEL OUTLET PROTECTION DETAIL FOR OUTLETS 1,2 AND 4.

NTS

TYPICAL OUTLET PROTECTION FOR RIVER OUTLETS 5,8 AND 9.

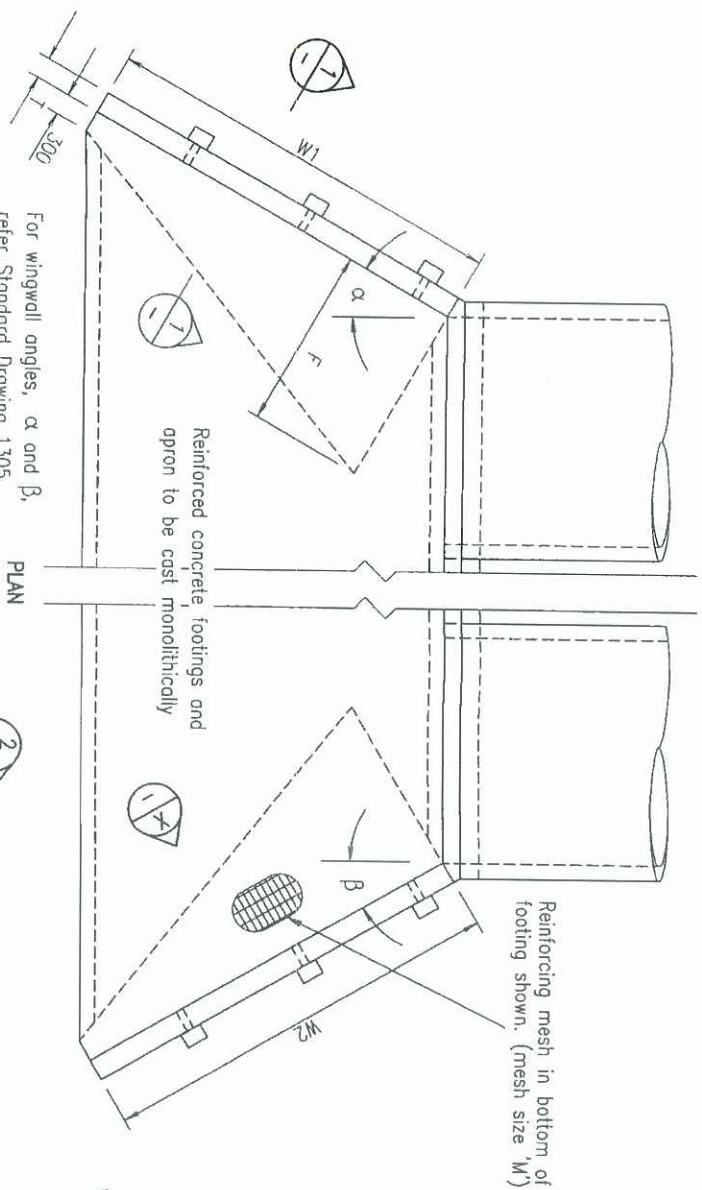
NTS



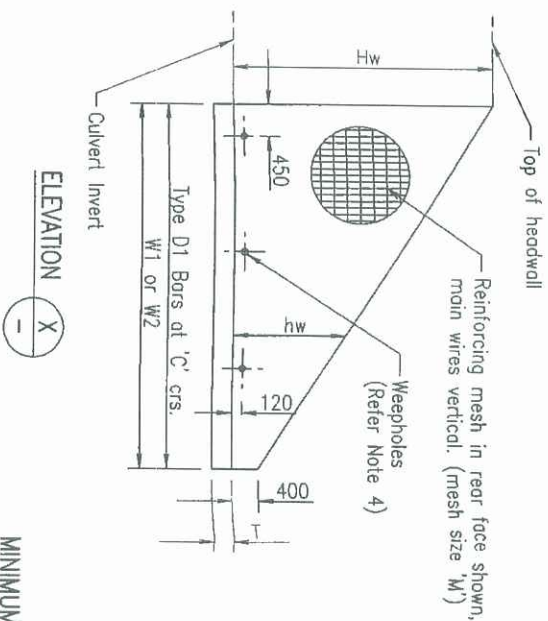
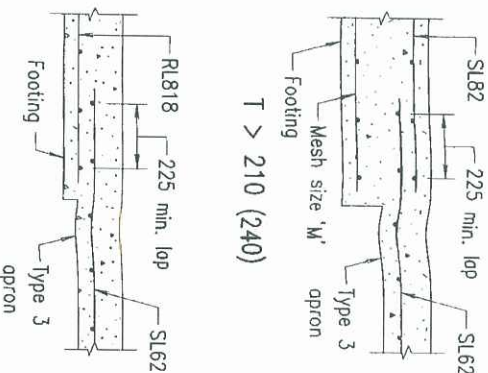
DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CLIENTS AND PRC SIZES IN MILLIMETRES. UNBIDDABLE / REDUCED

PRELIMINARY

REV	DATE	AMENDMENT / ISSUE	BY	CHK	APP	ASSOCIATED CONSULTANTS	APPROVED	CHECKED	BORNHORST + WARD CONSULTING ENGINEERS	CLIENT	PROJECT	SUBJECT	PROJECT NO.
D	30.08.11	RE-ISSUE FOR APPROVAL				LAND PARTNERS			Bornhorst & Ward Pty Ltd	URBAN LAND	LOT 100 -	OUTLET PROTECTION DETAILS	101698
C	12.08.11	RE-ISSUE FOR APPROVAL				ROBIN RUSSELL & ASSOCIATES			Phone: (07) 3013 4695	DEVELOPMENT	NORTHSHORE HAMILTON		
B	28.05.11	REVISED ISSUE FOR APPROVAL				APA GROUP			Facsimile: (07) 3013 4611	AUTHORITY	AUSTRALAND WORKS		
A	23.03.11	ISSUE FOR APPROVAL				SOIL SURVERS			Mobile: 0420 221 224				



WING WALL FOOTING – TYPE 3 APRON REINFORCEMENT DETAILS



up to Hw†	F	T
1000	210 (240)	210 (240)
1500	210 (240)	210 (240)
2000	0.75 Hw	250 (290)
2500		310 (340)
3000		310 (340)

† where Hw = Internal pipe diameter (d) + pipe thickness (t) + 230

MINIMUM REINFORCEMENT REQUIREMENTS (Refer Note 2)

hw	M	Type D1 Bars			12 dia. Type D2 Bars
		dia.	A	B	
400 – 1000	RL818	12	550	400	200
1001 – 1500	RL818	12	550	400	200
1501 – 2000	RL1018	12	600	400	100
2001 – 2500	RL1018	12	650	400	100
2501 – 3000	RL1218	20	750	500	100

NOTES :

1. CONCRETE
Reinforced concrete class S40/20 (S50/20).
Concrete cover to be S5 (75) unless shown otherwise.
Exposure classification B2.

2. STEEL :
Reinforcing steel to be in accordance with AS/NZS 4671.
Deformed bars – Grade D500N.
Round bars – Grade R250N.
Deformed Wire – Grade D500L.

All reinforcing steel to be ACRS certified.
Steel reinforcement to be read in conjunction with Drg. Nos. 1043 and 1044.
3. AGGRESSIVE ENVIRONMENT – Concrete class, dimensions indicating steel cover and 'T' are shown in brackets for aggressive environment.

4. WEEPHOLES of 90 dia. one to be provided at maximum 1200 crs. in wingwalls. A 300 x 300 x 150 no fines concrete block or approved equivalent is to be provided at each weephole. Location of weepholes is to provide S5 clear cover to wingwall steel.

5. LAPs shall be made so that the two outermost wires of one fabric overlap the two outermost wires of the other fabric being lapped.

6. MESH AND TYPE D1 AND D2 BARS may be varied for the appropriate value of 'hw' used in the lower parts of the wing. 'T' is a constant thickness based on maximum height 'hw'.

7. EXCESS BAR LENGTH – Excess bar length protruding outside the dimensions of the wall or footing shall be cut to provide the minimum cover.

8. DETAILS TO BE SHOWN ELSEWHERE IN THE DOCUMENTS :
Wingwall lengths W1 and W2.
Apron type (1, 2 or 3), depth of Type 2 apron (if required).
Apron cutoff wall, U/S and/or D/S (if required).
Aggressive environment treatment (if required).

9. DIMENSIONS are in millimetres unless shown otherwise.

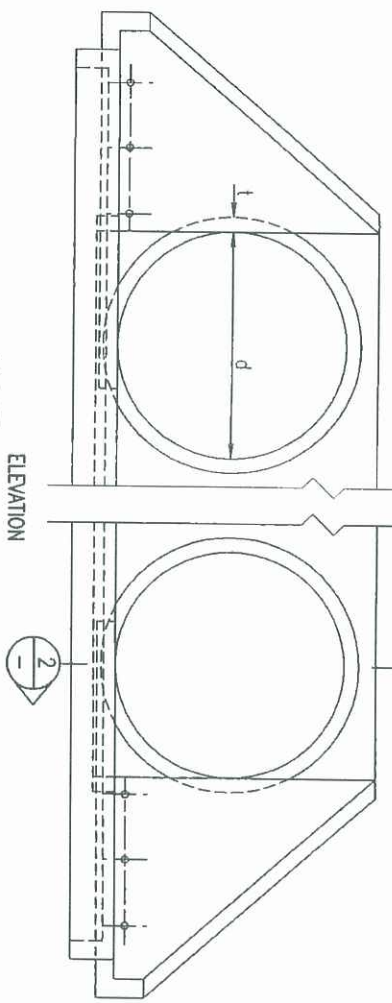
ASSOCIATED DOCUMENTS :
Department of Main Roads Manual of Standard Drawings Roads
Department of Main Roads Manual of Standard Specifications Roads

REFERENCED DOCUMENTS :
Standard Drawings :
1043 Standard Bar Shapes Drawing 1 of 2 and 2 of 2
1044 Standard Hook, Lap and Bend Details; and General Steel Reinforcement Information

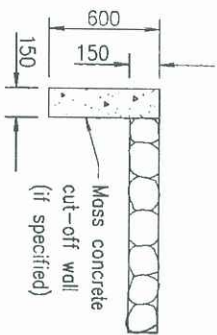
1305 General Arrangement and Installation of Wingwalls, Headwalls and Aprons
Standard Specifications :
Drainage, Retaining Structures and Protective Treatments

Australian Standards :
AS/NZS 4671 Steel Reinforcing Materials
AS/NZS 4680 Hot-dip Galvanized (Zinc) Coatings on Fabricated Ferrous Articles

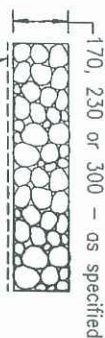
MULTIPLE CELL CULVERT ELEVATION



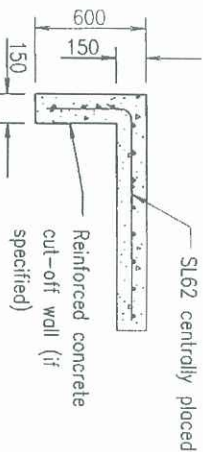
TYPE 1 APRON (Grouted rock pitching) APRON TYPES



TYPE 2 APRON (Rock filled wire mattresses)



TYPE 3 APRON (Reinforced concrete)



PLANS AND DOCUMENTS referred to in the ULDA APPROVAL dated 20 / 9 / 11

