Appendix K

Technical Drawings

NORTH

CALTEX KURNELL PORT AND BERTHING PROJECT

DREDGING WORKS

LOCALITY PLAN
NTS

DRAWING LIST

WorleyParsons
resources & energy

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

PRELIMINARY

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D	CLIENT
C	ISSUED FOR TENDER	17/10/12	PBC	ARG	DHL	DGA	DPJ	
B	ISSUED FOR CLIENT REVIEW	12/10/12	PBC	ARG	DHL	DGA		
A	ISSUED FOR INTERNAL REVIEW	09/10/12	PBC	ARG	DHL	DGA		

REVISIONS | APPROVALS

REFERENCE DRAWINGS | SPECIFICATIONS

PLANT 23 KURNELL PORT AND BERTHING PROJECT

DREDGING WORKS
TITLE SHEET, DRAWING LIST AND
LOCALITY PLAN

RFC. No.	INDEX	SHT SIZE	DRAWING No.	SHT No.	REV.
X	A	A1	148010	0	C

PLOT DATE & TIME: 16/10/2012 2:57:17 PM USER NAME: phil.cornish LOCATION: S:\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\DREDGING\148010.DWG

GENERAL NOTES

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE PRINCIPALS REPRESENTATIVE BEFORE PROCEEDING WITH THE WORK.

2. DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE PROPOSED AND EXISTING STRUCTURES IN A STABLE CONDITION AND ENSURING NO PART IS OVERSTRESSED DURING CONSTRUCTION ACTIVITIES. TEMPORARY BRACING AND PROPS SHALL BE PROVIDED BY THE CONTRACTOR TO KEEP THE WORKS STABLE AT ALL TIMES.

3. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT AUSTRALIAN STANDARDS AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THESE DRAWINGS AND THE SPECIFICATION.

4. ALL CRITICAL ARRANGEMENTS AND DIMENSIONS SHOWN SHALL BE VERIFIED BY THE CONTRACTOR ON SITE BEFORE WORK COMMENCES. DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.

5. BEFORE UNDERTAKING ANY WORK, ESTABLISH THE LOCATIONS OF ALL EXISTING SERVICES AFFECTED BY THE WORKS. ADVISE THE PRINCIPAL IF THERE ARE ANY UNKNOWN SERVICES THAT CAN POTENTIALLY BE AFFECTED BY THE WORKS.

6. THE CONTRACTOR SHALL PROVIDE TEST CERTIFICATES FROM AN APPROVED BODY CERTIFYING THAT THE MATERIALS USED COMPLY WITH THE RELEVANT SPECIFICATIONS.

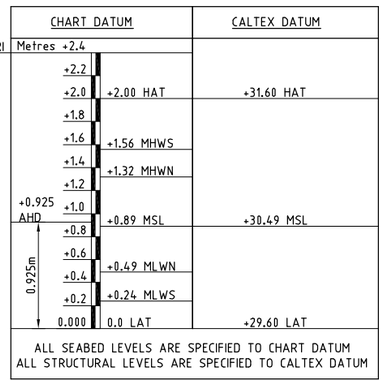
7. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

DATUMS & TIDAL DATA

1. VERTICAL DATUM IS CHART DATUM FOR ALL THE DREDGING AND REVETMENT WORKS. CHART DATUM (CD) IS APPROXIMATELY EQUAL TO ISLW AND IS 0.925m BELOW AUSTRALIAN HEIGHT DATUM (AHD).

2. NOTE, THE VERTICAL DATUM FOR STRUCTURAL ELEMENTS (EXCLUDING THOSE IN NOTE 1) ARE IN CALTEX REFINERY DATUM, 29.6m CALTEX DATUM IS EQUAL TO 0m CHART DATUM (CD).

3. HORIZONTAL DATUM IS THE MAP GRID OF AUSTRALIA (MGA94).



DREDGING

1. THE EXTENT OF THE DREDGING WORK IS INDICATED ON THE DRAWINGS.

2. THE DREDGING SHALL BE CARRIED OUT IN THE LOCATIONS SHOWN AND TO THE LEVELS, WIDTHS AND SIDE SLOPES INDICATED ON THE DRAWINGS.

3. AN INDICATION OF THE MATERIAL TO BE REMOVED DURING DREDGING IS INDICATED IN THE GEOTECHNICAL INVESTIGATIONS THAT HAVE BEEN COMPLETED AT THE SITE.

4. ALL MATERIAL DREDGED SHALL BE DISPOSED OFFSHORE AT A DESIGNATED SPOIL GROUND AREA OR WHERE SUITABLE, USED TO COVER PIPELINES OR FILL DEEPENED AREA AS SPECIFIED ON THE DRAWINGS AND IN THE SPECIFICATION. AREA 3 AND AREA 1 HIGHLY CONTAMINATED MATERIAL SHALL BE DREDGED WITH NO OVERFLOW ALLOWED FROM LOADING BARGES.

WorleyParsons
resources & energy

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

PRELIMINARY

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D	CLIENT
C	ISSUED FOR TENDER	17/10/12	PBC	ARG	DHL	DGA	DPJ	
B	ISSUED FOR CLIENT REVIEW	12/10/12	PBC	ARG	DHL	DGA		
A	ISSUED FOR INTERNAL REVIEW	09/10/12	PBC	ARG	DHL	DGA		

REVISIONS | APPROVALS

REFERENCE DRAWINGS | SPECIFICATIONS

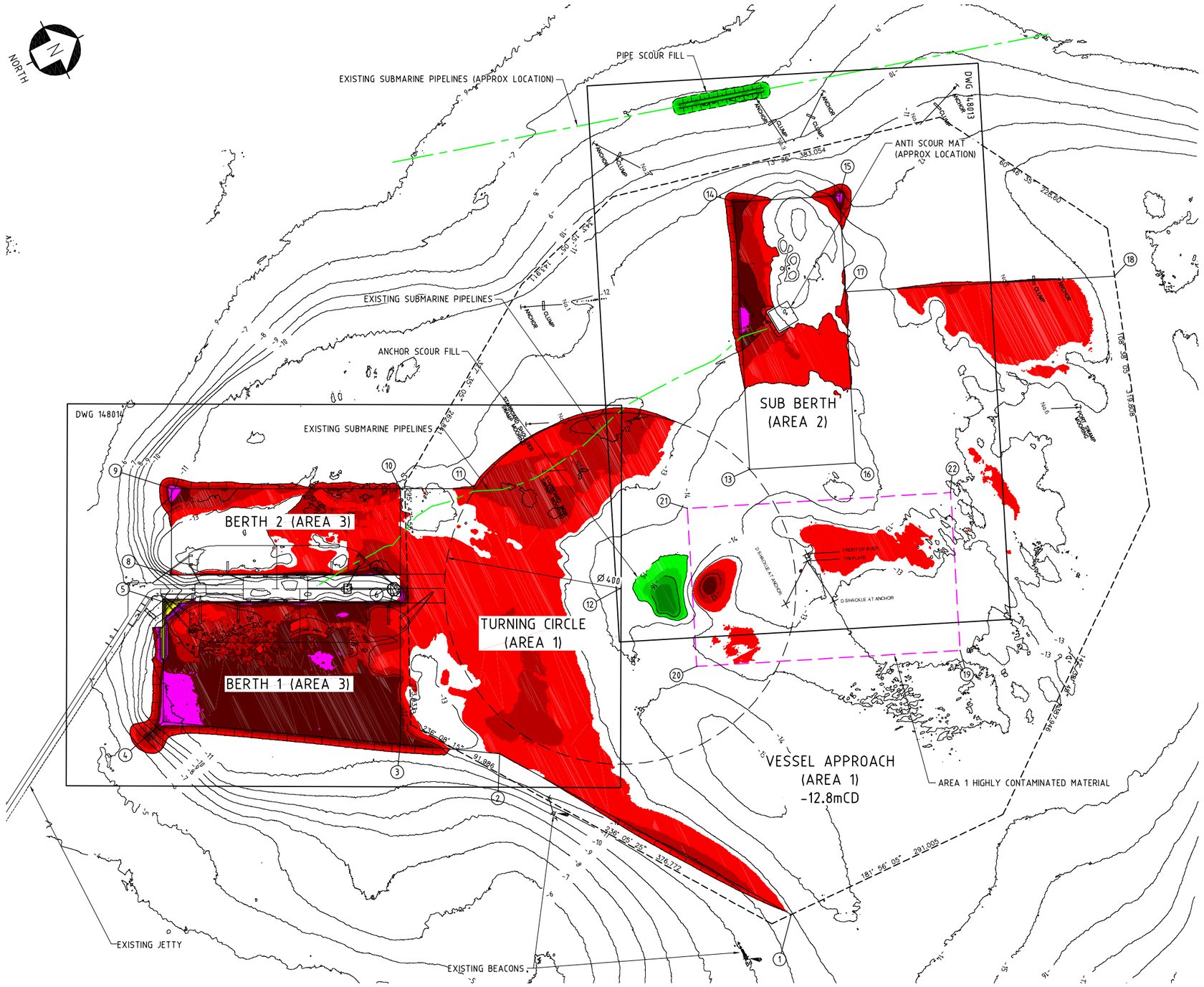
PLANT 23 KURNELL PORT AND BERTHING PROJECT

DREDGING WORKS

GENERAL NOTES AND SPECIFICATIONS

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148011	1	C

PLOT DATE & TIME: 16/10/2012 3:00:36 PM USER NAME: phil.cornish LOCATION: S:\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\ORGS\CIVIL\DREDGING\148011.DWG



LEGEND

EXISTING CONTOURS, mCD (1m INTERVAL)

BUOYS, ANCHORS & MOORINGS

APPROACH & MANOEUVRING AREAS UNDER AUSTRALIAN OIL REFINING AGREEMENT RATIFICATION ACT 1954 NO. 34 SCHEDULE 10. WITH BEARING & LENGTH

DREDGING DEPTH

- DREDGING 0.0m TO 0.5m
- DREDGING 0.5m TO 1.0m
- DREDGING 1.0m TO 1.5m
- DREDGING 1.5m TO 2.0m
- DREDGING 2.0m TO 2.5m
- DREDGING 2.5m TO 3.0m
- DREDGING 3.0m TO 3.5m
- DREDGING 3.5m TO 4.0m
- DREDGING 4.0m TO 4.5m

FILL DEPTH

- FILL 0.0m TO 0.5m
- FILL 0.5m TO 1.0m
- FILL 1.0m TO 1.5m
- FILL 1.0m TO 1.5m

DREDGE SETOUT

POINT	EASTING	NORTHING
1	335275.256	6236757.725
2	334960.809	6236546.330
3	334899.470	6236450.766
4	334753.340	6236223.101
5	334632.413	6236285.331
6	334755.638	6236524.783
7	334728.565	6236538.715
8	334609.442	6236307.233
9	334521.859	6236352.305
10	334640.982	6236583.786
11	334680.170	6236659.937
12	334856.570	6236754.187
13	334803.396	6236946.989
14	334524.747	6237070.510
15	334573.387	6237180.844
16	334852.037	6237057.323
17	334673.561	6237136.439
18	334797.890	6237416.912
19	335096.159	6237065.698
20	334975.142	6236791.189
21	334810.437	6236863.800
22	334931.454	6237138.308

NOTES

1. VERTICAL DATUM IS CHART DATUM FOR ALL THE DREDGING AND REVETMENT WORKS. CHART DATUM (CD) IS APPROXIMATELY EQUAL TO ISLW AND IS 0.925m BELOW AUSTRALIAN HEIGHT DATUM (AHD).
2. EXISTING CONTOURS HAVE BEEN GENERATED BASED ON SYDNEY PORTS CORP JUNE 2010 & MAY 2012 SURVEY DATA
3. ALL PROPOSED BATTER SLOPES 1 IN 6 MAX
4. EXISTING JETTY, BUOYS, ANCHORS & MOORINGS IS BASED ON WATSON BUCHAN CONSULTING SURVEYORS WAE DRG A1-144221 SHT 0 REV 7 05.05.2012 AND SUBSTRUCTURE CAD DRG'S SUPPLIED BY CALTEX 1996. ALL DIMENSIONS AND LEVELS ARE TO BE CONFIRMED ON SITE PRIOR TO DREDGING AND FILLING.
5. CHAINS ATTACHED TO ANCHOR ARE NOT SHOWN ON DRAWING. ALL CHAINS MAY BE MOVED SUBJECT TO APPROVAL OF THE PRINCIPAL'S REPRESENTATIVE. ANCHORS CANNOT BE DISTURBED. CONTRACTOR TO CONFIRM LOCATION, LEVEL AND DETAILS PRIOR TO DREDGING.
6. THE HORIZONTAL AND VERTICAL LOCATION OF THE SUB-BERTH PIPELINES HAVE BEEN PLOTTED FROM THE CO-ORDINATES AND LEVELS SUPPLIED BY CALTEX
7. THE LOCATION AND LEVEL OF THE SUB-BERTH PIPELINES START POINT (CHAINAGE -21.84) SUPPLIED BY CALTEX:
   334696E, 6236452N, RL -10.82m
8. LOCATION, LEVEL AND DETAILS OF PIPELINES TO BE PROVIDED. CONTRACTOR SHALL CONFIRM LOCATION, LEVEL AND DETAIL PRIOR TO DREDGING
9. LOCATION OF ANTI SCOUR MAT TAKEN FROM 'BKSB 008-A_1-SUB BERTH ANTI-SCOUR MATS (4).pdf'. LOCATION TO BE PROVIDED AND CONTRACTOR SHALL CONFIRM LOCATION PRIOR TO DREDGING

50 0 50 100 150 200 250m
1:2500 (A1) 1:5000 (A3)

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

WorleyParsons
resources & energy

PRELIMINARY

PLANT 23 KURNELL PORT AND BERTHING PROJECT
DREDGING WORKS
GENERAL ARRANGEMENT

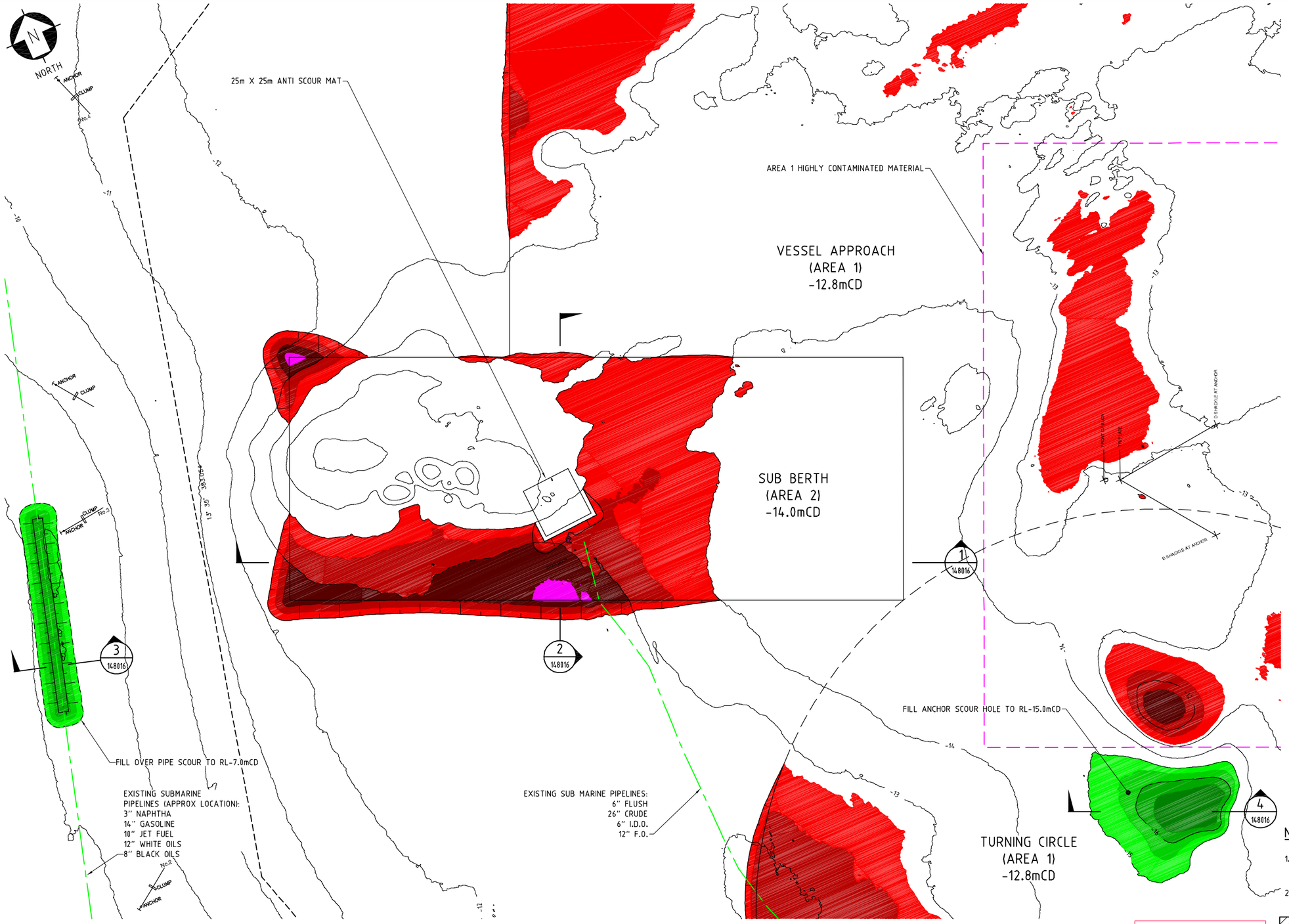
No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
C	ISSUED FOR TENDER	17/10/12	PBC	ARG	DHL	DGA	DPJ
B	ISSUED FOR CLIENT REVIEW	12/10/12	PBC	ARG	DHL	DGA	
A	ISSUED FOR INTERNAL REVIEW	09/10/12	PBC	ARG	DHL	DGA	

REVISIONS | APPROVALS

REFERENCE DRAWINGS | SPECIFICATIONS

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148012	0	C

PLOT DATE & TIME: 16/10/2012 3:10:23 PM USER NAME: phil.cornish LOCATION: S:\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\DREDGING\148012.DWG



LEGEND

EXISTING CONTOURS, mCD (1m INTERVAL)

BUOYS, ANCHORS & MOORINGS

APPROACH & MANOEUVRING AREAS UNDER AUSTRALIAN OIL REFINING AGREEMENT RATIFICATION ACT 1954 NO. 34 SCHEDULE 10. WITH BEARING & LENGTH

DREDGING DEPTH

- DREDGING 0.0m TO 0.5m
- DREDGING 0.5m TO 1.0m
- DREDGING 1.0m TO 1.5m
- DREDGING 1.5m TO 2.0m
- DREDGING 2.0m TO 2.5m
- DREDGING 2.5m TO 3.0m
- DREDGING 3.0m TO 3.5m
- DREDGING 3.5m TO 4.0m
- DREDGING 4.0m TO 4.5m

FILL DEPTH

- FILL 0.0m TO 0.5m
- FILL 0.5m TO 1.0m
- FILL 1.0m TO 1.5m
- FILL 1.0m TO 1.5m

NOTES

1. EXISTING CONTOURS HAVE BEEN GENERATED BASED ON SYDNEY PORTS CORP JUNE 2010 & MAY 2012 SURVEY DATA
2. ALL PROPOSED BATTER SLOPES 1 IN 6 MAX

20 0 20 40 60 80 100m

1:1000 (A1) 1:2000 (A3)

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

PRELIMINARY

WorleyParsons
resources & energy

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
C	ISSUED FOR TENDER	17/10/12	PBC	ARG	DHL	DGA	DPJ
B	ISSUED FOR CLIENT REVIEW	12/10/12	PBC	ARG	DHL	DGA	
A	ISSUED FOR INTERNAL REVIEW	09/10/12	PBC	ARG	DHL	DGA	

REVISIONS | APPROVALS

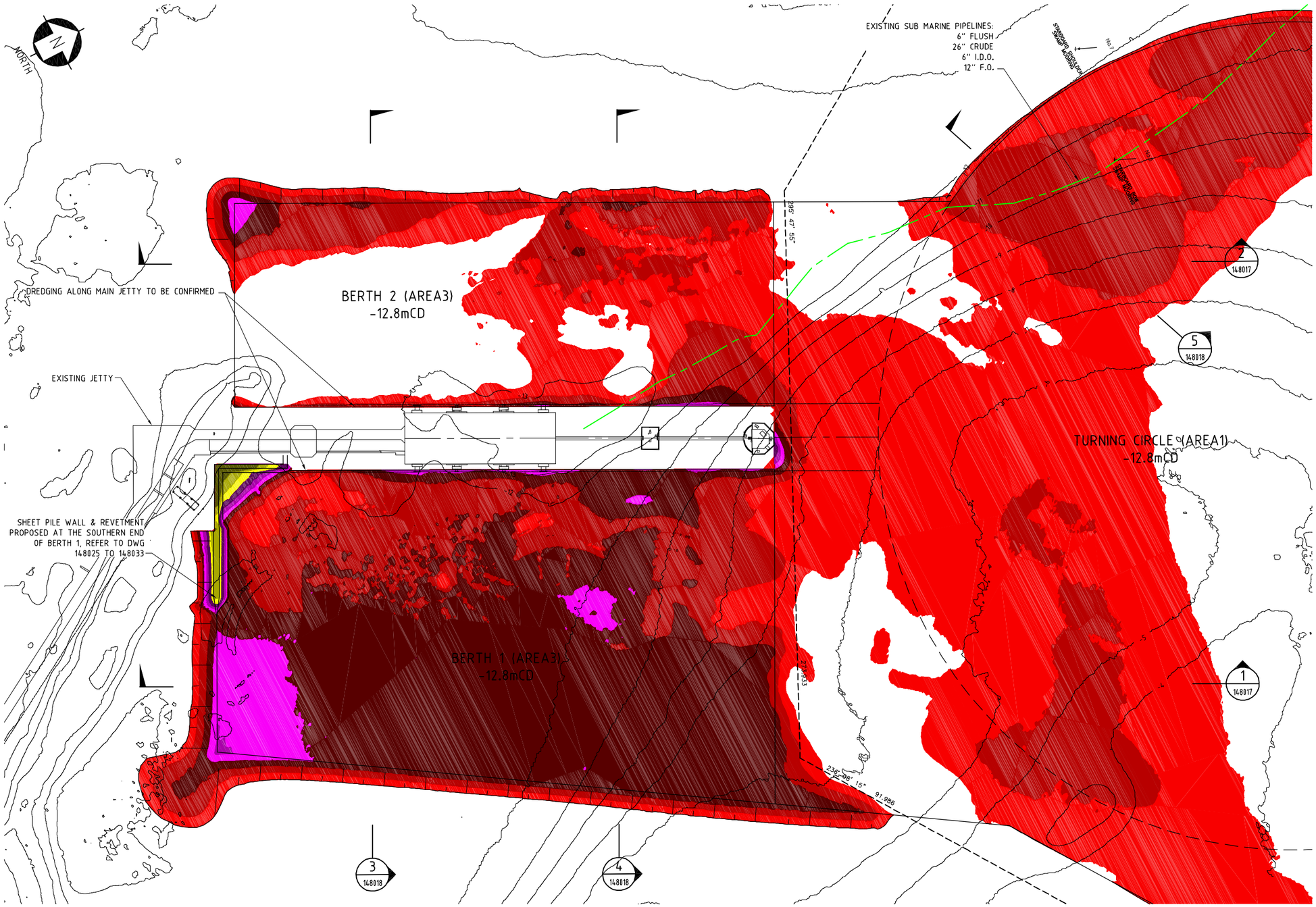
REFERENCE DRAWINGS | SPECIFICATIONS

PLANT 23 KURNELL PORT AND BERTHING PROJECT

DREDGING WORKS
SUB-BERTH PLAN
(AREA 2)

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148013	0	C

PLOT DATE & TIME: 16/10/2012 3:15:24 PM USER NAME: phil.cornish LOCATION: S:\03867_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\DREDGING\148013.DWG



LEGEND

EXISTING CONTOURS, mCD (1m INTERVAL)

BUOYS, ANCHORS & MOORINGS

APPROACH & MANOEUVRING AREAS UNDER AUSTRALIAN OIL REFINING AGREEMENT RATIFICATION ACT 1954 NO. 34 SCHEDULE 10. WITH BEARING & LENGTH

DREDGING DEPTH

- DREDGING 0.0m TO 0.5m
- DREDGING 0.5m TO 1.0m
- DREDGING 1.0m TO 1.5m
- DREDGING 1.5m TO 2.0m
- DREDGING 2.0m TO 2.5m
- DREDGING 2.5m TO 3.0m
- DREDGING 3.0m TO 3.5m
- DREDGING 3.5m TO 4.0m
- DREDGING 4.0m TO 4.5m

NOTES

1. EXISTING CONTOURS HAVE BEEN GENERATED BASED ON SYDNEY PORTS CORP JUNE 2010 & MAY 2012 SURVEY DATA
2. ALL PROPOSED BATTER SLOPES 1 IN 6 MAX
3. EXISTING JETTY, BUOYS, ANCHORS & MOORINGS IS BASED ON WATSON BUCHAN CONSULTING SURVEYORS WAE DRG A1-144221 SHT 0 REV 7 05.05.2012 AND SUBSTRUCTURE CAD DRG'S SUPPLIED BY CALTEX 1996. ALL DIMENSIONS AND LEVELS ARE TO BE CONFIRMED ON SITE PRIOR TO DREDGING AND FILLING

WorleyParsons
resources & energy

20 0 20 40 60 80 100m
1:1000 (A1) 1:2000 (A3)

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

PRELIMINARY

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
C	ISSUED FOR TENDER	17/10/12	PBC	ARG	DHL	DGA	DPJ
B	ISSUED FOR CLIENT REVIEW	12/10/12	PBC	ARG	DHL	DGA	
A	ISSUED FOR INTERNAL REVIEW	09/10/12	PBC	ARG	DHL	DGA	

REFERENCE DRAWINGS | SPECIFICATIONS | REVISIONS | APPROVALS

PLANT 23 KURNELL PORT AND BERTHING PROJECT

DREDGING WORKS
BERTH 1 AND 2 PLAN
(AREA 3)

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148014	0	C

PLOT DATE & TIME: 16/10/2012 3:14:32 PM USER NAME: phil.cornish LOCATION: S:\43667_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\DREDGING\148014.DWG

NORTH

SYDNEY OFFSHORE SPOIL GROUND

33°51.01' S, 151°27.91 E

33°51.51' S, 151°24.07' E

33°52.91' S, 151°27.91 E

33°52.91' S, 151°24.07' E

33°52.21' S, 151°26.02 E

APPROXIMATE EXTENT OF SEDIMENT DISPOSAL SUB-SITE IN THE NORTH WESTERN QUARTER OF THE SPOIL GROUND

CALTEX BOTANY SITE

IMAGE SOURCE:
AUSTRALIAN HYDROGRAPHIC SERVICE, WOLLONGONG, NSW, 2001.
APPROACHES TO PORT JACKSON, PORT HACKING TO THE SKILLION; AUS 197.

1000 0 1000 2000 3000 4000 5000m

1:50,000 (A1) 1:100,000 (A3)

INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION

WorleyParsons
resources & energy

PRELIMINARY

PLANT 23 KURNELL PORT AND BERTHING PROJECT

DREDGING WORKS

PROPOSED SPOIL GROUND

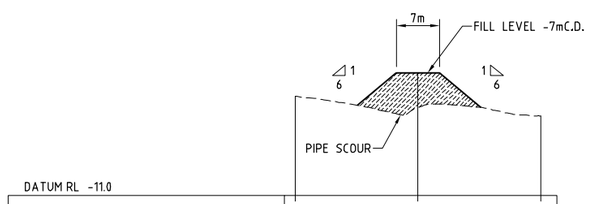
No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
C	ISSUED FOR TENDER	17/10/12	PBC	ARG	DHL	DGA	DPJ
B	ISSUED FOR CLIENT REVIEW	12/10/12	PBC	ARG	DHL	DGA	
A	ISSUED FOR INTERNAL REVIEW	09/10/12	PBC	ARG	DHL	DGA	

REVISIONS | APPROVALS

REFERENCE DRAWINGS | SPECIFICATIONS

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148015	0	C

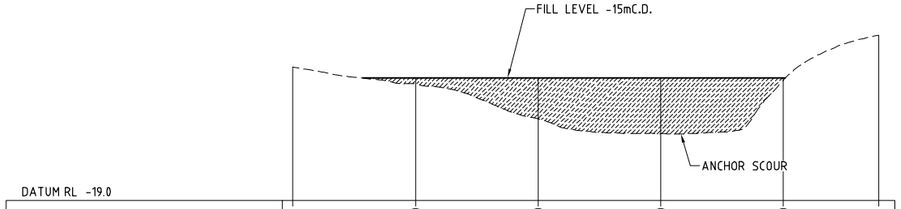
LOCATION: S:\93667_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\DREDGING\148015.DWG
USER NAME: phil.cornish
PLOT DATE & TIME: 16/10/2012 3:18:08 PM



DATUM RL -11.0

DESIGN FILL PROFILE		-7.00	
EXISTING SURFACE PROFILE	-7.76	-8.14	-8.40
CHAINAGE	0.00	20.00	40.00

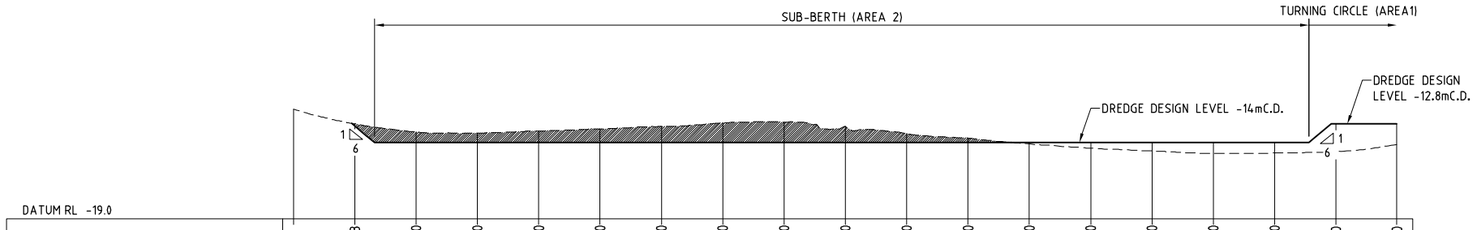
SECTION 3
SCALE HORIZONTAL 1:500
SCALE VERTICAL 1:100
14.8013



DATUM RL -19.0

DESIGN FILL PROFILE		-15.00	-15.00	-15.00	-15.00	
EXISTING SURFACE PROFILE	-14.65	-15.18	-16.34	-16.82	-15.08	-13.60
CHAINAGE	0.00	20.00	40.00	60.00	80.00	95.53

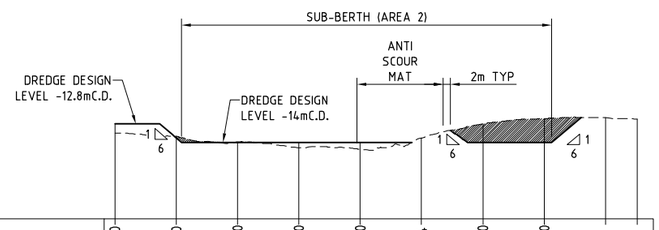
SECTION 4
SCALE HORIZONTAL 1:500
SCALE VERTICAL 1:100
14.8013



DATUM RL -19.0

DESIGN DREDGE PROFILE		-12.93	-14.00	-14.00	-14.00	-14.00	-14.00	-14.00	-14.00	-14.00	-14.00	-14.00	-14.00	-14.00	-14.00	-14.00	-12.80	-12.80	
EXISTING SURFACE PROFILE	-11.84	-12.79	-13.32	-13.40	-13.26	-13.13	-12.97	-12.72	-12.68	-12.97	-13.43	-13.72	-14.10	-14.38	-14.55	-14.72	-14.70	-14.61	-14.13
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	359.87

SECTION 1
SCALE HORIZONTAL 1:1000
SCALE VERTICAL 1:200
14.8013



DATUM RL -19.0

DESIGN DREDGE PROFILE	-12.80	-13.70	-14.00	-14.00	-14.00	-11.94	-14.00	-14.00		
EXISTING SURFACE PROFILE	-13.39	-13.60	-13.97	-14.34	-14.47	-13.72	-12.79	-12.45	-12.39	-12.48
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	170.40

SECTION 2
SCALE HORIZONTAL 1:1000
SCALE VERTICAL 1:200
14.8013

LEGEND

MATERIAL TO BE DREDGED

MATERIAL TO BE FILLED

NOTES

1. VERTICAL DATUM IS CHART DATUM FOR ALL THE DREDGING AND REVETMENT WORKS. CHART DATUM (CD) IS APPROXIMATELY EQUAL TO ISLW AND IS 0.925m BELOW AUSTRALIAN HEIGHT DATUM (AHD).
2. OFFSET OF VERTICAL BOX CUT FROM FENDER LINE TO BE CONFIRMED

10 0 10 20 30 40 50m
HORIZONTAL 1:500 (A1) 1:1000 (A3)
2 0 2 4 6 8 10m
VERTICAL 1:100 (A1) 1:200 (A3)

20 0 20 40 60 80 100m
HORIZONTAL 1:1000 (A1) 1:2000 (A3)
4 0 4 8 12 16 20m
VERTICAL 1:200 (A1) 1:400 (A3)

INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION

WorleyParsons
resources & energy

PRELIMINARY

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D	CLIENT
C	ISSUED FOR TENDER	17/10/12	PBC	ARG	DHL	DGA	DPJ	
B	ISSUED FOR CLIENT REVIEW	12/10/12	PBC	ARG	DHL	DGA		
A	ISSUED FOR INTERNAL REVIEW	09/10/12	PBC	ARG	DHL	DGA		

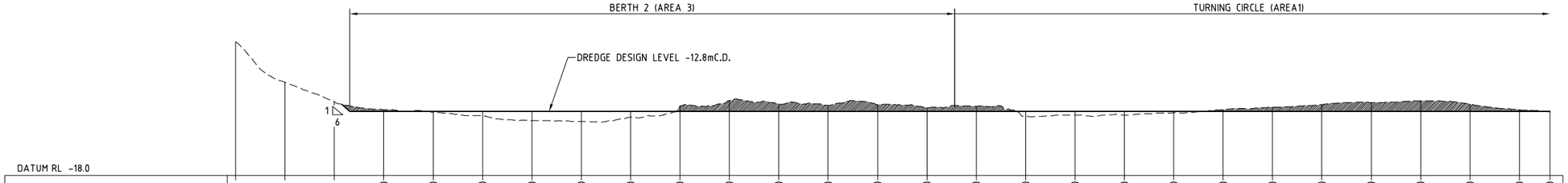
REFERENCE DRAWINGS | SPECIFICATIONS | REVISIONS | APPROVALS

PLANT 23 KURNELL PORT AND BERTHING PROJECT

DREDGING WORKS
DREDGING SECTIONS
SHEET 1

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148016	0	C

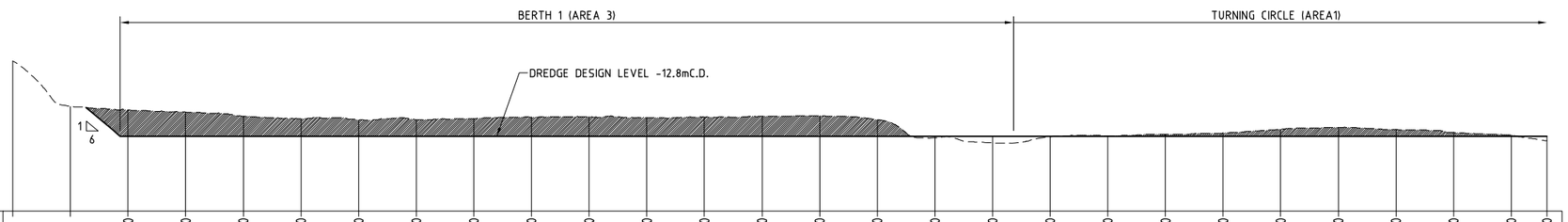
PLOT DATE & TIME: 16/10/2012 3:29:35 PM USER NAME: phil.cornish LOCATION: S:\63067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\DREDGING\148016.DWG



DATUM RL -18.0

CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	480.00	500.00	520.00	532.37
EXISTING SURFACE PROFILE	-7.20	-10.46	-12.05	-12.68	-12.89	-13.16	-13.56	-13.64	-13.28	-12.39	-11.95	-12.23	-12.34	-12.27	-12.51	-12.41	-13.23	-13.12	-13.12	-12.93	-12.68	-12.48	-12.26	-12.10	-11.96	-12.24	-12.69	-12.87
DESIGN DREDGE PROFILE			-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80

SECTION 2 (148014)
SCALE HORIZONTAL 1:1000
SCALE VERTICAL 1:200



DATUM RL -18.0

CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	480.00	500.00	520.00	532.37
EXISTING SURFACE PROFILE	-7.61	-10.74	-10.98	-11.14	-11.42	-11.60	-11.70	-11.66	-11.59	-11.48	-11.46	-11.53	-11.49	-11.43	-11.40	-11.66	-12.93	-13.28	-12.85	-12.78	-12.68	-12.59	-12.33	-12.20	-12.35	-12.55	-12.73	-13.13
DESIGN DREDGE PROFILE			-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80

SECTION 1 (148014)
SCALE HORIZONTAL 1:1000
SCALE VERTICAL 1:200

LEGEND

MATERIAL TO BE DREDGED

NOTES

1. VERTICAL DATUM IS CHART DATUM FOR ALL THE DREDGING AND REVETMENT WORKS. CHART DATUM (CD) IS APPROXIMATELY EQUAL TO ISLW AND IS 0.925m BELOW AUSTRALIAN HEIGHT DATUM (AHD).
2. OFFSET OF VERTICAL BOX CUT FROM FENDER LINE TO BE CONFIRMED

20 0 20 40 60 80 100m
HORIZONTAL 1:1000 (A1) 1:2000 (A3)

4 0 4 8 12 16 20m
VERTICAL 1:200 (A1) 1:400 (A3)

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

PRELIMINARY

WorleyParsons
resources & energy

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
C	ISSUED FOR TENDER	17/10/12	PBC	ARG	DHL	DGA	DPJ
B	ISSUED FOR CLIENT REVIEW	12/10/12	PBC	ARG	DHL	DGA	
A	ISSUED FOR INTERNAL REVIEW	09/10/12	PBC	ARG	DHL	DGA	

REVISIONS APPROVALS

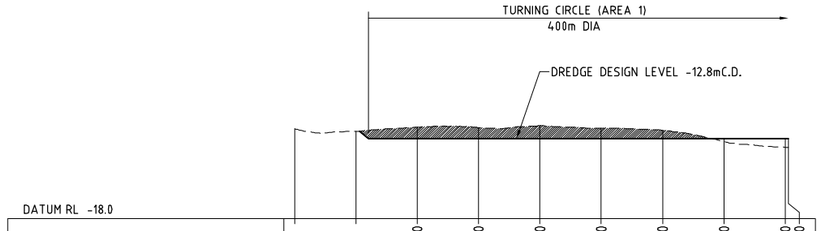
REFERENCE DRAWINGS | SPECIFICATIONS

PLANT 23 KURNELL PORT AND BERTHING PROJECT

DREDGING WORKS
DREDGING SECTIONS
SHEET 2

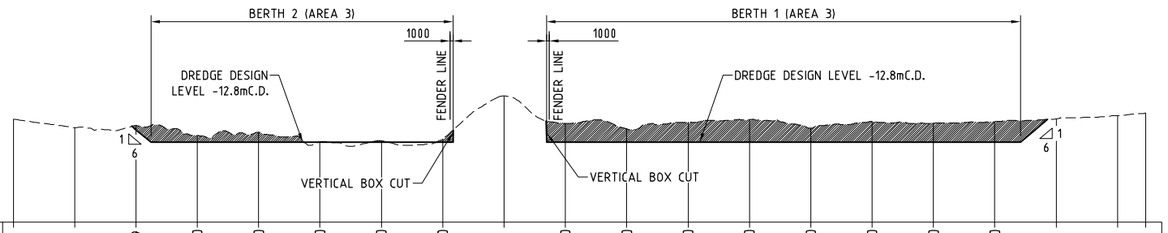
RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148017	0	C

PLOT DATE & TIME: 16/10/2012 3:29:48 PM USER NAME: phil.cornish LOCATION: S:\03667_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\DREDGING\148016.DWG



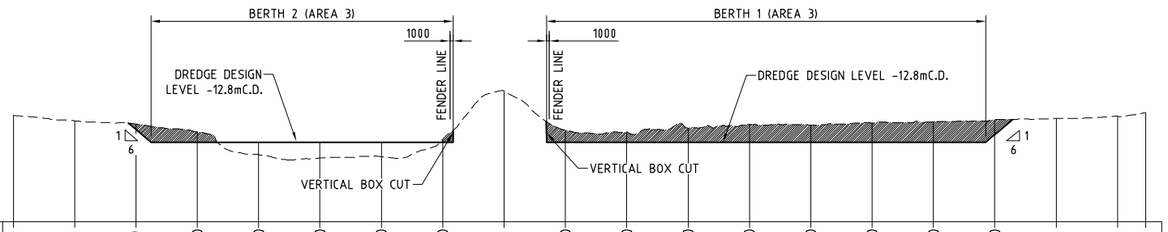
DATUM RL -18.0										
DESIGN DREDGE PROFILE		-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80
EXISTING SURFACE PROFILE	-12.15	-12.31	-12.04	-12.07	-11.95	-12.11	-12.24	-12.99	-13.34	-13.36
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	161.07

SECTION 5 (148014)
SCALE HORIZONTAL 1:1000
SCALE VERTICAL 1:200



DATUM RL -18.0																					
DESIGN DREDGE PROFILE		-11.99	-12.80	-12.80	-12.80	-12.80	-12.80		-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80					
EXISTING SURFACE PROFILE	-11.30	-11.85	-11.72	-12.36	-12.15	-12.79	-12.72	-12.59	-9.79	-11.57	-11.94	-11.52	-11.33	-11.89	-11.46	-11.56	-11.47	-11.29	-11.07	-10.90	
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	369.17	

SECTION 4 (148014)
SCALE HORIZONTAL 1:1000
SCALE VERTICAL 1:200



DATUM RL -18.0																					
DESIGN DREDGE PROFILE		-11.99	-12.80	-12.80	-12.80	-12.80	-12.80		-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.80	-12.30					
EXISTING SURFACE PROFILE	-11.07	-11.42	-11.63	-12.15	-13.63	-13.85	-13.75	-12.63	-9.48	-12.02	-12.14	-11.89	-11.65	-11.69	-11.57	-11.47	-11.35	-11.27	-11.12	-10.87	
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	369.17	

SECTION 3 (148014)
SCALE HORIZONTAL 1:1000
SCALE VERTICAL 1:200

LEGEND

MATERIAL TO BE DREDGED

NOTES

1. VERTICAL DATUM IS CHART DATUM FOR ALL THE DREDGING AND REVETMENT WORKS. CHART DATUM (CD) IS APPROXIMATELY EQUAL TO ISLW AND IS 0.925m BELOW AUSTRALIAN HEIGHT DATUM (AHD).
2. OFFSET OF VERTICAL BOX CUT FROM FENDER LINE TO BE CONFIRMED

HORIZONTAL 1:1000 (A1) 1:2000 (A3)
VERTICAL 1:200 (A1) 1:400 (A3)

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

WorleyParsons
resources & energy

PRELIMINARY

PLANT 23 KURNELL PORT AND BERTHING PROJECT

DREDGING WORKS
DREDGING SECTIONS
SHEET 3

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148018	0	C

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
C	ISSUED FOR TENDER	17/10/12	PBC	ARG	DHL	DGA	DPJ
B	ISSUED FOR CLIENT REVIEW	12/10/12	PBC	ARG	DHL	DGA	
A	ISSUED FOR INTERNAL REVIEW	09/10/12	PBC	ARG	DHL	DGA	

REVISIONS | APPROVALS

REFERENCE DRAWINGS | SPECIFICATIONS

PLOT DATE & TIME: 16/10/2012 3:30:16 PM USER NAME: phil.cornish LOCATION: S:\03867_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\DREDGING\148016.DWG

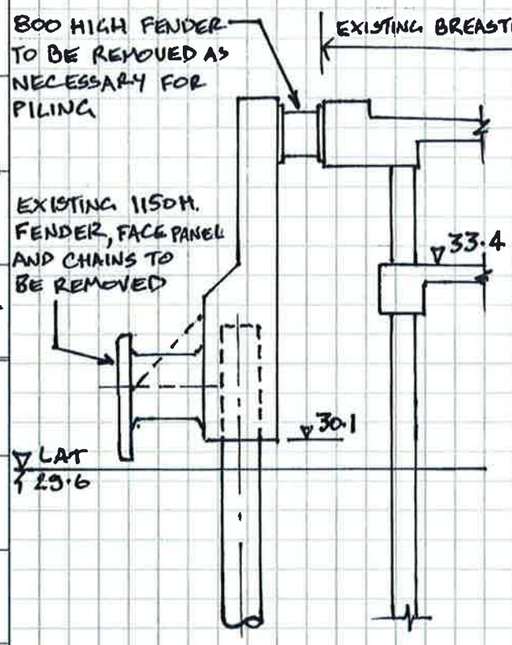
WorleyParsons
resources & energy

Customer CALTEX
Project title
Calculation title

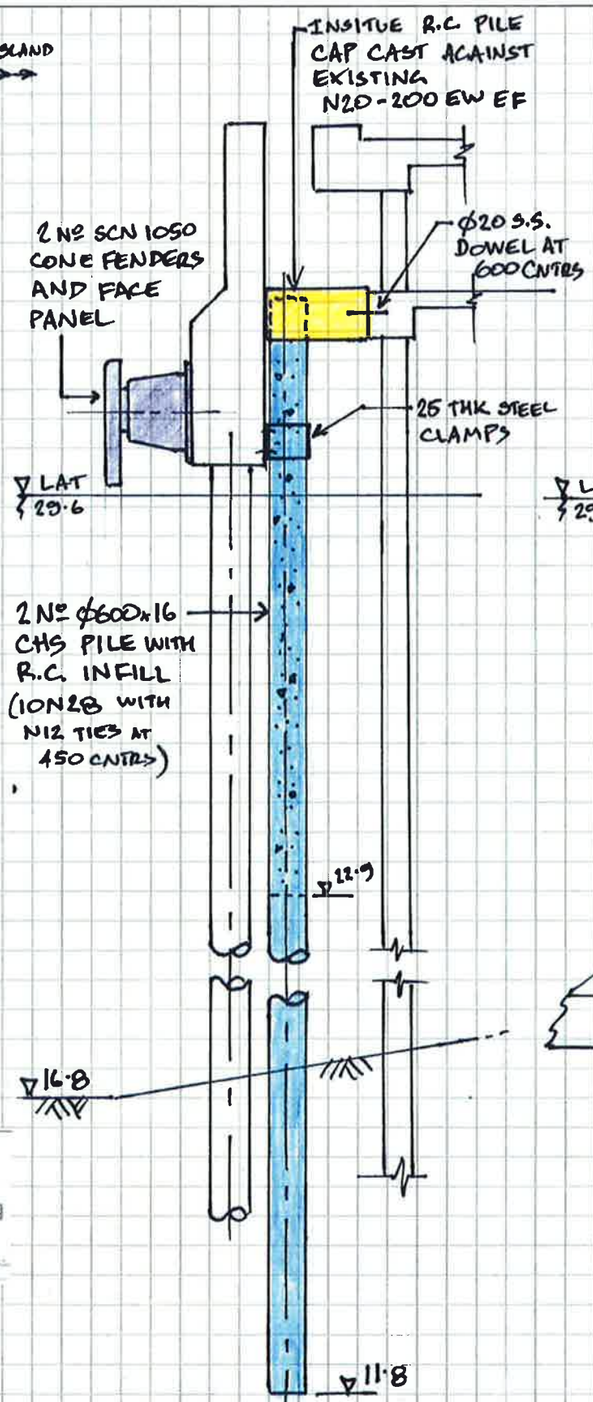
Proj No.
Calc No.
Phase/CTR
Project file

Page ___ of ___

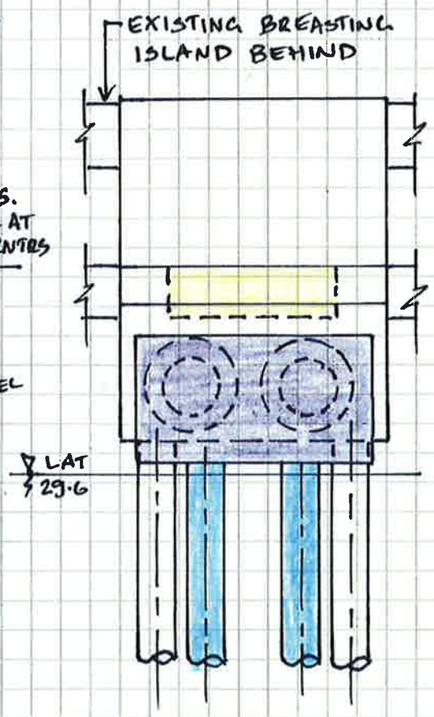
REVISION	DATE	BY	CHECKED
A	12/10/12	MJT	BF



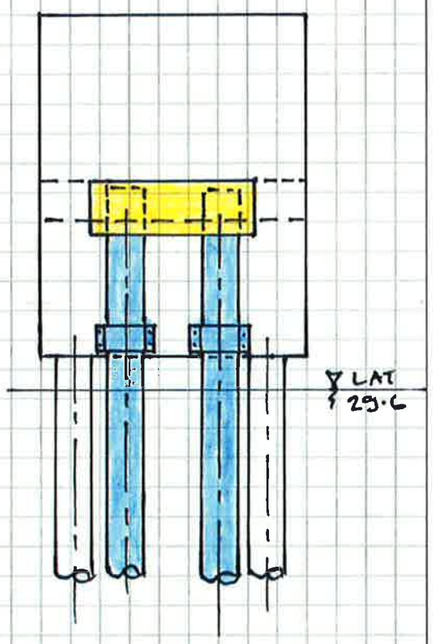
ELEVATION OF EXISTING SECONDARY FENDER - 2 OFF
1:100



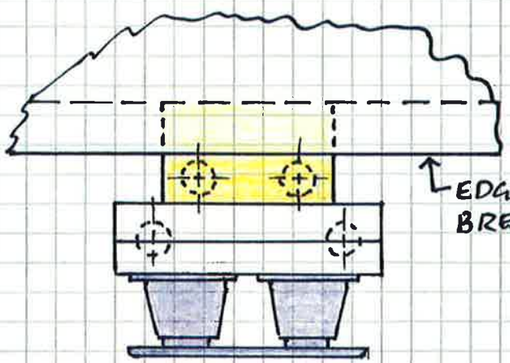
ELEVATION OF PROPOSED UPGRADE TO EXISTING SECONDARY FENDER - 2 OFF
1:100



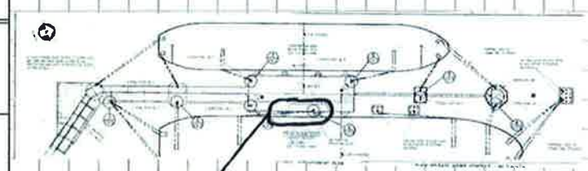
FRONT ELEVATION
1:100



REAR ELEVATION
1:100



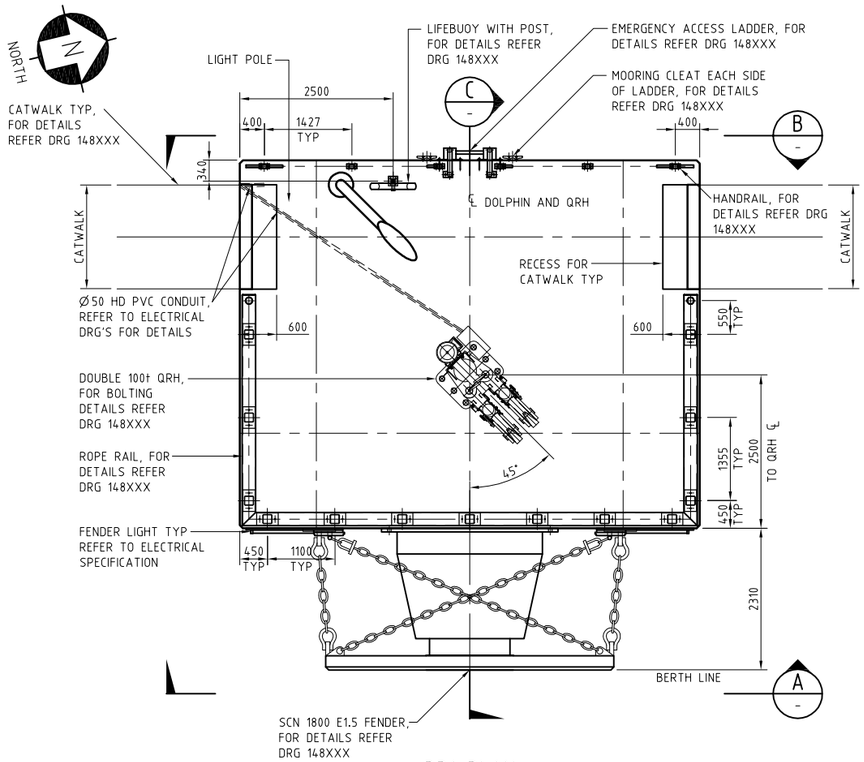
PLAN VIEW
1:100



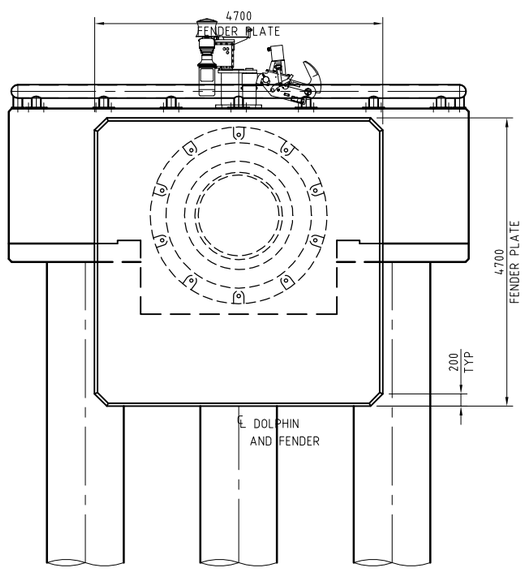
LOCALITY PLAN
N.T.S.

SECONDARY FENDER UPGRADE

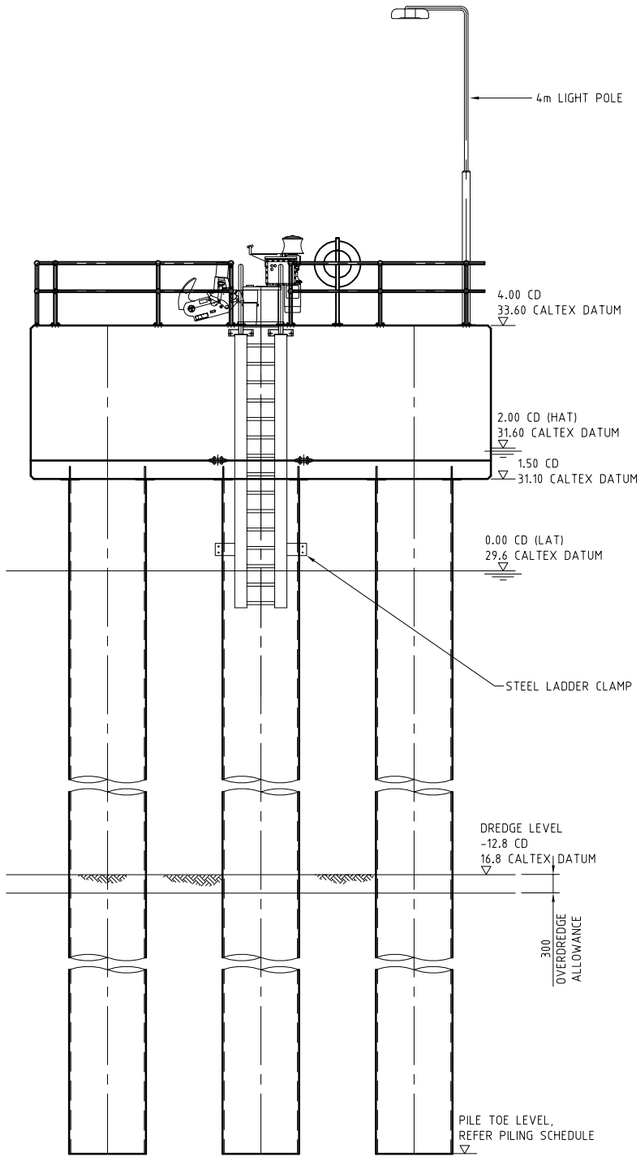
DOC. Nº 301015-03067-DSK-12



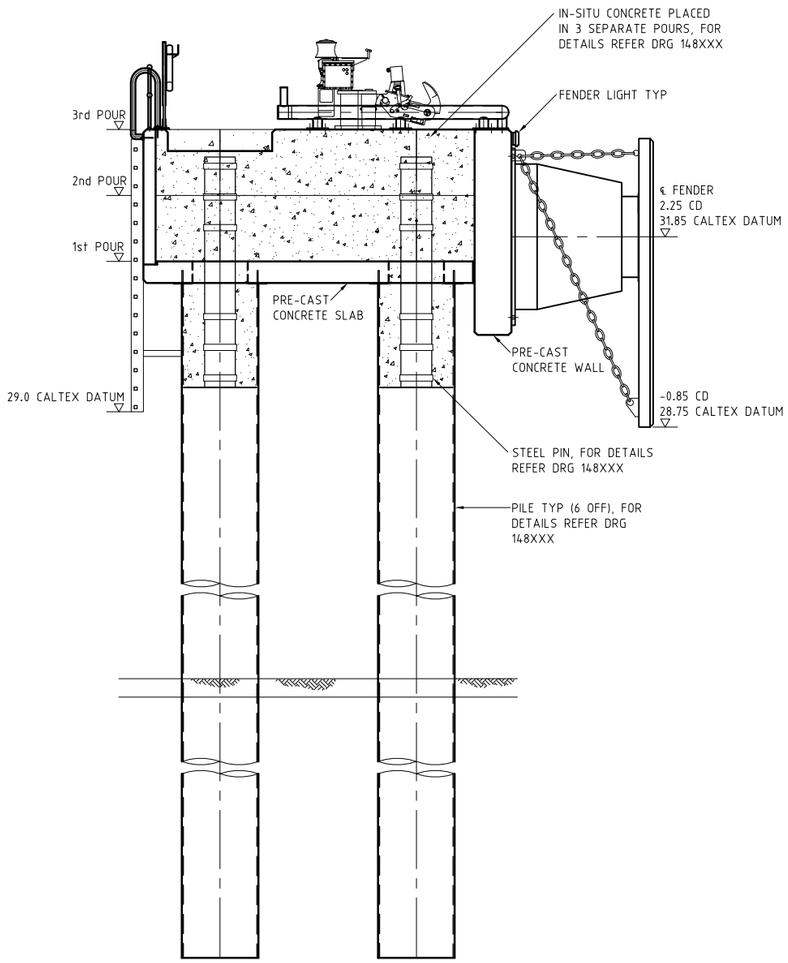
BD1 PLAN
1:50



VIEW A
1:50



VIEW B
1:50



SECTION C
1:50

WorleyParsons
resources & energy

1000 0 1000 2000 3000 4000 5000mm
1:50 (A1) 1:100 (A3)

INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION

PRELIMINARY

PLANT 23 KURNELL PORT AND BERTHING PROJECT

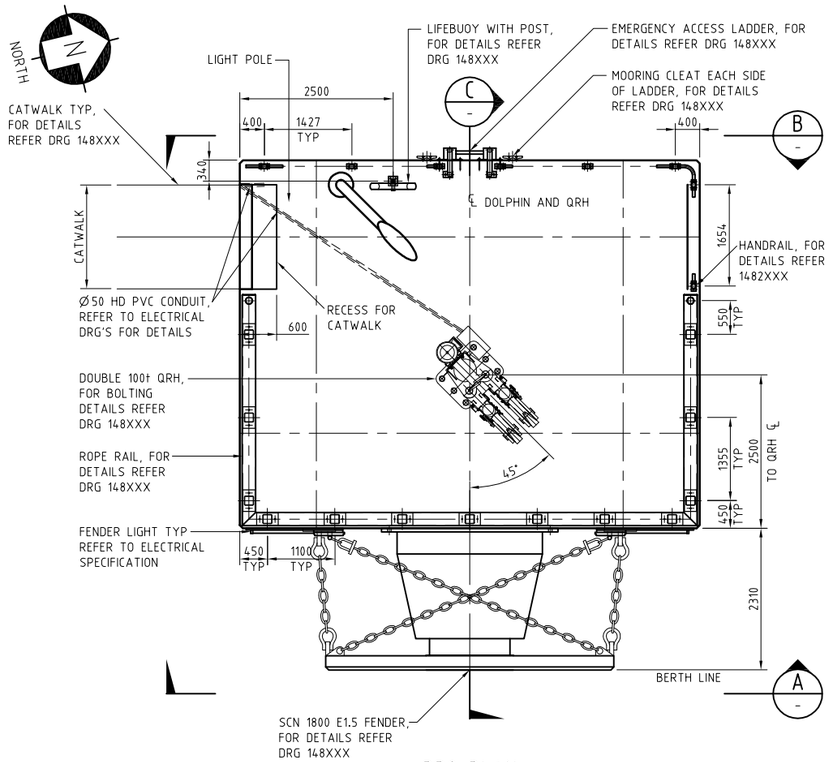
BERTHING DOLPHIN BD1
GENERAL ARRANGEMENT
PLAN AND ELEVATIONS

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
A	ISSUED FOR PRICING	12.10.10	VIP	ARG	SJB	MJT	

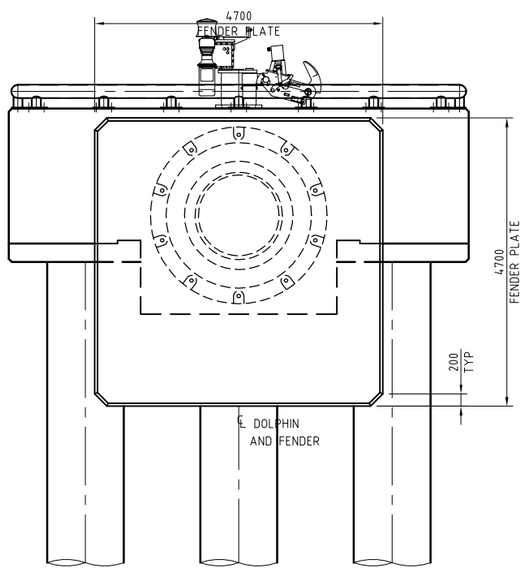
REFERENCE DRAWINGS | SPECIFICATIONS | REVISIONS | APPROVALS

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
	M	A1	148271	0	A

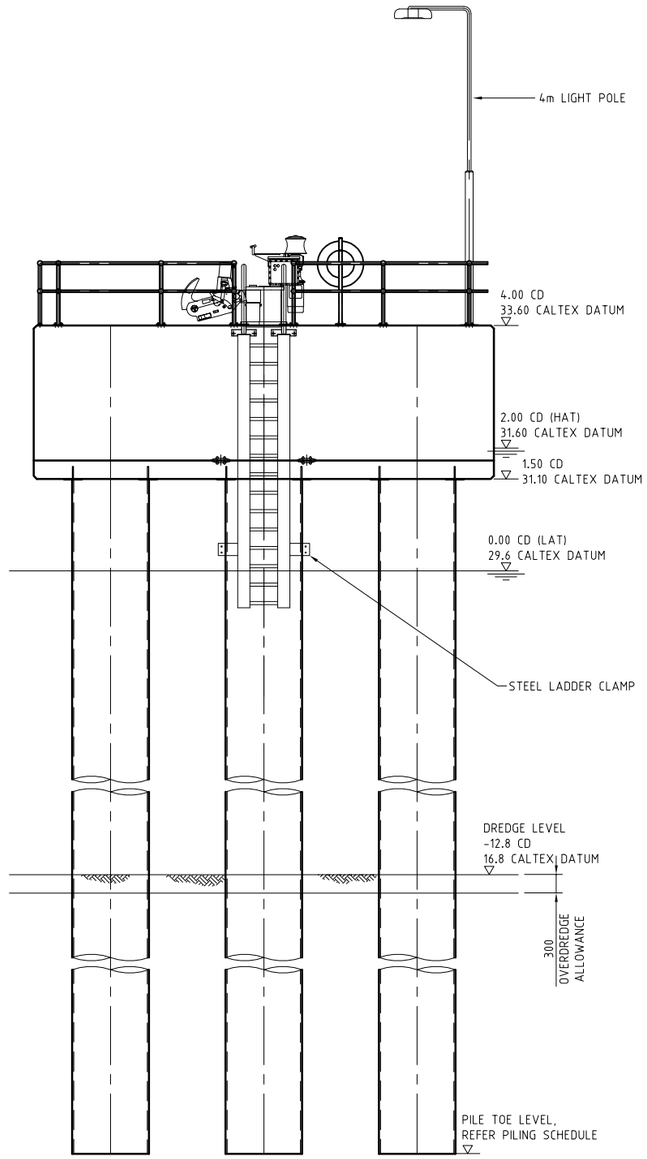
PLOT DATE & TIME: 12/10/2012 2:02:00 PM USER NAME: andrew.gilham LOCATION: W:_INFRASTRUCTURE\PROJECTS\301015\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\XREF\X_BERTHING DOLPHIN.DWG



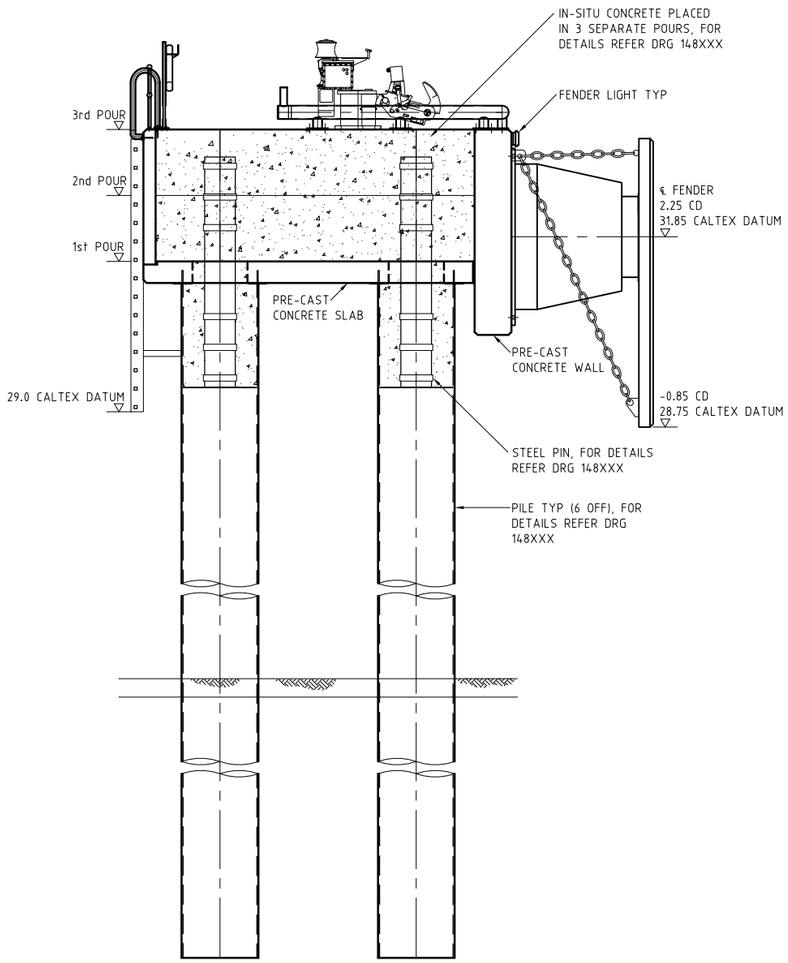
BD2 PLAN
1:50



VIEW A
1:50



VIEW B
1:50



SECTION C
1:50

WorleyParsons
resources & energy

1000 0 1000 2000 3000 4000 5000mm
1:50 (A1) 1:100 (A3)

INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION

PRELIMINARY

PLANT 23 KURNELL PORT AND BERTHING PROJECT

BERTHING DOLPHIN BD2
GENERAL ARRANGEMENT
PLAN AND ELEVATIONS

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
A	ISSUED FOR PRICING	12.10.10	VIP	ARG	SJB	MJT	

REFERENCE DRAWINGS | SPECIFICATIONS | REVISIONS | APPROVALS

RFC. No. | INDEX M | SHT SIZE A1 | DRAWING No. 148272 | SHT No. 0 | REV. A

PLOT DATE & TIME: 12/10/2012 2:02:22 PM USER NAME: andrew.gilham LOCATION: W:_INFRASTRUCTURE\PROJECTS\301015\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\XREF\X_BERTHING DOLPHIN.DWG

NORTH

CALTEX KURNELL PORT AND BERTHING PROJECT

REVETMENT AND SHEET PILE WORKS

LOCALITY PLAN
NTS

DRAWING LIST

148025	TITLE SHEET, DRAWING LIST AND LOCALITY PLAN
148026	GENERAL NOTES AND SPECIFICATION
148027	GENERAL ARRANGEMENT
148028	REVETMENT PLAN
148029	REVETMENT TYPICAL SECTION
148030	REVETMENT TYPICAL DETAILS (NOT ISSUED)
148031	SHEET PILE WALL PLAN
148032	SHEET PILE WALL ELEVATION
148033	SHEET PILE WALL TYPICAL SECTIONS AND DETAILS

WorleyParsons
resources & energy

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

PRELIMINARY

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D	CLIENT
A	ISSUED FOR PRICING	19/10/12	PBC	ARG	DHL	AFN		

REVISIONS | APPROVALS

REFERENCE DRAWINGS | SPECIFICATIONS

PLANT 23 KURNELL PORT AND BERTHING PROJECT

REVETMENT AND SHEET PILE WORKS
TITLE SHEET, DRAWING LIST AND
LOCALITY PLAN

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148025	0	A

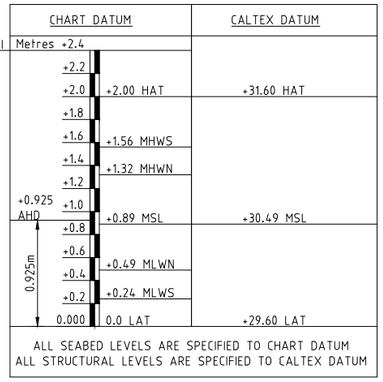
PLOT DATE & TIME: 19/10/2012 4:08:27 PM USER NAME: phil.cornish LOCATION: S:\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\REVETMENT\148025.DWG

GENERAL NOTES

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE PRINCIPALS REPRESENTATIVE BEFORE PROCEEDING WITH THE WORK.
2. DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE PROPOSED AND EXISTING STRUCTURES IN A STABLE CONDITION AND ENSURING NO PART IS OVERSTRESSED DURING CONSTRUCTION ACTIVITIES. TEMPORARY BRACING AND PROPS SHALL BE PROVIDED BY THE CONTRACTOR TO KEEP THE WORKS STABLE AT ALL TIMES.
3. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT AUSTRALIAN STANDARDS AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THESE DRAWINGS AND THE SPECIFICATION.
4. ALL CRITICAL ARRANGEMENTS AND DIMENSIONS SHOWN SHALL BE VERIFIED BY THE CONTRACTOR ON SITE BEFORE WORK COMMENCES. DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.
5. BEFORE UNDERTAKING ANY WORK, ESTABLISH THE LOCATIONS OF ALL EXISTING SERVICES AFFECTED BY THE WORKS. ADVISE THE PRINCIPAL IF THERE ARE ANY UNKNOWN SERVICES THAT CAN POTENTIALLY BE AFFECTED BY THE WORKS.
6.
7. THE CONTRACTOR SHALL PROVIDE TEST CERTIFICATES FROM AN APPROVED BODY CERTIFYING THAT THE MATERIALS USED COMPLY WITH THE RELEVANT SPECIFICATIONS.
8. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

DATUMS & TIDAL DATA

1. VERTICAL DATUM IS CALTEX REFINERY DATUM FOR ALL THE STRUCTURAL ELEMENTS AND CHART DATUM FOR ALL THE DREDGE DESIGN LEVELS. 29.6m CALTEX DATUM IS EQUAL TO 0m CHART DATUM (CD) WHICH IS APPROXIMATELY EQUAL TO ISLW AND IS 0.925m BELOW AUSTRALIAN HEIGHT DATUM (AHD).
2. HORIZONTAL DATUM IS THE MAP GRID OF AUSTRALIA (MGA94).



STEEL SHEET PILES

1. SHEET PILES SHALL BE STEEL WITH MINIMUM 355MPa YIELD STRESS. PILE SECTIONS AND STEEL GRADE TO BE APPROVED IN WRITING BY THE PRINCIPAL'S REPRESENTATIVE PRIOR TO PROCUREMENT BY THE CONTRACTOR.
2. SHEET PILES SHALL BE TRANSPORTED, HANDLED AND STORED ON SITE IN SUCH A MANNER AND LOCATION SO AS TO PREVENT DAMAGE, DISTORTION OR CORROSION. HOLES OR OPENINGS SHALL NOT BE BURNT OR DRILLED IN THE FINISHED SECTION OF PILES FOR THE PURPOSE OF HANDLING. WHERE PILES HAVE BEEN DAMAGED DUE TO HANDLING, LIFTING AND/OR PITCHING, THE CONTRACTOR SHALL BE REQUIRED TO FIX AND/OR REPLACE SUCH PILES AT THEIR EXPENSE.
3. THE CONTRACTOR SHALL MAKE THEIR OWN ASSESSMENT OF THE PILING PLANT REQUIRED TO INSTALL THE PILES TO THE REQUIRED LEVELS CONSIDERING THE PARTICULAR PILE SECTION PROVIDED, GROUND CONDITIONS, NOISE RESTRICTIONS AND VIBRATION EFFECTS.
4. BEFORE COMMENCEMENT OF PILING, THE CONTRACTOR SHALL SUBMIT TO THE PRINCIPAL'S REPRESENTATIVE FULL DETAILS OF THE FOLLOWING:
   - NUMBER AND TYPES OF PILE GUIDE FRAMES;
   - PILE DRIVING RIG;
   - PILING TECHNIQUE;
   - HAMMERS AND/OR RAMS.
6. THE CONTRACTOR SHALL NOT REMOVE ANY EQUIPMENT OR PLANT FROM THE SITE PRIOR TO COMPLETION OF PILE DRIVING AND WITHOUT WRITTEN NOTIFICATION TO THE PRINCIPAL'S REPRESENTATIVE GIVING 7 DAYS PRIOR NOTICE.
7. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE HAMMERS OF SUFFICIENT WEIGHT OR CAPACITY TO CONTROL THE LOAD IMPARTED TO THE PILES SO AS TO ENSURE THAT NO PILES ARE DAMAGED DURING PILING AND THAT THE PILES ARE INSTALLED TO THE REQUIRED PENETRATION DEPTH.
8. THE SHEET PILE SETOUT INCLUDING POSITION, LEVELS, DIMENSIONS AND ALIGNMENTS SHALL BE CARRIED OUT BY A REGISTERED SURVEYOR, AT THE CONTRACTOR'S EXPENSE BEFORE COMMENCEMENT OF THE PILING WORK AND DURING THE EXECUTION OF THE WORK.
9. PILES SHALL BE LIFTED AND PITCHED ACCURATELY IN THEIR POSITIONS AND ON APPROPRIATE LINES AND LEVELS.
10. PRIOR TO COMMENCEMENT OF PILE DRIVING, THE CONTRACTOR IS TO CONFIRM THE LOCATION OF ANY EXISTING PILES IN THE FILL THAT MAY AFFECT PROPOSED ALIGNMENT (EG. BENEATH EXISTING SERVICES TRENCHES TO BE DEMOLISHED AND REINSTATED).
11. THE CONTRACTOR SHALL KEEP COMPLETE AND ACCURATE PILING RECORDS DETAILING THE INFORMATION AS REQUIRED BY THE PILING CODE. RECORDS SHALL BE MADE AVAILABLE TO THE PRINCIPAL'S REPRESENTATIVE WITHIN ONE WEEK OF PILING BEING CARRIED OUT.
12. UNLESS PROPOSED OTHERWISE IN WRITING BY THE CONTRACTOR, SHEET PILES SHALL BE PITCHED TO FORM PANELS BEFORE DRIVING. THE PILES SHALL BE PREVENTED FROM LEANING AND/OR TILTING AND IN THIS RESPECT THE CONTRACTOR SHALL ALLOW FOR SUITABLE TEMPORARY GUIDE WALINGS, LEG GUIDES, BACK GUIDES, ETC., TO BE INSTALLED.
13. AS REQUIRED, THE HEADS OF PILES ARE TO BE PROTECTED BY AN APPROVED TYPE OF HELMET AND DOLLY DURING DRIVING.
14. PILES MAY BE VIBRATED INTO POSITION IN LIEU OF DRIVING, SUBJECT TO THERE BEING NO DAMAGE IMPARTED ONTO THE EXISTING JETTIES OR SURROUNDING STRUCTURES.
15. WHERE NECESSARY, THE INTERLOCK OF THE PILES SHALL BE LUBRICATED WITH AN APPROVED GREASE.
16. DURING INSTALLATION, ADJUSTMENTS ARE TO BE MADE TO COMPENSATE CENTRES OF SHEET PILING TO FIT INTO THE OVERALL LENGTH OF SHEET PILING PANELS.
17. CUTTING OFF PILE TOPS SHALL ONLY BE ALLOWED IF THE PRINCIPAL'S REPRESENTATIVE IS SATISFIED THAT THE PILES HAVE BEEN DRIVEN TO THE REQUIRED DEPTH. A RECORD SHALL BE KEPT OF PILES WHICH ARE CUT AND THE LENGTH CUT OFF.
18. TAPER PILES SHALL NOT BE INTRODUCED IN ORDER TO CORRECT PILES WHICH HAVE DEVELOPED A LEAN UNLESS APPROVAL OF THE PRINCIPAL'S REPRESENTATIVE IS FIRST OBTAINED.
19. ANY PILES WHICH SPREAD OR DO NOT PROPERLY INTERLOCK OR DO NOT REMAIN INTERLOCKED SHALL BE WITHDRAWN AND RE-INSTALLED AT NO ADDITIONAL COST TO THE PRINCIPAL.
20. THE MAXIMUM TOLERANCE IN CUT-OFF LEVEL SHALL BE 0mm ABOVE OR 100mm BELOW THE SPECIFIED LEVEL. THE MAXIMUM TOLERANCE IN ALIGNMENT SHALL BE 100mm EITHER SIDE OF THE SPECIFIED LINE. THE MAXIMUM TOLERANCE ON VERTICALITY SHALL BE 1 IN 50 IN PLANES PARALLEL AND PERPENDICULAR TO THE FACE OF THE PILING.
21. THE CONTRACTOR SHALL INSTALL THE PILES TO LESSER TOLERANCES IF REQUIRED TO ACCOMMODATE OTHER PARTS OF THE WORKS.

ROCK REVETMENT AND SCOUR PROTECTION - GEOTEXTILE

1. THE GEOTEXTILE FILTER FABRIC SHALL BE PLACED ON THE PREPARED PROFILE WHERE REQUIRED IN ACCORDANCE WITH THE DRAWINGS.
2. GEOTEXTILE TO BE LAID ON A CONTINUOUS BED FREE OF VOIDS AND FREE OF SHARP OBJECTS TO PREVENT TEARING.
3. GEOTEXTILE ELEMENTS MAY BE JOINED BY EITHER OVERLAPPING OR SEWING. OVERLAP WIDTHS TO BE NO LESS THAN 1000mm. FOR SEWING, 100mm OVERLAP IS SUFFICIENT USING A NON-BIODEGRADABLE THREAD.
4. GEOTEXTILE PLACED IN WATER WILL REQUIRE BALLAST TO SECURE IT IN POSITION. GEOTEXTILE SHALL BE SECURED AND STABILISED DURING CONSTRUCTION TO AVOID FLAPPING.

ROCK REVETMENT AND SCOUR PROTECTION - ROCK

1. INDIVIDUAL ROCKS SHALL BE HARD, DURABLE AND CLEAN AND SHOULD BE FREE FROM CRACKS, CLEAVAGE PLANES, JOINTS, SEAMS, CHEMICAL ALTERATION OR WEATHERING AND OTHER DEFECTS WHICH WOULD RESULT IN THE BREAKDOWN OF THE ROCK IN THE MARINE ENVIRONMENT.
2. ROCK SHALL BE IGNEOUS.
3. THE ARMOUR ROCK, UNDERLAYER, FILTER LAYER AND SCOUR PROTECTION SHALL BE PLACED SUCH THAT THE SPECIFIED REQUIREMENTS FOR MASS AND DIAMETER (MAXIMUM, MINIMUM AND 50% OR MEDIAN), FINISHED SIDE SLOPES, CREST AND TOE LEVELS, LAYER THICKNESSES AND DENSITY REQUIREMENTS, ARE SATISFIED. IN ADDITION ROCKS SHALL BE WEDGED AND LOCKED TOGETHER SUCH THAT THEY ARE NOT FREE TO MOVE.
4. IN ADDITION TO THE ABOVE, THE ROCK SHALL BE PLACED TO SATISFY THE FOLLOWING:
   - ROCK SHALL BE PLACED TO MINIMISE ITS BREAKDOWN ON HANDLING, PRODUCTION OF FINES AND WATER CONTAMINATION;
   - AVOID SEGREGATION DURING PLACEMENT; AND
   - THE FINISHED SLOPE SHALL BE NO STEEPER THAN THE SLOPE SPECIFIED IN THE DRAWINGS.

WorleyParsons resources & energy

INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION

PRELIMINARY

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D	CLIENT
A	ISSUED FOR PRICING	19/10/12	PBC	ARG	DHL	AFN		

REVISIONS | APPROVALS

REFERENCE DRAWINGS | SPECIFICATIONS

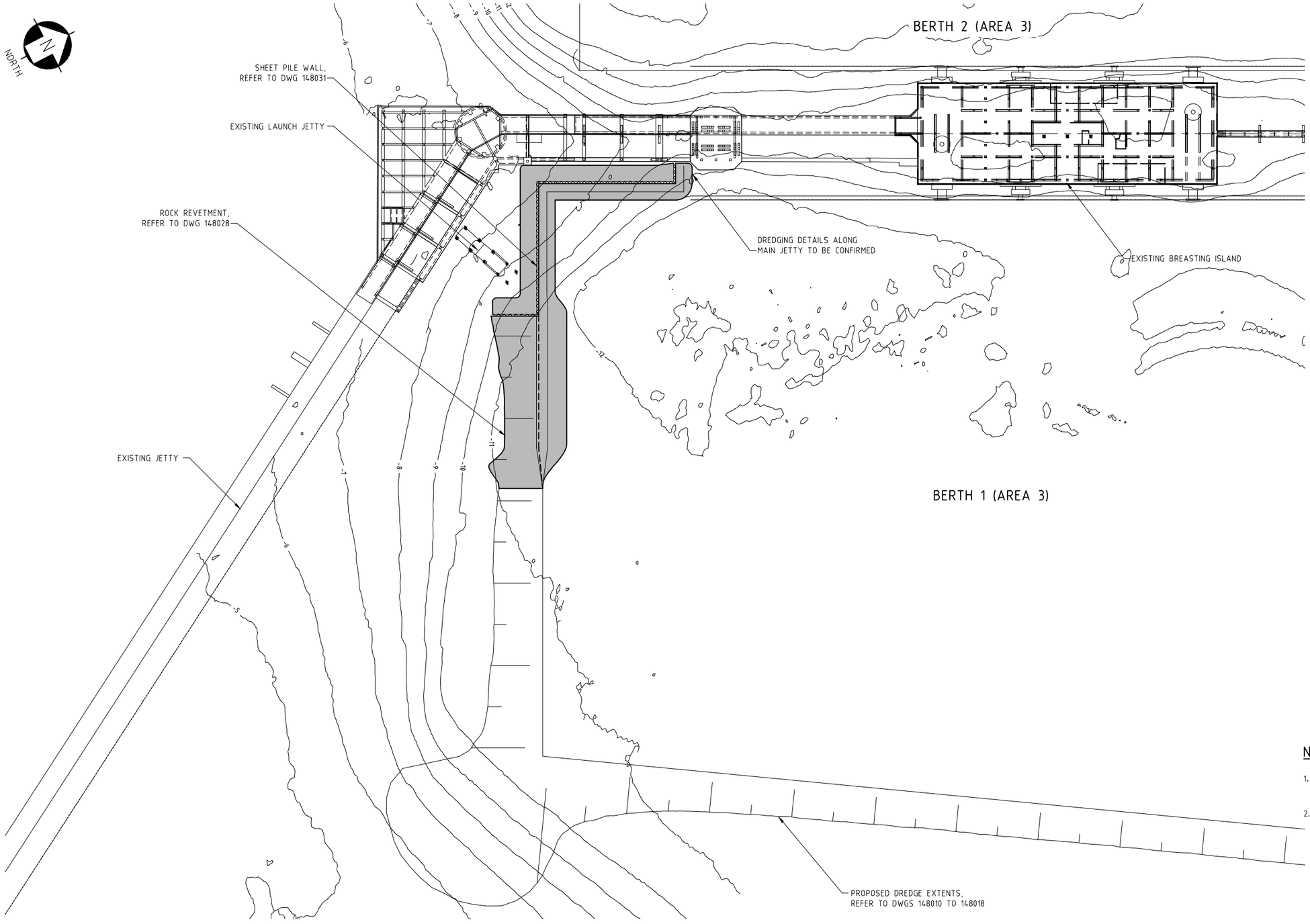
PLANT 23 KURNELL PORT AND BERTHING PROJECT

REVETMENT AND SHEET PILE WORKS

GENERAL NOTES AND SPECIFICATIONS

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148026	1	A

PLOT DATE & TIME: 19/10/2012 4:08:31 PM USER NAME: phil.cornish LOCATION: W:_INFRASTRUCTURE\PROJECTS\30105\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\REVETMENT\148026.DWG



LEGEND

-10 EXISTING CONTOURS, mCD (1m INTERVAL)

NOTES

1. EXISTING CONTOURS HAVE BEEN GENERATED BASED ON SYDNEY PORTS CORP JUNE 2010 & MAY 2012 SURVEY DATA
2. EXISTING JETTY IS BASED ON WATSON BUCHAN CONSULTING SURVEYORS WAE DRG A1-144221 SHT 0 REV 7 05.05.2012 AND SUBSTRUCTURE CAD DRG'S SUPPLIED BY CALTEX 1996. ALL DIMENSIONS AND LEVELS ARE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION AND CONSTRUCTION.

10 0 10 20 30 40 50m

1:500 (A1) 1:1000 (A3)

INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION

PRELIMINARY

WorleyParsons resources & energy

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
A	ISSUED FOR PRICING	19/10/12	PBC	ARG	DHL	AFN	

REFERENCE DRAWINGS | SPECIFICATIONS | REVISIONS | APPROVALS

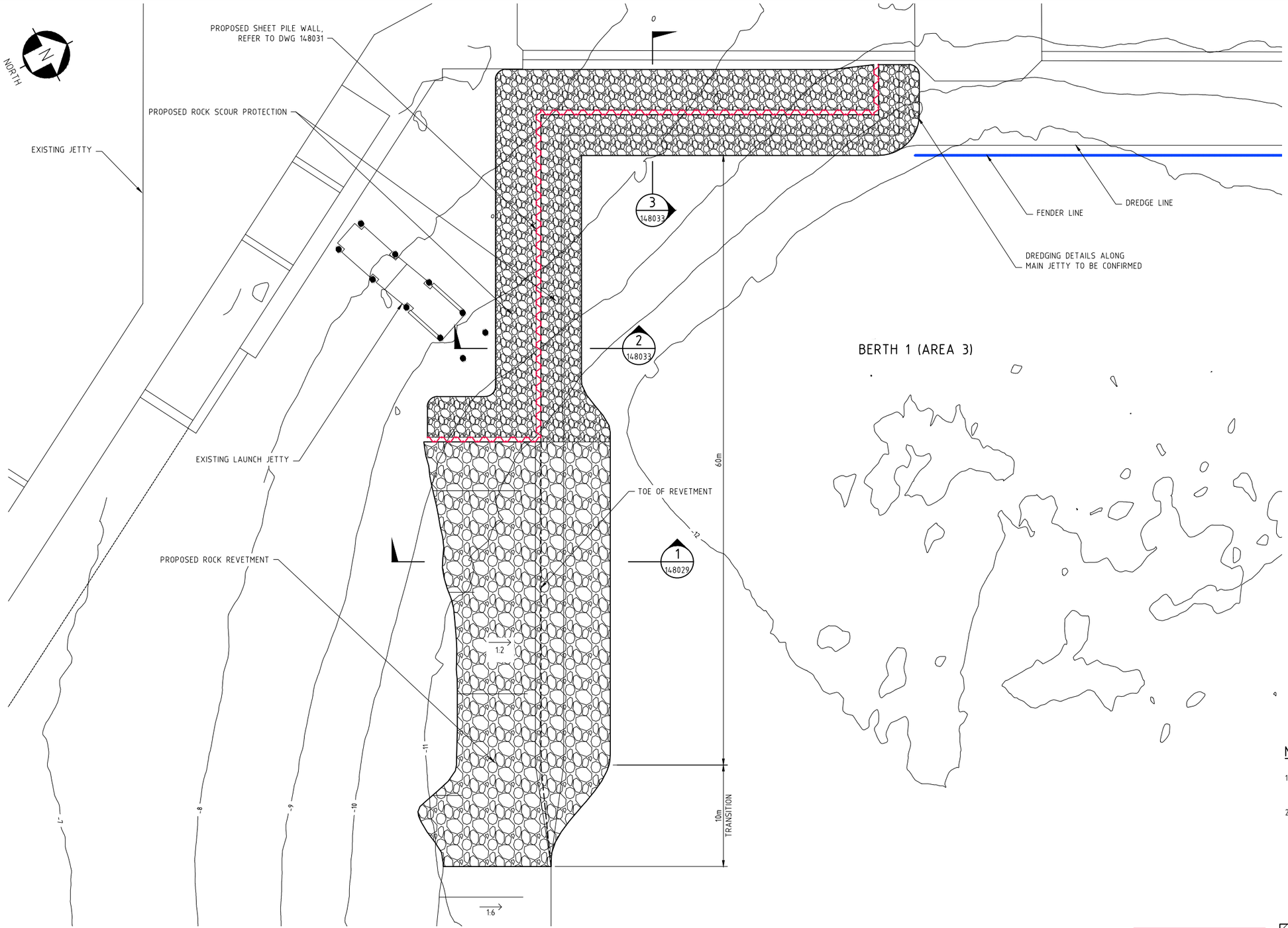
PLANT 23 KURNELL PORT AND BERTHING PROJECT

REVETMENT AND SHEET PILE WORKS

GENERAL ARRANGEMENT

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148027	0	A

PLOT DATE & TIME: 19/10/2012 4:08:48 PM USER NAME: phil.cornish LOCATION: W:_INFRASTRUCTURE\PROJECTS\301015\93067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\REVETMENT\148027.DWG



NOTES

1. EXISTING CONTOURS HAVE BEEN GENERATED BASED ON SYDNEY PORTS CORP JUNE 2010 & MAY 2012 SURVEY DATA
2. EXISTING JETTY IS BASED ON WATSON BUCHAN CONSULTING SURVEYORS WAE DRG A1-144221 SHT 0 REV 7 05.05.2012 AND SUBSTRUCTURE CAD DRG'S SUPPLIED BY CALTEX 1996. ALL DIMENSIONS AND LEVELS ARE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION AND CONSTRUCTION.

4 0 4 8 12 16 20m
1:200 (A1) 1:400 (A3)

INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION

WorleyParsons
resources & energy

PRELIMINARY

PLANT 23 KURNELL PORT AND BERTHING PROJECT

REVETMENT AND SHEET PILE WORKS

REVETMENT PLAN

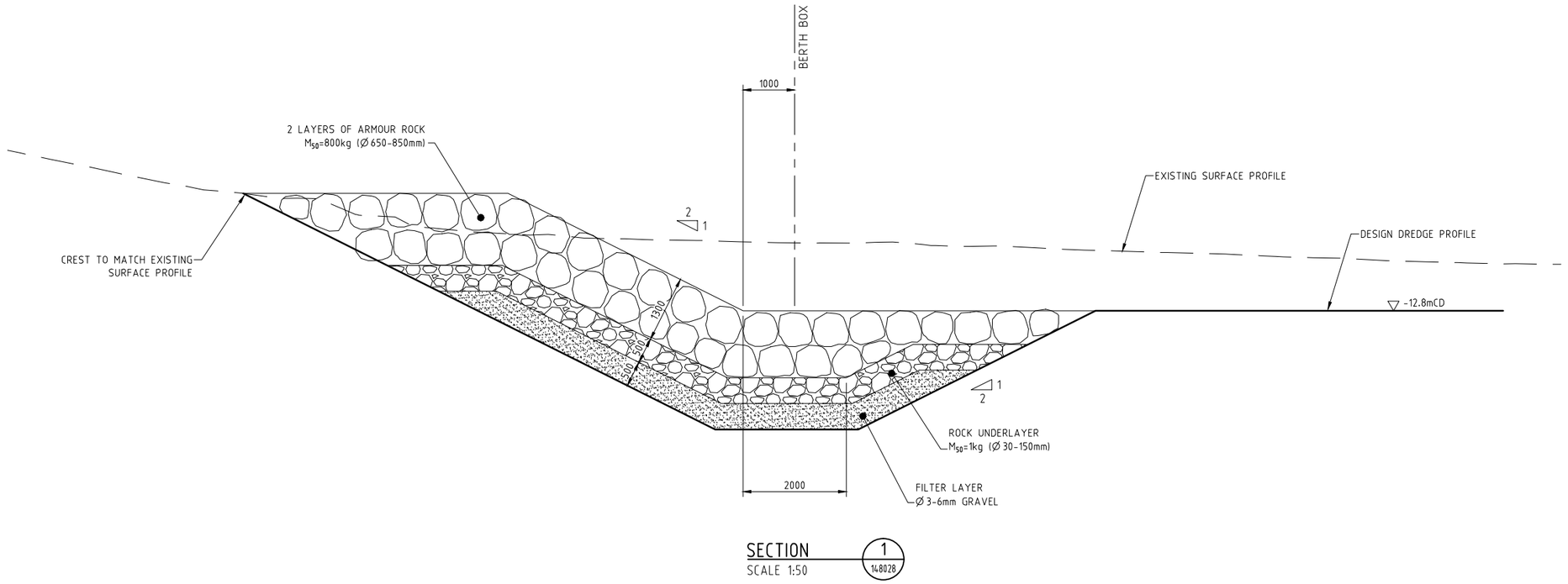
RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148028	0	A

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D	CLIENT
A	ISSUED FOR PRICING	19/10/12	PBC	ARG	DHL	AFN		

REVISIONS APPROVALS

REFERENCE DRAWINGS SPECIFICATIONS

PLOT DATE & TIME: 19/10/2012 4:08:58 PM USER NAME: phil.cornish LOCATION: W:_INFRASTRUCTURE\PROJECTS\30105\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\REVETMENT\148028.DWG



SECTION 1 (148028)
SCALE 1:50

WorleyParsons
resources & energy

1000 0 1000 2000 3000 4000 5000mm
1:50 (A1) 1:100 (A3)

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

PRELIMINARY

PLANT 23 KURNELL PORT AND BERTHING PROJECT

REVETMENT AND SHEET PILE WORKS

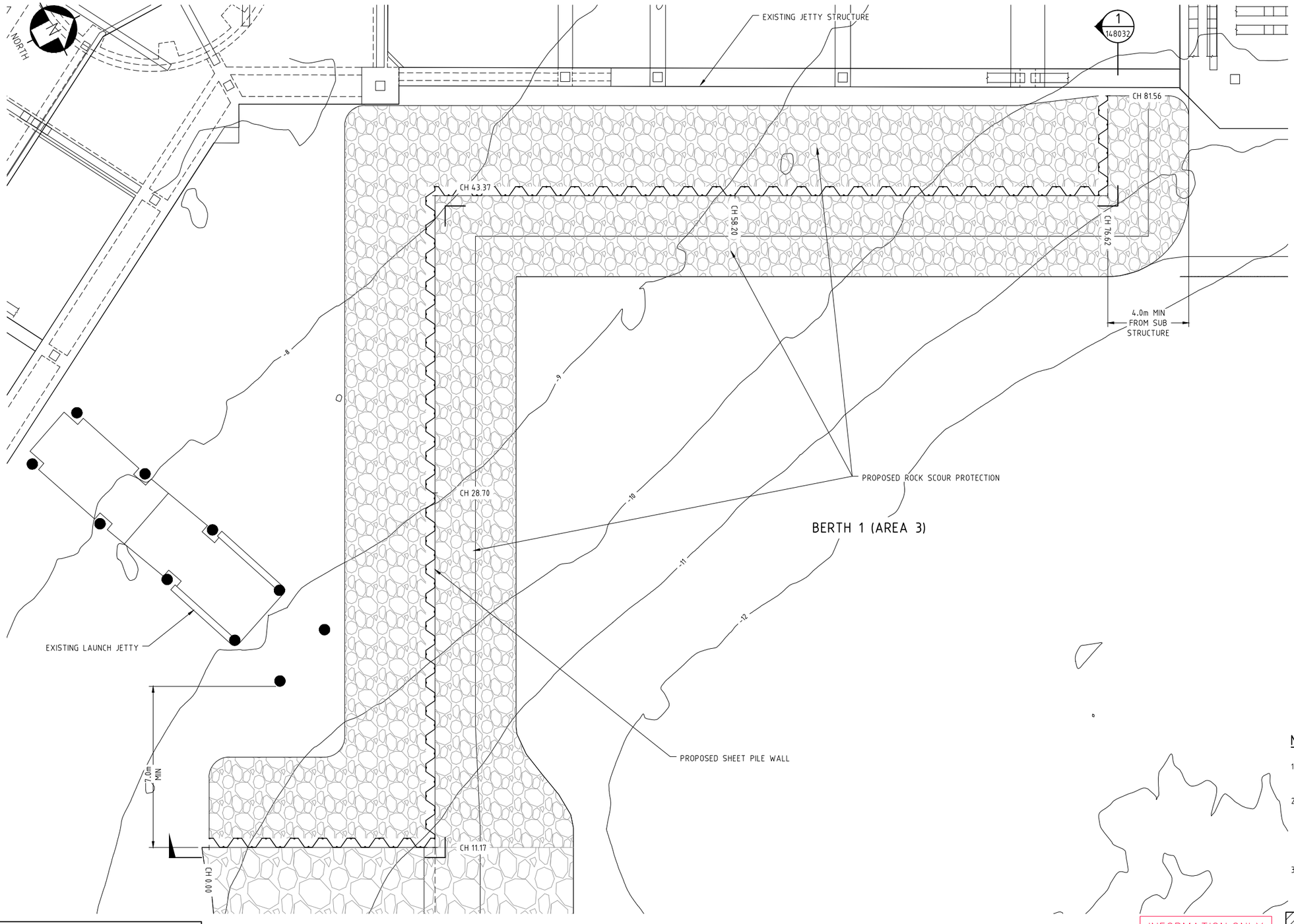
REVETMENT TYPICAL SECTION

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
A	ISSUED FOR PRICING	19/10/12	PBC	ARG	DHL	AFN	

REFERENCE DRAWINGS | SPECIFICATIONS | REVISIONS | APPROVALS

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148029	0	A

PLOT DATE & TIME: 19/10/2012 4:09:00 PM USER NAME: phil.cornish LOCATION: W:_INFRASTRUCTURE\PROJECTS\30105\53067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\REVETMENT\148029.DWG



LEGEND

-10 EXISTING CONTOURS, mCD (1m INTERVAL)

NOTES

1. EXISTING CONTOURS HAVE BEEN GENERATED BASED ON SYDNEY PORTS CORP JUNE 2010 & MAY 2012 SURVEY DATA
2. EXISTING JETTY IS BASED ON WATSON BUCHAN CONSULTING SURVEYORS WAE DRG A1-144221 SHT 0 REV 7 05.05.2012 AND SUBSTRUCTURE CAD DRG'S SUPPLIED BY CALTEX 1996. ALL DIMENSIONS AND LEVELS ARE TO BE CONFIRMED ON SITE PRIOR TO FABRICATION AND CONSTRUCTION.
3. CHAINAGE LABELS ON SHEET PILE WALL ARE BASED ON A SINGLE SHEET PILE WIDTH OF 700mm.

2 0 2 4 6 8 10m
1:100 (A1) 1:200 (A3)

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

PRELIMINARY

WorleyParsons
resources & energy

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
A	ISSUED FOR PRICING	19/10/12	PBC	ARG	DHL	AFN	

REFERENCE DRAWINGS | SPECIFICATIONS | REVISIONS | APPROVALS

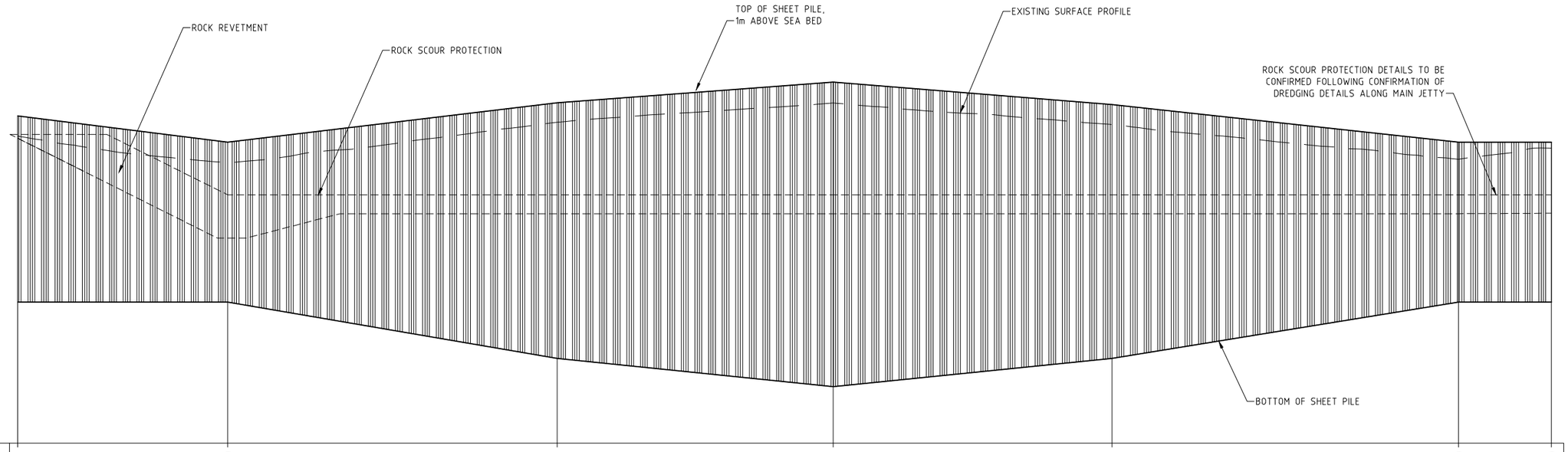
PLANT 23 KURNELL PORT AND BERTHING PROJECT

REVETMENT AND SHEET PILE WORKS

SHEET PILE WALL PLAN

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148031	0	A

PLOT DATE & TIME: 19/10/2012 4:09:11 PM USER NAME: phil.cornish LOCATION: W:_INFRASTRUCTURE\PROJECTS\301015\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\REVETMENT\148031.DWG



DATUM RL -26.0

TOP OF SHEET PILE	-8.60	-10.00	-7.90	-6.80	-8.00	-10.00	-10.00
BOTTOM OF SHEET PILE	-18.50	-18.50	-21.50	-23.00	-21.50	-18.50	-18.50
EXISTING SURFACE PROFILE	-9.67	-11.09	-8.94	-7.91	-9.06	-10.90	-10.31
CHAINAGE	0.00	11.17	28.70	43.37	58.20	76.62	81.56

ELEVATION 1 (148031)
SCALE 1:125

NOTES:

1. STEEL SHEET PILE TO BE AZ36-700N OR BETTER
2. MINIMUM SHEET PILE SECTION DETAILS (UNO):
   - CROSS SECTION AREA: 215cm²/m OF WALL MIN
   - SECTION MODULUS: 3590cm³/m OF WALL MIN
   - YIELD STRESS: 355 MPa MIN
3. ALL LEVELS REDUCED TO CHART DATUM
4. CHAINAGE LABELS ARE BASED ON A SINGLE SHEET PILE WIDTH OF 700mm

2500 0 2500 5000 7500 10000 12500mm
1:125 (A1) 1:250 (A3)

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

WorleyParsons
resources & energy

PRELIMINARY

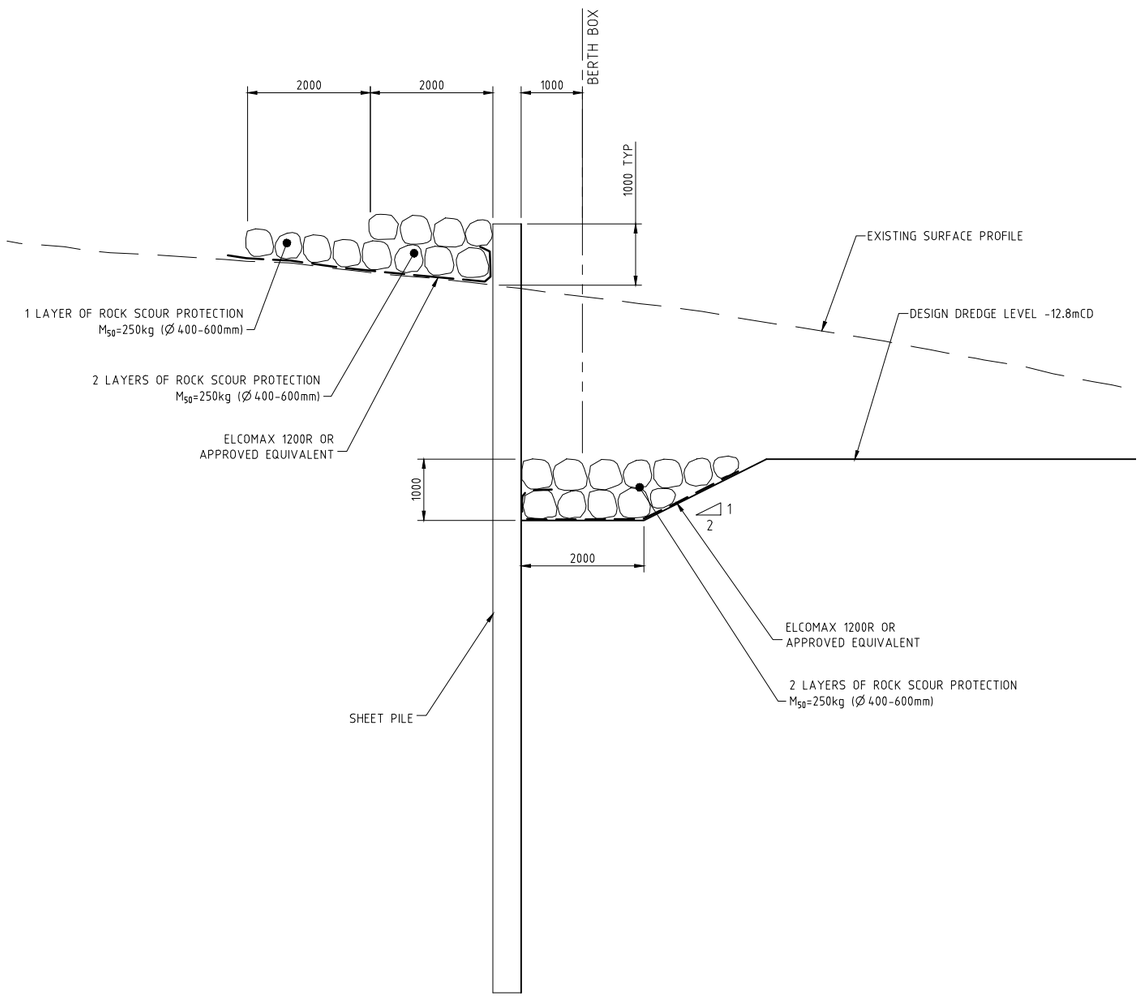
PLANT 23 KURNELL PORT AND BERTHING PROJECT
REVETMENT AND SHEET PILE WORKS
SHEET PILE WALL ELEVATION

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148032	0	A

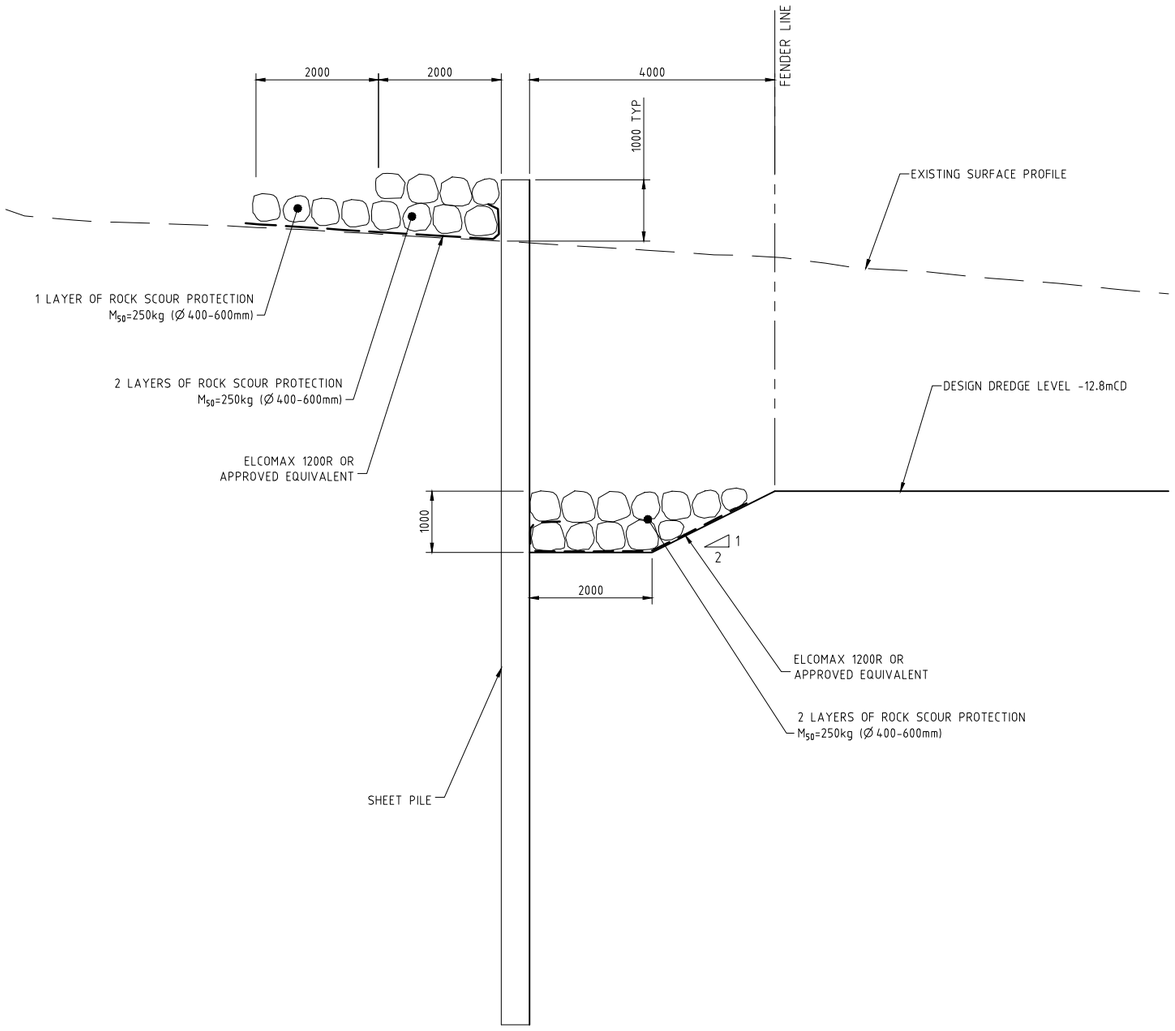
No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D CLIENT
A	ISSUED FOR PRICING	19/10/12	PBC	ARG	DHL	AFN	

REFERENCE DRAWINGS | SPECIFICATIONS | REVISIONS | APPROVALS

PLOT DATE & TIME: 19/10/2012 4:09:14 PM USER NAME: phil.cornish LOCATION: W:_INFRASTRUCTURE\PROJECTS\301015\V3067_CALTEX KURNELL JETTY UPGRADE\V2.0 DRAWINGS\DRGS\CIVIL\REVETMENT\148032.DWG



SECTION 2
SCALE 1:50
148028



SECTION 3
SCALE 1:50
148028

WorleyParsons
resources & energy

1000 0 1000 2000 3000 4000 5000mm
1:50 (A1) 1:100 (A3)

INFORMATION ONLY
NOT TO BE USED
FOR CONSTRUCTION

PRELIMINARY

PLANT 23 KURNELL PORT AND BERTHING PROJECT

REVETMENT AND SHEET PILE WORKS

SHEET PILE WALL TYPICAL SECTIONS AND DETAILS

No.	DESCRIPTION	DATE	DRN	DRAFT CHK	DES	ENG CHK	APP'D	CLIENT
A	ISSUED FOR PRICING	19/10/12	PBC	ARG	DHL	AFN		

REFERENCE DRAWINGS | SPECIFICATIONS | REVISIONS | APPROVALS

RFC. No.	INDEX	SHT SIZE.	DRAWING No.	SHT No.	REV.
X	A	A1	148033	0	A

PLOT DATE & TIME: 19/10/2012 4:08:29 PM USER NAME: phil.cornish LOCATION: W:_INFRASTRUCTURE\PROJECTS\301015\03067_CALTEX KURNELL JETTY UPGRADE\12.0 DRAWINGS\DRGS\CIVIL\REVETMENT\148033.DWG

Appendix L

Borehole Records (2012)

Figure 1: Borehole Plan

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.2 CD*
EASTING: 334663
NORTHING: 6236267
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 73187
DATE: 3 - 5/10/2012
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-12	0.0	SILTY SAND - very loose to loose, brown-grey, silty sand with dark grey ash and slag fragments and some shells (20-40mm in diameter)							
				U_{70}	0.5		pp = 180-220 Fell an initial 800mm under own weight		
-13	1.0	SANDY CLAY - firm to stiff, grey, fine to medium grained, sandy clay with a trace of fine shell fragments			1.5				
	1.8	SILTY SAND - medium dense, grey to dark grey, slightly clayey, silty sand		S	2.0		3,9,10 N = 19		
-14	2.8	SAND - dense, dark brown, fine to medium grained sand (description based on drilling cuttings)			2.45				
				S	3.0		10,11,19 N = 30 (no sample recovered)		
-15					3.45				
				S	4.0		12,18,20 N = 38 (no sample recovered)		
-16					4.45				
				S	5.0		16,25,30 N = 55		
-17	5.2	SAND - very dense, brown, fine to medium grained sand with trace of silt			5.5				
		- becoming grey from about 6.0m							
-18				S	6.5		35,40/110mm refusal		
					6.76				
-19					8.0				
	8.2	SILTY SAND - dense, grey to dark grey, silty sand with some clay		S	8.45		25,13,21 N = 34		
-20	8.9	SANDY CLAY - grey to dark grey, sandy clay		D	9.0		(drilling cuttings)		
	9.6	SAND - very dense, grey to dark grey, fine to medium grained, slightly silty sand		S	9.5		12,26,25 N = 51		
-21					9.95				

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 6.0m

TYPE OF BORING: Rotary washboring with blade bit to 24.95m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.2 CD*
EASTING: 334663
NORTHING: 6236267
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 73187
DATE: 3 - 5/10/2012
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-22	11	SAND - very dense, grey to dark grey, fine to medium grained, slightly silty sand *(continued)*							11
		- becoming dark grey from about 11.0m		S	11.0 11.4		8,12,40/100mm refusal		
-23	12								12
	12.3	SAND - very dense, grey to light grey, fine to medium grained sand with a trace of silt		S	12.5 12.7		45,20/50mm refusal		
-24	13								13
-25	14			S	14.0 14.2		50,20/50mm refusal		14
	14.7	CLAYEY SAND - very dense, grey to dark grey, fine to medium grained clayey sand							
-26	15								15
	15.3	SAND - very dense, brown, fine to medium grained sand with a trace of silt		S	15.5 15.8		25,45 refusal		
-27	16								16
-28	17			S	17.0 17.3		38,45 refusal		17
-29	18								18
-30	19			S	18.5 18.8		38,50 refusal		19
-31									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 6.0m

TYPE OF BORING: Rotary washboring with blade bit to 24.95m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.2 CD*
EASTING: 334663
NORTHING: 6236267
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 73187
DATE: 3 - 5/10/2012
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-32	21	SAND - very dense, brown, fine to medium grained sand with a trace of silt *(continued)*		S	20.0 20.3		27,45 refusal		21
		- becoming grey-brown from about 21.0m		S	21.5 21.95		24,40,35 N = 75		
-33	22								22
-34	23			S	23.0 23.3		37,51 refusal		23
-35	24								24
-36	24.95 25			S	24.5 24.95		22,40,50 N = 90		25
		Bore discontinued at 24.95m (RL-35.05m CD) - target depth reached							
-37	26								26
-38	27								27
-39	28								28
-40	29								29
-41									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 6.0m

TYPE OF BORING: Rotary washboring with blade bit to 24.95m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.8 CD*
EASTING: 334779
NORTHING: 6236259
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 73187
DATE: 7 - 8/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-12	0.0	SILTY SAND - very loose to loose, grey, silty sand with some shells and shell fragments			0.0				
	0.5	PEAT - hard, black peat		U_{70}			pp >400		
-13	1.0	CLAY - stiff, dark grey, clay with a trace of fine grained sand, interbedded with some sandy clay lenses		S	1.0		5,5,8 N = 13		
					1.45				
-14	2.1	SAND - dense, brown, fine to medium grained sand with a trace of silt		U_{70}	2.0		refusal		
					2.22				
-15				S	3.0		12,17,25 N = 42		
					3.45				
-16				S	4.0		13,20,25 N = 45		
	4.5				4.45				
-17		Bore discontinued at 4.5m (RL-16.3m CD) - target depth reached							
-18									
-19									
-20									
-21									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 3.0m

TYPE OF BORING: Rotary washboring with blade bit to 4.5m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -12.6 CD*
EASTING: 334818
NORTHING: 6236338
DIP/AZIMUTH: 90°/--

BORE No: 3
PROJECT No: 73187
DATE: 8/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-13	0.2	SILTY SAND - loose to very loose, grey, silty sand with some shell fragments			0.0				
	0.5	PEAT - very stiff to hard, black peat		U_{70}			pp = 180-240 Fell an initial 250mm under own weight		
	0.9	CLAY - very stiff to hard, dark grey clay with some fine grained sand and silt			0.95				
-14	1	SAND - medium dense, brown, fine to medium grained sand with a trace of silt		S	1.0		11,10,7 N = 17		
					1.45				
-15	2			S	2.0		11,13,18 N = 31		
					2.45				
-16	3			S	3.0		16,30,40 N = 70		
	3.5				3.45				
		Bore discontinued at 3.5m (RL-16.1m CD) - target depth reached							
-17	4								
-18	5								
	6								
-19	7								
-20	8								
-21	9								
-22									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 2.0m

TYPE OF BORING: Rotary washboring with blade bit to 3.5m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.2 CD*
EASTING: 334883
NORTHING: 6236418
DIP/AZIMUTH: 90°/--

BORE No: 4
PROJECT No: 73187
DATE: 10/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - very loose to loose, brown, fine to medium grained sand with some shell fragments		U_{70}	0.0		(refusal at 0.7m depth)		
	0.5	SAND - loose to medium dense, grey to light grey, fine to medium grained sand with a trace of silt			0.7				
-12	1			S	1.0		1,3,5 N = 8		1
					1.45				
-13	2			S	2.0		3,6,7 N = 13		2
					2.45				
-14	3			S	3.0		2,10,16 N = 26		3
	3.5	SAND - dense to very dense, grey to light grey, fine to medium grained sand with a trace of silt			3.45				
-15	4			S	4.0		17,22,25 N = 47		4
					4.45				
-16	5			S	5.0		30,40 refusal		5
	5.3	Bore discontinued at 5.3m (RL-16.5m CD) - target depth reached			5.3				
-17	6								6
-18	7								7
-19	8								8
-20	9								9
-21									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 3.0m

TYPE OF BORING: Rotary washboring with blade bit to 5.3m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -13.0 CD*
EASTING: 334652
NORTHING: 6236399
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 73187
DATE: 11/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-13	0.0	SILTY SAND - very loose to loose, dark grey silty sand with shell fragments		U_{70}	0.0		pp = 200-220 Fell an initial 500mm under own weight		
	0.6	CLAYEY SAND - very loose, grey, clayey sand with some shell fragments							
-14	0.8	CLAY - stiff to very stiff, grey clay with some fine grained sand and silt		S	1.0		4,5,5 N = 10		1
	1				1.45				
	1.8	SANDY CLAY - stiff, dark grey sandy clay		S	2.0		3,4,6 N = 10		
-15	2				2.45				2
-16	3								
	3.0	SAND - dense to very dense, fine to medium grained sand with a trace of silt		S	3.0		15,20,22 N = 42		3
	3.5	Bore discontinued at 3.5m (RL-16.5m CD) - target depth reached			3.45				
-17	4								4
-18	5								5
-19	6								6
-20	7								7
-21	8								8
-22	9								9

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 2.0m

TYPE OF BORING: Rotary washboring with blade bit to 3.5m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.2 CD*
EASTING: 334525
NORTHING: 6236366
DIP/AZIMUTH: 90°/--

BORE No: 6
PROJECT No: 73187
DATE: 18/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-12	0.9	SILTY SAND - very loose, grey/dark grey, silty sand with some clay and a trace of shells/shell fragments		U_{70}	0.0		(150mm fall under rod weight, 200mm sample recovered)		
-13	2	SAND - very loose, light brown/grey sand with a trace of silt		S	1.0		0,0,1 N = 1		
					1.45				
				S	2.0		0,1,2 N = 3		
					2.45				
-14	3			S	3.0		1,1,1 N = 2		
					3.45				
-15	4	- becoming grey, slightly silty sand from 4.2m		S	4.0		1,1,1 N = 2		
					4.45				
-16	5	- becoming light brown, medium dense sand from 5.1m		S	5.0		2,8,12 N = 20		
	5.45	Bore discontinued at 5.45m (RL-16.65m CD) - limit of investigation			5.45				
-17	6								
-18	7								
-19	8								
-20	9								
-21									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 5.0m

TYPE OF BORING: Rotary washboring with blade bit to 5.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.9 CD*
EASTING: 334732
NORTHING: 6236350
DIP/AZIMUTH: 90°/--

BORE No: 7
PROJECT No: 73187
DATE: 23/10/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-12	0.0	PEAT - hard, black peat		U_{70}	0.0		refusal at 0.7m depth		
	0.6	SILTY CLAY - very stiff, grey silty clay with some grey, fine to medium grained sand lenses			0.6		pp >400		
-13	1			S	1.0		6,9,11 N = 20		1
	1.7	SILTY SAND - medium dense, dark brown/dark grey, silty, fine to medium grained sand			1.45				
-14	2			S	2.0		6,6,12 N = 18		2
	2.8	SAND - dense, brown, fine to medium grained sand			2.45				
-15	3			S	3.0		7,12,25 N = 37		3
					3.45				
-16	4	- becoming very dense from 4.2m		S	4.0		13,26,40 N = 66		4
	4.45	Bore discontinued at 4.45m (RL-16.35m CD) - limit of investigation			4.45				
-17	5								5
-18	6								6
-19	7								7
-20	8								8
-21	9								9

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 1.0m

TYPE OF BORING: Rotary washboring with blade bit to 4.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.6 CD*
EASTING: 334615
NORTHING: 6236530
DIP/AZIMUTH: 90°/--

BORE No: 8
PROJECT No: 73187
DATE: 14 - 15/11/2012
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-12	0.0	PEAT - hard, black peat		U_{70}	0.0		refusal at 0.15m depth		
				U_{70}	0.15		refusal at 0.45m depth		
					0.45				
	1			S	1.0		13,18,35 N = 53		1
-13					1.45				
	2			S	2.0		9,11,12 N = 23		2
	2.2	SILTY CLAY - very stiff, grey silty clay with some thin sand lenses and a trace of organic material (wood fragments and leaves)			2.45				
-14	3			S	3.0		3,4,7 N = 11		3
-15					3.45				
	3.8	SILTY SAND - medium dense, grey/dark grey slightly clayey silty sand		S	4.0		9,7,5 N = 12		4
-16	4.45	Bore discontinued at 4.45m (RL-16.05m CD) - limit of investigation			4.45				
	5								5
-17									
	6								6
-18									
	7								7
-19									
	8								8
-20									
	9								9
-21									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 0.7m

TYPE OF BORING: Rotary washboring with blade bit to 4.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -12.7 CD*
EASTING: 334764
NORTHING: 6236569
DIP/AZIMUTH: 90°/--

BORE No: 9
PROJECT No: 73187
DATE: 26 - 28/11/2012
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-13	0.2	SILTY SAND - loose, grey, silty sand with a trace of shell fragments			0.0				
		SAND - medium dense, light grey, fine to medium grained sand		U_{70}			Approximately 0.5m recovery		
	1			S	1.0		5,4,5 N = 9		1
-14					1.45				
	2			S	2.0		2,8,8 N = 16		2
-15					2.45				
	3	- becoming very dense from 3.0m		S	3.0		22,35 refusal		3
-16					3.3				
	3.7	SILTY SAND - dense, brown, fine to medium grained silty sand							
	4			S	4.0		9,15,18 N = 33		4
-17					4.45				
	5								5
	5.0	SAND - very dense, grey, fine to medium grained sand							
-18				S	5.5		25,40 refusal		
					5.8				
	6								6
-19									
	7			S	7.0		35,34,20/50mm refusal		7
-20					7.35				
	8								8
	8.1	CLAY - stiff, grey clay with a trace of fine to medium grained sand		D	8.1				
-21					8.3				
				S	8.5		4,7,8 N = 15		
	9				8.95				9
-22									
	9.9								

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 4.7m

TYPE OF BORING: Rotary washboring with blade bit to 28.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -12.7 CD*
EASTING: 334764
NORTHING: 6236569
DIP/AZIMUTH: 90°/--

BORE No: 9
PROJECT No: 73187
DATE: 26 - 28/11/2012
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-23		SILTY SAND - brown silty sand *(continued)*		S	10.0 10.45		6,20,22 N = 42		
		- light brown, slightly clayey sand from 10.5m							
	11 11.0	SAND - very dense, grey sand							
-24				S	11.5 11.75		30,35/100mm refusal		
	12								
-25									
	13			S	13.0 13.2		40,20/50mm refusal		
-26									
	14								
-27				S	14.5 14.7		40,20/50mm refusal		
	15	15.0-15.4m: stiff, grey sandy clay band							
-28									
	16			S	16.0 16.3		28,50 refusal		
-29									
	17								
-30				S	17.5 17.7		45,20/50mm refusal		
	18								
-31									
	19			S	19.0 19.15		60 refusal		
-32									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 4.7m

TYPE OF BORING: Rotary washboring with blade bit to 28.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -12.7 CD*
EASTING: 334764
NORTHING: 6236569
DIP/AZIMUTH: 90°/--

BORE No: 9
PROJECT No: 73187
DATE: 26 - 28/11/2012
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-33		SAND - very dense, grey sand *(continued)*							
				S	20.5 20.65		65 refusal		
-34	21								21
		- stiff, brown, slightly sandy clay band at 21.7m (0.4m thick)							
	22				22.0				22
-35	22.2	CLAY - very stiff, grey clay (brown inclusions?)		S	22.45		40,32,20 N = 52		
	23								23
-36					23.5				
				S	23.95		10,14,17 N = 31		
	24								24
-37									
	25	- trace of sand and shell fragments from 25.0m			25.0				25
-38				S	25.45		12,18,22 N = 40		
	26								26
-39					26.5				
				S	26.95		9,12,20 N = 32		
	27								27
-40									
	28	- grey clayey sand band at 27.8m (0.6m thick) with trace shell fragments			28.0				28
-41				S			6,8,12 N = 20		
	28.45	Bore discontinued at 28.45m (RL-41.15m CD) - limit of investigation			28.45				
	29								29
-42									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 4.7m

TYPE OF BORING: Rotary washboring with blade bit to 28.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.6 CD*
EASTING: 334713
NORTHING: 6236446
DIP/AZIMUTH: 90°/--

BORE No: 10
PROJECT No: 73187
DATE: 29/10 - 1/11/2012
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-12	0.0	SILTY SAND - loose, grey, silty sand with a trace of shell fragments		U_{70}	0.0		refusal at 0.7m depth		
	0.45	PEAT - hard black peat			0.7				
-13	1			S	1.0		13,25,30/100mm refusal		
					1.4				
	1.8	SILTY CLAY - very stiff, grey, silty clay with some fine to medium grained sand lenses		S	2.0		5,10,10 N = 20		
-14	2				2.45				
	2.8	SILTY SAND - dense, grey, fine to medium grained silty sand with some clay		S	3.0		6,16,18 N = 34		
-15	3				3.45				
	4			S	4.0		10,14,25 N = 39		
	4.2	SAND - dense, brown, fine to medium grained sand			4.45				
-16	5								
-17				S	5.5		10,13,28 N = 41		
	6				5.95				
-18	7	- very dense, light brown-grey sand from about 7.0m		S	7.0		20,35 refusal		
-19					7.3				
	8								
-20				S	8.5		12,32,20/100mm refusal		
	9				8.9				
-21	9.8	CLAY - stiff, grey clay							

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB/AP **CASING:** HW to 1.3m; HQ to 22.1m

TYPE OF BORING: Rotary washboring with blade bit to 28.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.6 CD*
EASTING: 334713
NORTHING: 6236446
DIP/AZIMUTH: 90°/--

BORE No: 10
PROJECT No: 73187
DATE: 29/10 - 1/11/2012
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-22		CLAY - stiff, grey clay *(continued)*		S	10.0 10.45		4,6,8 N = 14		
	11								11
-23	11.3	SILTY SAND - dense, grey, silty sand		S	11.5 11.95		18,28,18 N = 46		
	12								12
-24									
	13	- 0.3m thick grey-light brown clay band at 12.9m		S	13.0 13.3		6,40 refusal		13
	13.2	SAND - very dense, grey, fine to medium grained sand							
-25									
	14								14
-26				S	14.5 14.65		50 refusal		
	15								15
-27									
	16			S	16.0 16.15		50 refusal		16
-28									
	17								17
-29		- 0.1m thick clay band at 17.5m		S	17.5 17.65		40 refusal		
	18								18
-30									
	19			S	19.0 19.3		13,40 refusal		19
-31									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB/AP **CASING:** HW to 1.3m; HQ to 22.1m

TYPE OF BORING: Rotary washboring with blade bit to 28.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.6 CD*
EASTING: 334713
NORTHING: 6236446
DIP/AZIMUTH: 90°/--

BORE No: 10
PROJECT No: 73187
DATE: 29/10 - 1/11/2012
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-32	21	SAND - very dense, grey, fine to medium grained sand *(continued)*		S	20.5 20.65		45 refusal		21
-33	21.3	CLAY - stiff to very stiff, grey clay with a trace of silt							
	22			S	22.0 22.45		1,7,10 N = 17		22
-34	23								23
-35				S	23.5 23.95		2,4,8 N = 12		
	24								24
-36	25			S	25.0 25.45		3,8,9 N = 17		25
-37	26								26
-38				S	26.5 26.95		5,10,13 N = 23		
	27								27
-39	28	- a trace of fine, light grey shell fragments from 28.0m		S	28.0		2,7,9 N = 16		28
-40	28.45	Bore discontinued at 28.45m (RL-40.05m CD) - limit of investigation			28.45				
	29								29
-41									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB/AP **CASING:** HW to 1.3m; HQ to 22.1m

TYPE OF BORING: Rotary washboring with blade bit to 28.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.7 CD*
EASTING: 334725
NORTHING: 6236470
DIP/AZIMUTH: 90°/--

BORE No: 11
PROJECT No: 73187
DATE: 5 - 8/11/2012
SHEET 1 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-12	0.5	SAND - loose, grey, slightly silty, fine to medium grained sand with a trace of shell fragments							
		PEAT - hard, dark brown/black peat		U_{70}	0.5 0.62		refusal at 0.62m depth		
-13	1			S	1.0 1.42		20,40,45/120mm refusal		
	1.8	SILTY CLAY - very stiff, grey, silty clay with some fine to medium grained sand lenses		S	2.0 2.45		9,10,12 N = 22		
-14	2								
	2.9	SAND - medium dense, dark grey/grey, slightly silty, fine to medium grained sand		S	3.0 3.45		8,8,14 N = 22		
-15	3								
		- becoming brown, fine to medium grained sand from 3.7m		S	4.0 4.45		10,9,11 N = 20		
-16	4								
		- becoming dark grey from 5.2m		S	5.0 5.45		11,13,18 N = 31		
-17	5								
	6.0	SAND - very dense, dark grey, slightly silty, fine to medium grained sand		S	6.5 6.95		17,30,30 N = 60		
-18	6								
-19	7								
	8			S	8.0 8.3		25,35 refusal		
-20									
-21	9			S	9.5 9.8		30,35 refusal		

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 2.0m; HQ to 20.9m

TYPE OF BORING: Rotary washboring with blade bit to 28.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.7 CD*
EASTING: 334725
NORTHING: 6236470
DIP/AZIMUTH: 90°/--

BORE No: 11
PROJECT No: 73187
DATE: 5 - 8/11/2012
SHEET 2 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-22		SAND - very dense, dark grey, slightly silty, fine to medium grained sand *(continued)*							
	10.4	CLAY - stiff, grey clay with a trace of fine to medium grained sand							
	11			S	11.0		1,5,6 N = 11		11
-23	11.3	SAND - medium dense, grey-brown, fine to medium grained sand			11.45				
	12								12
-24				S	12.5		5,2,22 N = 24		
		- loose, brown silty sand band at 12.6m (0.2m thick)			12.95				
	13	- becoming dark brown from 12.9m							13
-25									
	14	- very stiff, grey-light brown, clay band with a trace of decomposed rootlet at 13.8m (0.4m thick)		S	14.0		30,35 refusal		14
-26	14.2	SAND - very dense, light brown-grey, fine to medium grained sand			14.3				
	15								15
-27				S	15.5		60 refusal		
					15.65				
	16								16
-28									
	17			S	17.0		60 refusal		17
-29					17.15				
	18								18
-30				S	18.5		40,30/100mm refusal		
					18.75				
	19								19
-31									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 2.0m; HQ to 20.9m

TYPE OF BORING: Rotary washboring with blade bit to 28.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -11.7 CD*
EASTING: 334725
NORTHING: 6236470
DIP/AZIMUTH: 90°/--

BORE No: 11
PROJECT No: 73187
DATE: 5 - 8/11/2012
SHEET 3 OF 3

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-32	21	SAND - very dense, light brown-grey, fine to medium grained sand *(continued)*		S	20.0 20.15		50 refusal		
-33	22	- 10mm band of grey clay at 21.7m		S	21.5 21.95		30,20,35 N = 55		
-34	23	- grey from about 23.0m		S	23.0 23.2		30,30/50mm refusal		
-35	24			S	24.5 24.7		40,25/50mm refusal		
-36	25								
-37	25.2	CLAY - stiff then very stiff, grey clay with a trace of fine to medium grained sand							
-38	26			S	26.0 26.45		2,7,8 N = 15		
-39	27								
-40	28			S	28.0		8,11,13 N = 24		
-41	28.45	Bore discontinued at 28.45m (RL-40.15m CD) - limit of investigation			28.45				
	29								

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 2.0m; HQ to 20.9m

TYPE OF BORING: Rotary washboring with blade bit to 28.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -6.5 CD*
EASTING: 334586
NORTHING: 6236266
DIP/AZIMUTH: 90°/--

BORE No: 12
PROJECT No: 73187
DATE: 15 - 16/10/2012
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-7	0.0	SAND - loose then medium dense, grey, fine to medium grained sand with a trace of shell fragments and silt		U_{70}	0.0		refusal at 0.9m depth		
	0.9				0.9				
-8	1.0			S	1.0		3,6,10 N = 16		
	1.45				1.45				
-9	2.5			S	2.5		3,2,3 N = 5		
	2.7	SILTY SAND - loose, dark grey, silty sand with a trace of clay			2.95				
-10	3.7	SAND - dense, brown, slightly silty, fine to medium grained sand		S	4.0		12,14,14 N = 28		
-11	4.45				4.45				
-12	5.5			S	5.5		13,18,24 N = 42		
	6.0	CLAY - grey clay with some fine to medium grained sand			5.95				
-13	6.5			D	6.5				
	7.0			U_{70}	7.0		refusal at 7.39m depth		
-14	7.3	SAND - medium dense, grey/dark grey, slightly silty sand			7.39				
	8.0	SAND - very dense, grey/light brown, fine to medium grained sand							
-15	8.5			S	8.5		23,30,25/100mm refusal		
	8.9				8.9				
-16									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 4.1m

TYPE OF BORING: Rotary washboring with blade bit to 34.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -6.5 CD*
EASTING: 334586
NORTHING: 6236266
DIP/AZIMUTH: 90°/--

BORE No: 12
PROJECT No: 73187
DATE: 15 - 16/10/2012
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - very dense, grey/light brown, fine to medium grained sand *(continued)*		S	10.0 10.3		30,40 refusal		
-18	11			S	11.5 11.75		40,35/100mm refusal		
-19	12	- becoming grey from 12.5m							
-20	13			S	13.0 13.45		20,25,20 N = 45		
-21	14 14.4	SANDY CLAY - firm, grey sandy clay		S	14.5 14.95		1,3,3 N = 6		
-22	15 15.6	SAND - very dense, grey/dark grey, slightly silty, fine to medium grained sand		S	16.0 16.3		30,40 refusal		
-23	16 17 17.1	SANDY CLAY - grey/dark brown, fine to medium grained sandy clay							
-24	17.7	SAND - very dense, grey/light brown, fine to medium grained sand		S	17.5 17.95		0,20,18 N = 38		
-25	18								
-26	19			S	19.0 19.3		40,45 refusal		

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 4.1m

TYPE OF BORING: Rotary washboring with blade bit to 34.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -6.5 CD*
EASTING: 334586
NORTHING: 6236266
DIP/AZIMUTH: 90°/--

BORE No: 12
PROJECT No: 73187
DATE: 15 - 16/10/2012
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-27		SAND - very dense, grey/light brown, fine to medium grained sand *(continued)*							
				S	20.5 20.8		40,45 refusal		
-28	21								21
	22			S	22.0 22.3		40,50 refusal		22
-29	23								23
-30				S	23.5 23.75		33,33/100mm refusal		
	24								24
-31									
	25			S	25.0 25.25		35,40/100mm refusal		25
-32									
	26								26
-33				S	26.5 26.75		35,40/100mm refusal		
	27								27
-34									
	28			S	28.0 28.15		60 refusal		28
-35									
	29								29
-36	29.5	CLAY - firm to stiff, grey clay		S	29.5 29.95		0,3,5 N = 8		

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 4.1m

TYPE OF BORING: Rotary washboring with blade bit to 34.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Ausbarge Marine Services Pty Ltd
PROJECT: Kurnell Berth Upgrade
LOCATION: Botany Bay, Kurnell

SURFACE LEVEL: -6.5 CD*
EASTING: 334586
NORTHING: 6236266
DIP/AZIMUTH: 90°/--

BORE No: 12
PROJECT No: 73187
DATE: 15 - 16/10/2012
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-37	31	CLAY - firm to stiff, grey clay *(continued)*							
	31.2	SAND - dense and very dense, grey, fine to medium grained, slightly clayey sand with some silt		S	31.0		13,22,24 N = 46		
-38	32				31.45				
-39				S	32.5		23,27,26 N = 53		
	33				32.95				
-40	34			S	34.0		13,18,20 N = 38		
-41	34.45	Bore discontinued at 34.45m (RL-40.95m CD) - limit of investigation			34.45				
	35								
-42	36								
-43	37								
-44	38								
-45	39								
-46									

RIG: Scout 4 **DRILLER:** R Kerney-Ennis **LOGGED:** SB **CASING:** HW to 4.1m

TYPE OF BORING: Rotary washboring with blade bit to 34.45m

WATER OBSERVATIONS:

REMARKS: Location coordinates are in MGA94 Zone 56. *CD = Chart Datum

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater