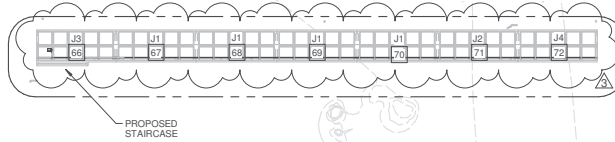
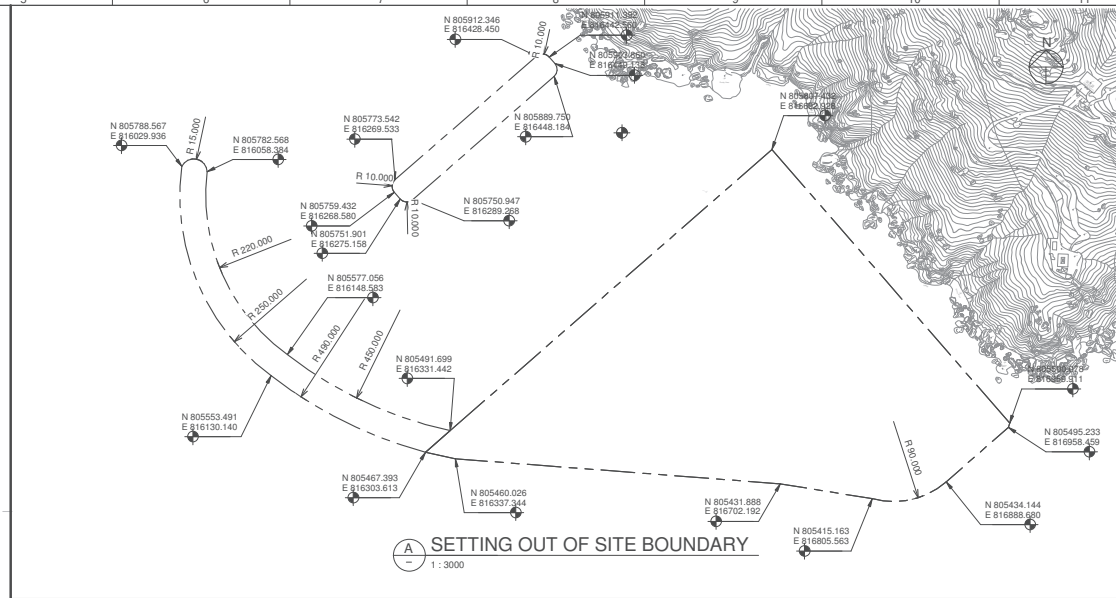


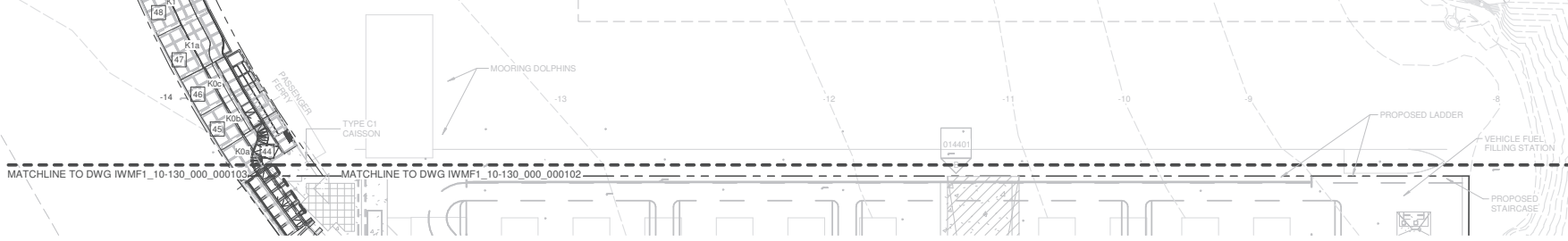
## **Annex C**

### Seawall and Breakwater Details

- LEGEND:**
- SITE BOUNDARY
  - CRANE RAIL
  - HEAVY LOAD ACCESS ROUTE
  - SEABED LEVEL



CAISSON SCHEDULE-BREAKWATER					
CAISSON TYPE	NUMBER OF CAISSONS	MATERIAL	VOLUME	WEIGHT (@2500kg/m <sup>3</sup> )	COMMENTS
J1	4	Precast Concrete	879.54 m <sup>3</sup>	2198.85 t	
J2	1	Precast Concrete	815.60 m <sup>3</sup>	2038.99 t	
J3	1	Precast Concrete	935.12 m <sup>3</sup>	2337.80 t	
J4	1	Precast Concrete	822.86 m <sup>3</sup>	2057.14 t	
K0a	1	Precast Concrete	1366.91 m <sup>3</sup>	3417.27 t	
K0b	1	Precast Concrete	1288.03 m <sup>3</sup>	3220.07 t	
K0c	1	Precast Concrete	1312.07 m <sup>3</sup>	3280.18 t	
K1	4	Precast Concrete	1534.03 m <sup>3</sup>	3835.08 t	
K1a	1	Precast Concrete	1535.31 m <sup>3</sup>	3838.27 t	
K2	1	Precast Concrete	1443.18 m <sup>3</sup>	3607.95 t	
K2a	1	Precast Concrete	1499.16 m <sup>3</sup>	3747.91 t	
K2b	1	Precast Concrete	1512.82 m <sup>3</sup>	3782.04 t	
K2c	7	Precast Concrete	1528.80 m <sup>3</sup>	3822.01 t	
K3	3	Precast Concrete	1376.88 m <sup>3</sup>	3442.20 t	
K3a	1	Precast Concrete	1417.40 m <sup>3</sup>	3543.50 t	



Revision Schedule

No.	Date	Description	Checked by	Approved by
1	23/12	Submission to CERC EMDL	CHEN	
2	28/12/19	Submission to CERC EMDL	CHEN	
3	10/01/20	Submission to CERC EMDL	CHEN	
4	07/03/20	Submission to CERC EMDL	CHEN	

Employer  
**環境保護署**  
Environmental Protection Department

Supervising Officer  
**AECOM**

Main Contractor  
**Keppel Seghers**  
吉寶西格赫斯-振華聯營公司  
KEPPEL SEGHERS - ZHEN HUA JOINT VENTURE

Designers  
**ARCADIS**  
**DLN**

Design Checker  
**SMEC**  
Member of the Surbana Jurong Group

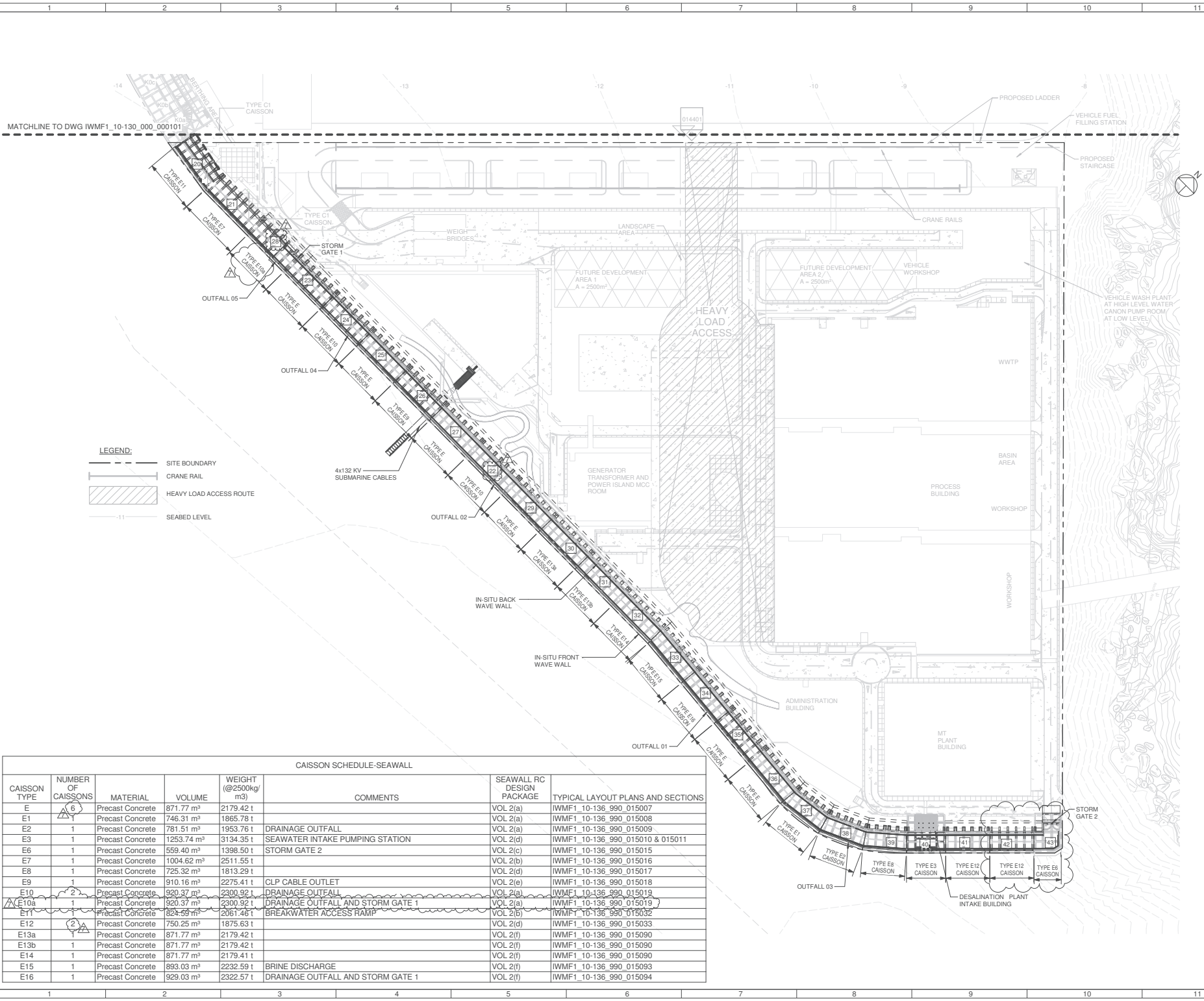
Certification

Project Name  
Contract No. EP/SP/66/12  
Integrated Waste Management Facilities  
Phase 1

Design Package

Drawing Title  
CIVIL & EXTERNAL WORKS  
SEAWALL DEFENCES CAISSON  
LAYOUT PLAN SHEET 1

Drawing Number IWMF1_10-130_000_000101	Revision 3
Date: 10 JAN 20	Scale (at A1)
Drawn by: Nick A	1:1000
Checked by: Martin H	Status PRE
Approved by: Kenny Yu	



Revision Schedule				
No.	Date	Description	Checked by	Approved by
1	2021/10	Submission to CRIC	PKFC	CHBO
2	2021/10	Submission to CRIC	PKFC	CHBO
3	2021/10	Submission to CRIC	PKFC	CHBO
4	2021/10	Submission to CRIC	PKFC	CHBO
5	2021/10	Submission to CRIC	PKFC	CHBO
6	2021/10	Submission to CRIC	PKFC	CHBO
7	2021/10	Submission to CRIC	PKFC	CHBO
8	2021/10	Submission to CRIC	PKFC	CHBO
9	2021/10	Submission to CRIC	PKFC	CHBO
10	2021/10	Submission to CRIC	PKFC	CHBO
11	2021/10	Submission to CRIC	PKFC	CHBO
12	2021/10	Submission to CRIC	PKFC	CHBO

Employer  
 環境保護署  
 Environmental Protection Department

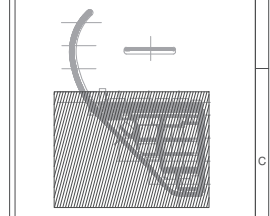
Supervising Officer  
**AECOM**

Main Contractor  
**Keppel Seghers**  
 青寶西格赫斯-振華聯營公司  
 KEPPEL SEGHERS - ZHEN HUA JOINT VENTURE

Designers  
**ARCADIS**  
**DLN**

Design Checker  
**SMC**  
 Member of the Surbana Jurong Group

Certification



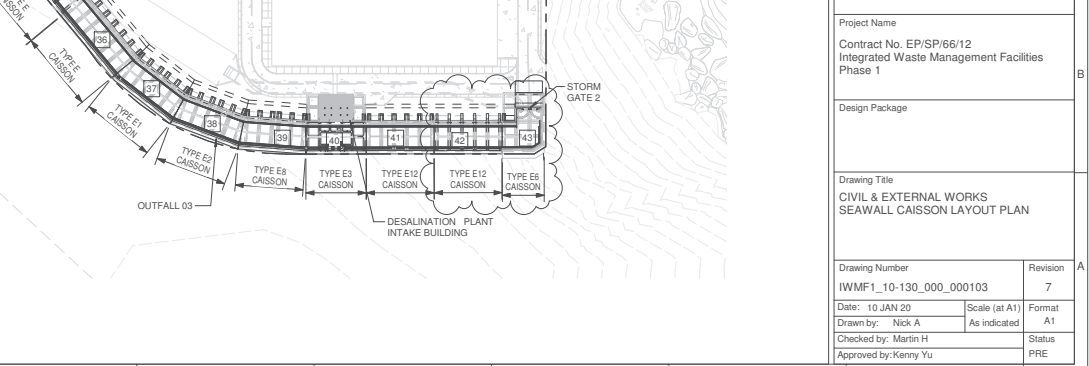
Project Name  
 Contract No. EP/SP/66/12  
 Integrated Waste Management Facilities  
 Phase 1

Design Package

Drawing Title  
 CIVIL & EXTERNAL WORKS  
 SEAWALL CAISSON LAYOUT PLAN

Drawing Number IWMF1_10-130_000_000103	Revision 7
Date: 10 JAN 20	Scale (at A1) As indicated
Drawn by: Nick A	Status A1
Checked by: Martin H	Approved by: Kenny Yu
Approved by: Kenny Yu	PRE

CAISSON SCHEDULE-SEAWALL						
CAISSON TYPE	NUMBER OF CAISSONS	MATERIAL	VOLUME	WEIGHT (@2500kg/m³)	COMMENTS	SEAWALL RC DESIGN PACKAGE
E	6	Precast Concrete	871.77 m³	2179.42 t		VOL 2(a)
E1	1	Precast Concrete	746.31 m³	1865.78 t		VOL 2(a)
E2	1	Precast Concrete	781.51 m³	1953.76 t	DRAINAGE OUTFALL	VOL 2(a)
E3	1	Precast Concrete	1253.74 m³	3134.35 t	SEAWATER INTAKE PUMPING STATION	VOL 2(d)
E6	1	Precast Concrete	559.40 m³	1398.50 t		VOL 2(c)
E7	1	Precast Concrete	1004.62 m³	2511.55 t	STORM GATE 2	VOL 2(b)
E8	1	Precast Concrete	725.32 m³	1813.29 t		VOL 2(d)
E9	1	Precast Concrete	910.16 m³	2275.41 t	CLP CABLE OUTLET	VOL 2(e)
E10	2	Precast Concrete	920.37 m³	2300.92 t	DRAINAGE OUTFALL	VOL 2(a)
E10a	1	Precast Concrete	920.37 m³	2300.92 t	DRAINAGE OUTFALL AND STORM GATE 1	VOL 2(a)
E11	1	Precast Concrete	928.59 m³	2361.46 t	BREAKWATER ACCESS RAMP	VOL 2(b)
E12	2	Precast Concrete	750.25 m³	1875.63 t		VOL 2(d)
E13a	1	Precast Concrete	871.77 m³	2179.42 t		VOL 2(f)
E13b	1	Precast Concrete	871.77 m³	2179.42 t		VOL 2(f)
E14	1	Precast Concrete	871.77 m³	2179.41 t		VOL 2(f)
E15	1	Precast Concrete	893.03 m³	2232.59 t	BRINE DISCHARGE	VOL 2(f)
E16	1	Precast Concrete	929.03 m³	2322.57 t	DRAINAGE OUTFALL AND STORM GATE 1	VOL 2(f)

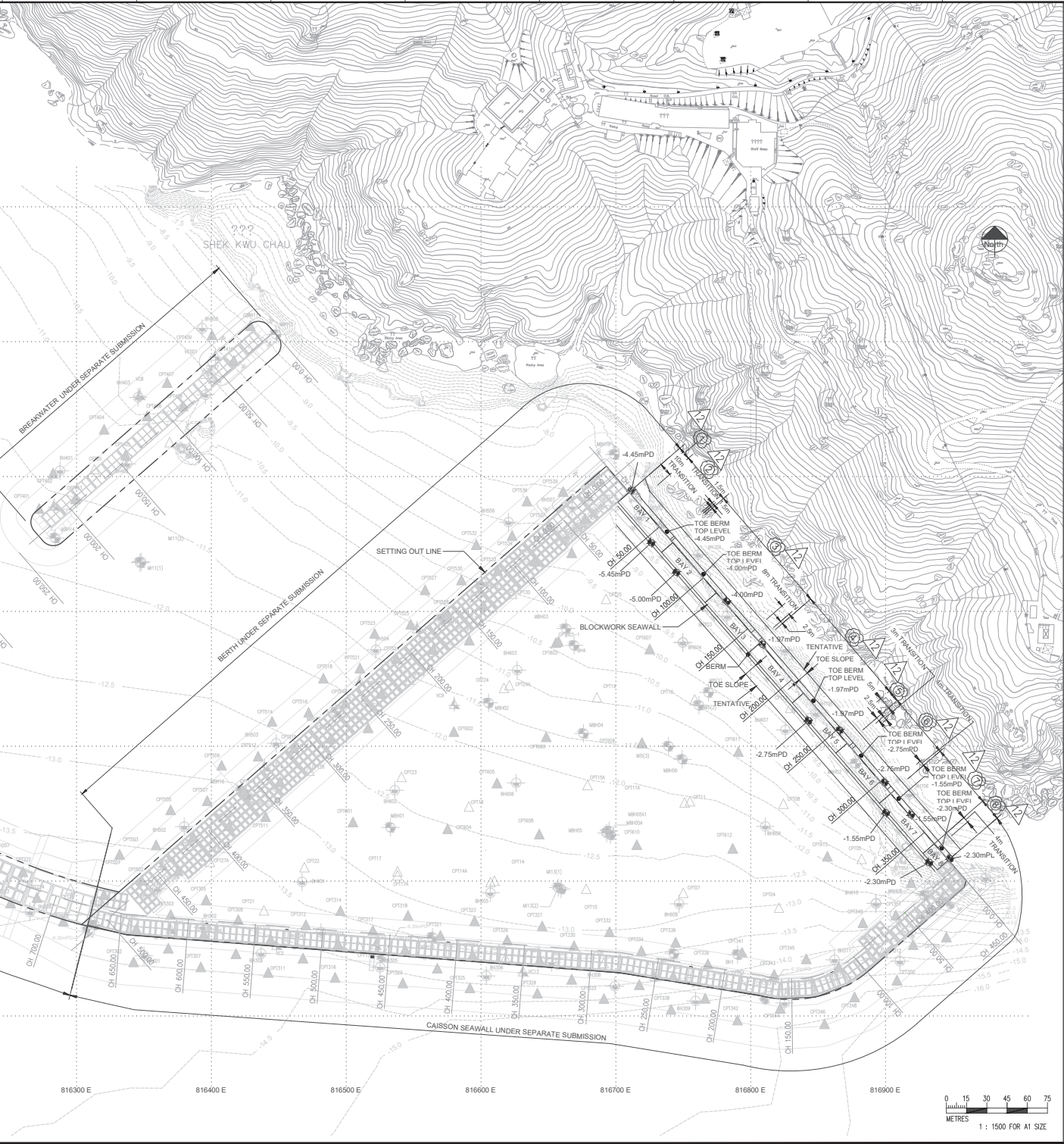


**LEGEND**

- 25.0m --- SEABED CONTOUR (mPD)
- 5.30mPD --- BERM TOP LEVEL
- ⊕/⊖ --- BOREHOLE
- △/▽ --- CONE PENETRATION TEST
- --- BAY 1
- █ --- BLOCKWORK SEAWALL

**NOTE:**

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING Nos IWMF1\_10-136\_990 SERIES
- COORDINATES OF BOUNDARY SETTING OUT POINTS SHALL REFER TO EMPLOYERS DRAWING No. 60236239/EP/1008A
- ALL THE SETTING OUT COORDINATES SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY QUALIFIED SURVEYORS ON SITE.



**SCHEDULE OF TOE AND SCOUR APRON PROVISION**

PORTION OF TOE AND SCOUR APRON	TYPE	DRAWING NUMBER
①	A	IWMF1_10-136_990_815451
②		IWMF1_10-136_990_815452
③		IWMF1_10-136_990_815455
④	B	IWMF1_10-136_990_815453
⑤	C	IWMF1_10-136_990_815458
⑥		IWMF1_10-136_990_815457
⑦		IWMF1_10-136_990_815454
⑧		IWMF1_10-136_990_815456

**Revision Schedule**

No.	Date	Description	Chk'd	App'd
0	15/02/19	DDA SUBMISSION	TC	KY
1	25/04/19	DDA SUBMISSION	TC	KY
2	16/06/19	DDA SUBMISSION	TC	KY
3	22/11/19	DDA SUBMISSION	TC	KY
4	12/12/19	DDA SUBMISSION	TC	KY
5	11/02/20	DDA SUBMISSION	TC	KY
6	12/02/20	DDA SUBMISSION	TC	KY
7	20/02/20	DDA SUBMISSION	TC	KY
8	03/03/20	DDA SUBMISSION	TC	KY
9	10/03/20	DDA SUBMISSION	TC	KY
10	14/05/20	DDA SUBMISSION	TC	KY
11	08/06/20	DDA SUBMISSION	TC	KY
12	17/09/20	DDA SUBMISSION	TC	KY

**Employer**  
 Environmental Protection Department

**Supervising Officer**  
**AECOM**

**Main Contractor**  
 Kiewit Sogehs H  
 中交海外工程 - 香港有限公司  
 CHINA OVERSEAS ENGINEERING - HONG KONG LIMITED

**Designers**  
**ARCADIS DLN**

**Design Checker**  
**SMC**  
 Member of the Surbana Jurong Group

**Certification**

Project Name  
**Contract No. EP/SP/66/12**  
**Integrated Waste Management**  
**Facilities Phase 1**

Design Package  
**2.2.20 SEAWALL DESIGN**

Drawing Title  
**RUBBLE MOUND & TOE APRON**  
**BLOCKWORK OVERALL LAYOUT**

Drawing Number  
 IWMF1\_10-136\_990\_800412

Date: 15 FEB 2019  
 Drawn by: HH  
 Checked by: TONY C  
 Approved by: KENNY YU

Revision  
 12  
 Scale (at A1)  
 1:1500  
 Status  
 DES

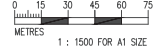


TABLE 1: DIMENSIONS FOR CHINESEPOD ARMOUR UNITS

WEIGHT OF CHINESEPOD ARMOUR UNITS	18.5 TON
h (ARMOUR SIZE) (SEE NOTE #)	2.895 m
$D_N$ (=0.698 h)	2.021 m
H1 (ARMOUR THICKNESS)	2.607 m
NOTE # : AS PER DRAWING NO. IWMF1_10-136_000_000601	

NOTES:

1. UNLESS A WEIGHT RANGE IS SPECIFIED, ROCK ARMOUR, UNDERLAYER, SCOUR APRON ROCK ARE DESIGNATED BY A NOMINAL WEIGHT. WEIGHT OF ROCK SHALL BE NO LESS THAN 0.75 NOR MORE THAN 1.25 TIMES THE NOMINAL WEIGHT WITH 50% OF INDIVIDUAL ROCKS WEIGHING NOT LESS THAN THE NOMINAL WEIGHT IN ACCORDANCE WITH SPECIFICATION (PART B) CLAUSE 21.13S.

2. PACKING DENSITY ( $\phi = D_N^2 N/A$ ) OF CHINESEPOD ARMOUR UNITS SHALL BE 0.637, WHERE

$$D_N = 0.698 h \text{ (SEE TABLE 1),}$$

N = NUMBER OF ARMOUR UNITS IN THE AREA CONCERNED,

A = SURFACE AREA OF THE ARMOUR LAYER PARALLEL TO THE LOCAL SLOPE (m<sup>2</sup>).

Revision Schedule				
No.	Date	Description	Chk'd	Appr'd
0	13/06/19	DDA SUBMISSION	TC	KY
1	24/07/19	DDA SUBMISSION	TC	KY
2	20/08/19	DDA SUBMISSION	TC	KY
3	24/09/19	DDA SUBMISSION	TC	KY
4	12/12/19	DDA SUBMISSION	TC	KY
5	11/05/20	DDA SUBMISSION	TC	KY
6	28/07/20	DDA SUBMISSION	TC	KY
7	31/08/20	DDA SUBMISSION	TC	KY
8	07/09/20	DDA SUBMISSION	TC	KY



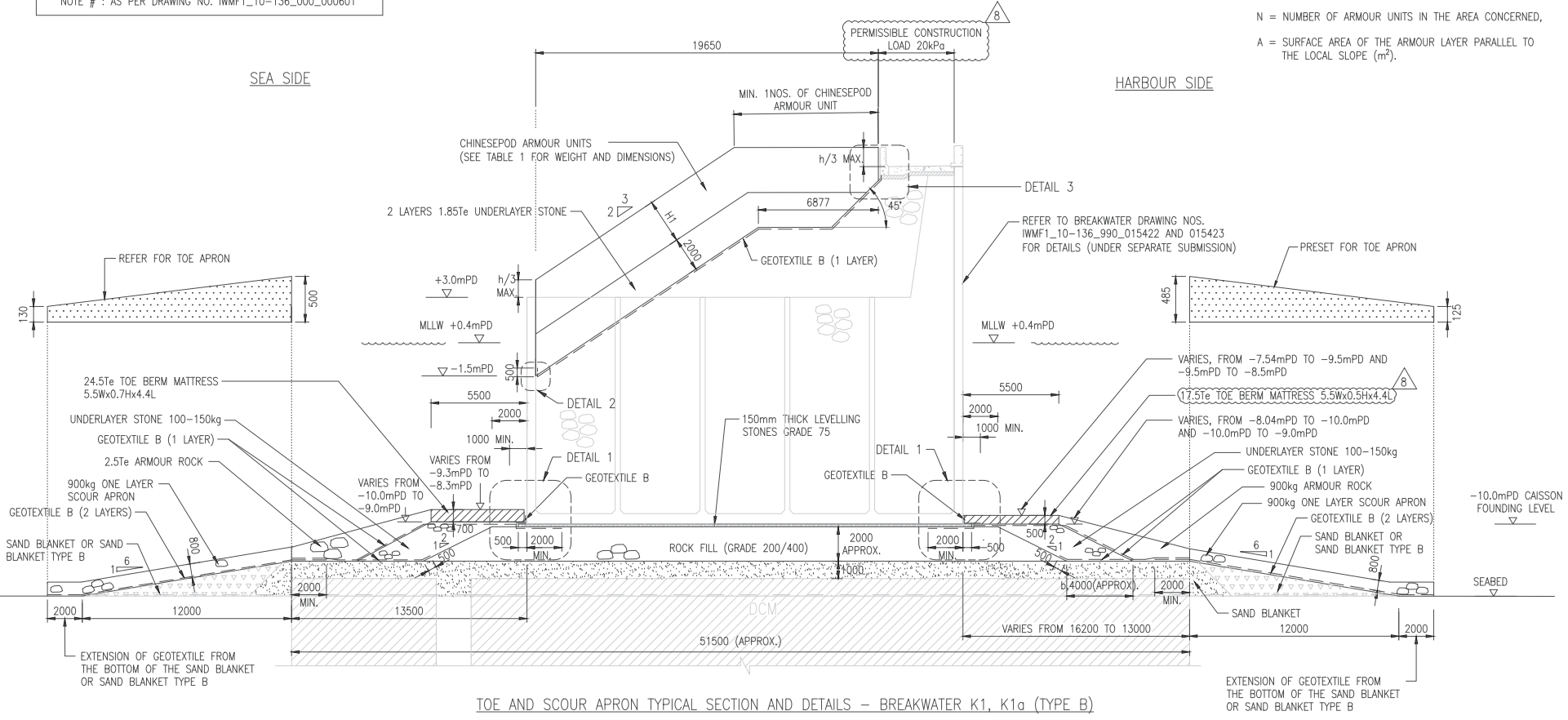
Certification

Project Name  
Contract No. EP/SP/66/12  
Integrated Waste Management Facilities Phase 1

Design Package  
2.2.21 BREAKWATER DESIGN

Drawing Title  
TOE AND SCOUR APRON TYPICAL SECTIONS AND DETAILS  
BREAKWATER K SHEET 4 OF 9

Drawing Number IWMF1_10-136_990_015633	Revision 8
Date: 13 JUNE 2019	Scale (at A1) 1:125
Drawn by: MAKARAND P	Status DES
Checked by: TONY C	Approved by: KENNY YU



TOE AND SCOUR APRON TYPICAL SECTION AND DETAILS – BREAKWATER K1, K1a (TYPE B)

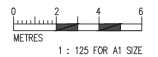
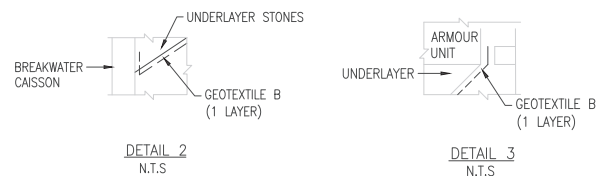
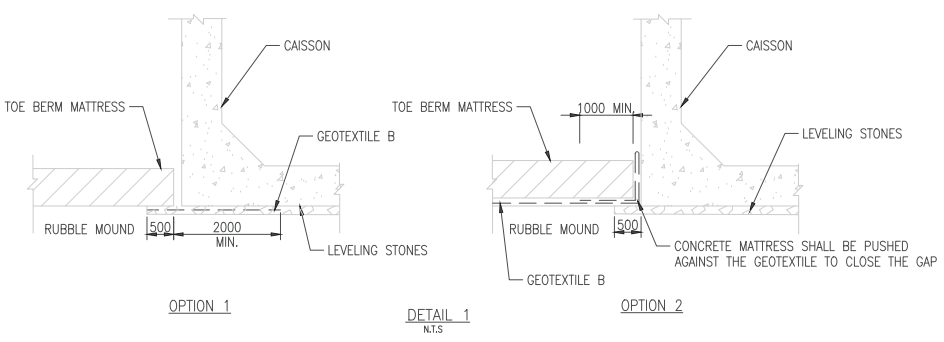


TABLE 1: DIMENSIONS FOR CHINESEPOD ARMOUR UNITS

WEIGHT OF CHINESEPOD ARMOUR UNITS	3 TON
h (ARMOUR SIZE) (SEE NOTE #)	1.579 m
$D_N (=0.698 h)$	1.102 m
H1 (ARMOUR THICKNESS)	1.422 m
NOTE # : AS PER DRAWING NO. IWMF1_10-136_000_000701	

SEA SIDE

HARBOUR SIDE

NOTES:

- UNLESS A WEIGHT RANGE IS SPECIFIED, ROCK ARMOUR, UNDERLAYER, SCOUR APRON ROCK ARE DESIGNATED BY A NOMINAL WEIGHT. WEIGHT OF ROCK SHALL BE NO LESS THAN 0.75 NOR MORE THAN 1.25 TIMES THE NOMINAL WEIGHT WITH 50% OF INDIVIDUAL ROCKS WEIGHING NOT LESS THAN THE NOMINAL WEIGHT IN ACCORDANCE WITH SPECIFICATION (PART B) CLAUSE 21.13S.
- PACKING DENSITY ( $\phi = D_N^2 N/A$ ) OF CHINESEPOD ARMOUR UNITS SHALL BE 0.637, WHERE  
 $D_N = 0.698 h$  (SEE TABLE 1),  
 $N =$  NUMBER OF ARMOUR UNITS IN THE AREA CONCERNED,  
 $A =$  SURFACE AREA OF THE ARMOUR LAYER PARALLEL TO THE LOCAL SLOPE ( $m^2$ ).

Revision Schedule				
No.	Date	Description	Chk'd	App'd
0	28/09/19	DDA SUBMISSION	TC	KY
1	22/11/19	DDA SUBMISSION	TC	KY
2	02/03/20	DDA SUBMISSION	TC	KY
3	27/04/20	DDA SUBMISSION	TC	KY
4	26/05/20	DDA SUBMISSION	TC	KY
5	23/06/20	DDA SUBMISSION	TC	KY
6	28/07/20	DDA SUBMISSION	TC	KY
7	14/08/20	DDA SUBMISSION	TC	KY
8	19/08/20	DDA SUBMISSION	TC	KY
9	20/08/20	DDA SUBMISSION	TC	KY
10	24/08/20	DDA SUBMISSION	TC	KY

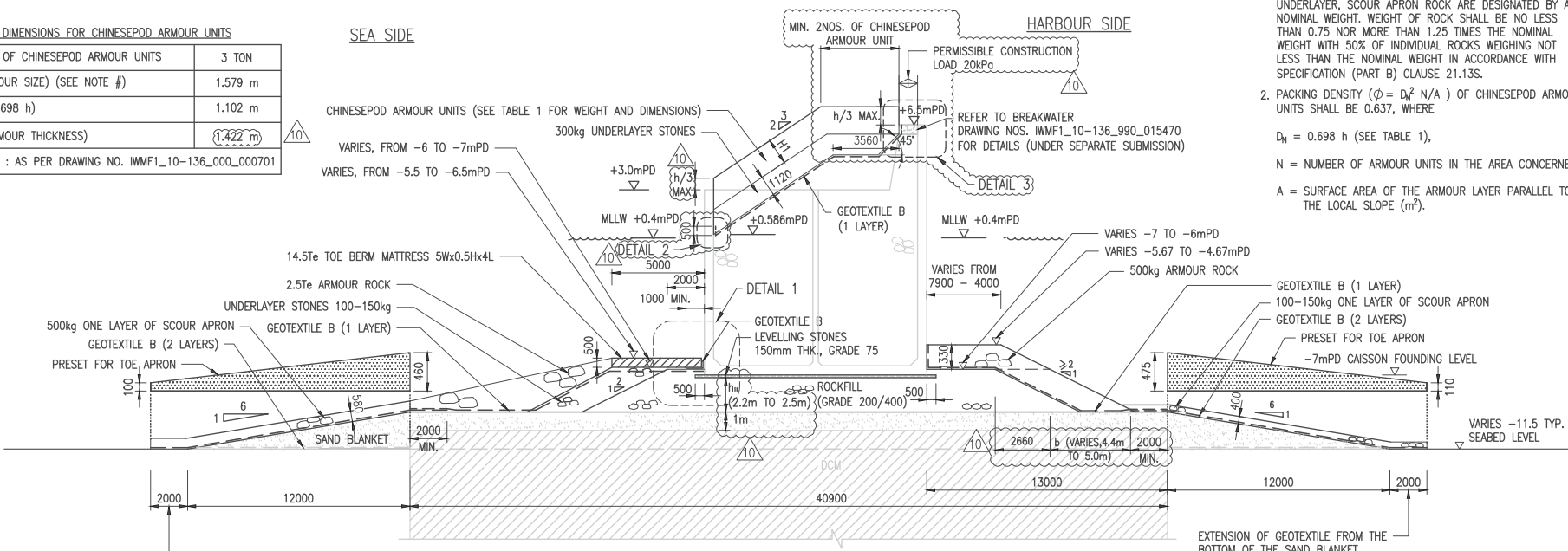
Employer  
  
 Environmental Protection Department

Supervising Officer  
  
 AECOM

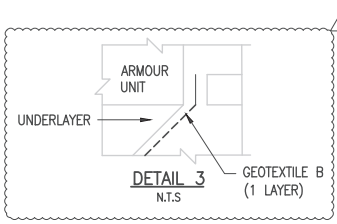
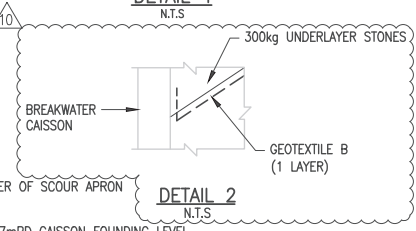
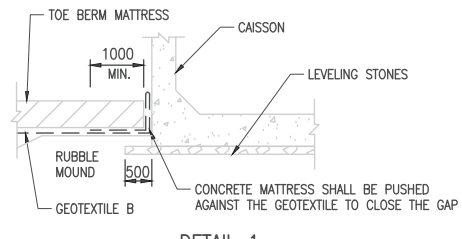
Main Contractor  
  
 Sogehs H

Designers  
  
 ARCADIS DLN

Design Checker  
  
 SMEC  
 Member of the Surbana Jurong Group

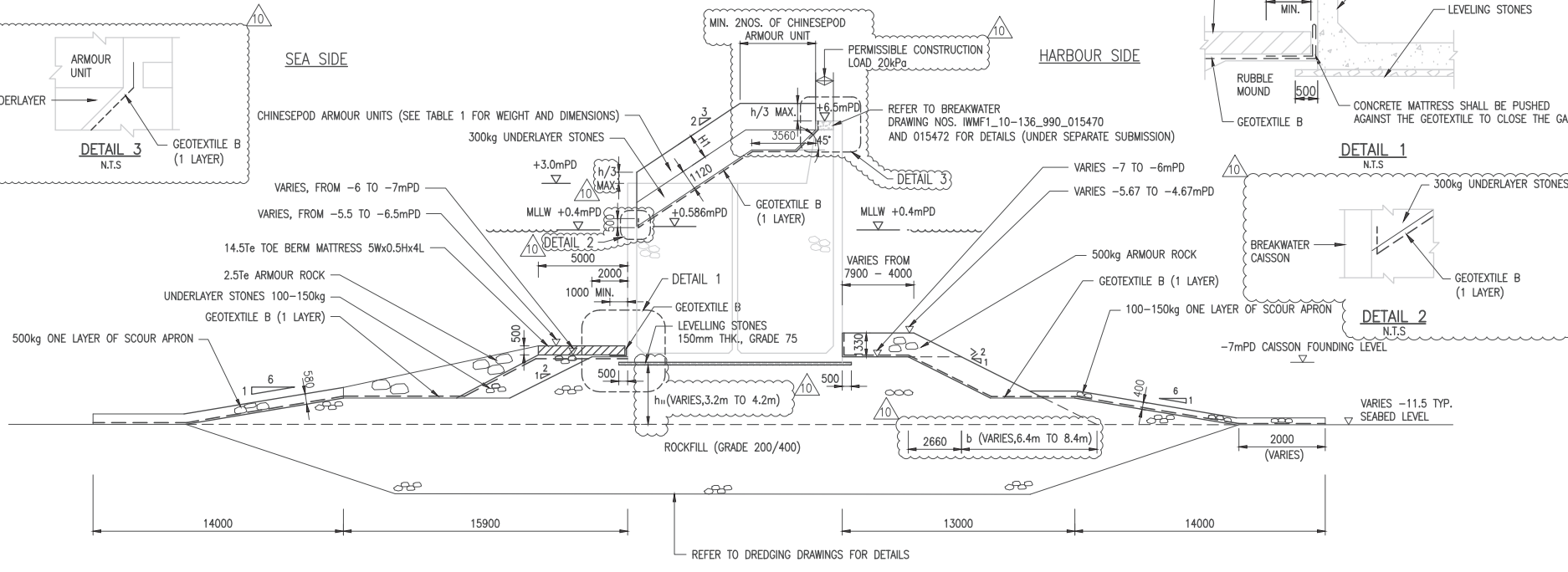


TOE AND SCOUR APRON TYPICAL SECTION AND DETAILS - BREAKWATER J (TYPE A) (DCM PORTION)

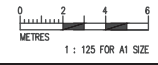


SEA SIDE

HARBOUR SIDE



TOE AND SCOUR APRON TYPICAL SECTION AND DETAILS - BREAKWATER J (TYPE A) (DREDGED PORTION)



Project Name  
 Contract No. EP/SP/66/12  
 Integrated Waste Management  
 Facilities Phase 1

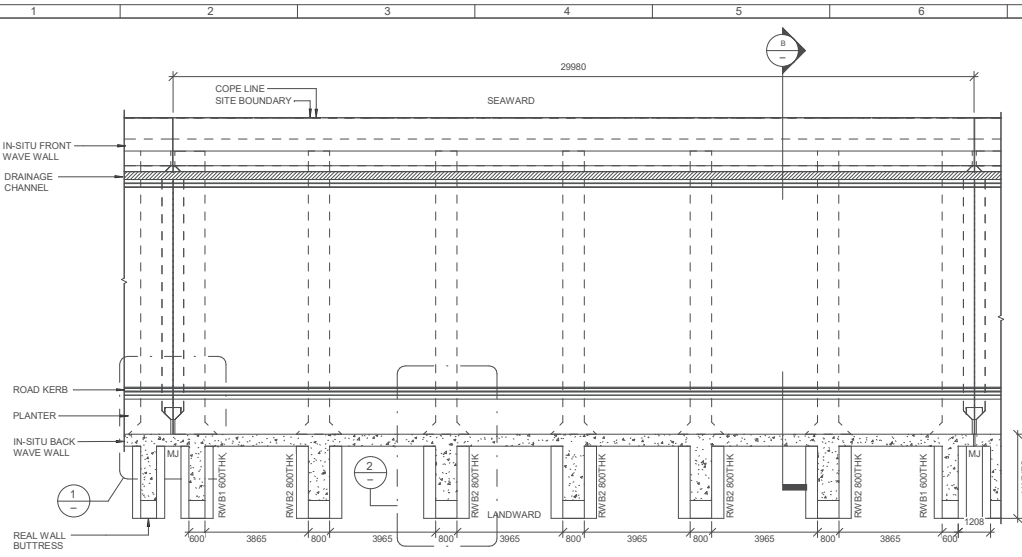
Design Package  
 2.2.21 BREAKWATER DESIGN

Drawing Title  
 TOE AND SCOUR APRON  
 TYPICAL SECTIONS AND DETAILS  
 BREAKWATER J  
 SHEET 2 OF 4

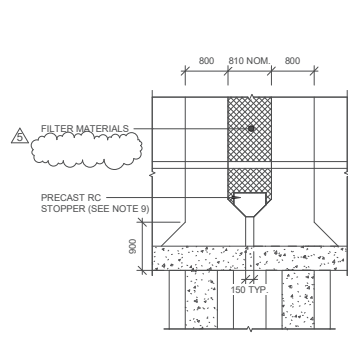
Drawing Number  
 IWMF1\_10-136\_990\_015731

Date: 28 SEPT 2019  
 Drawn by: ARTV  
 Checked by: TONY C  
 Approved by: KENNY YU

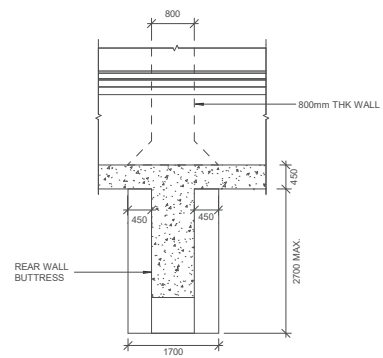
Revision  
 10  
 Scale (at A1)  
 1:125  
 Format  
 A1  
 Status  
 DES



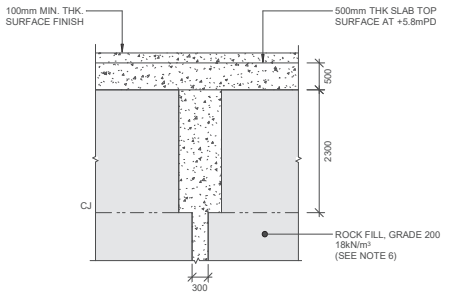
**(A) TYPICAL PLAN VIEW OF SEAWALL TYPE E (AT +8.0 LEVEL)**  
1:100



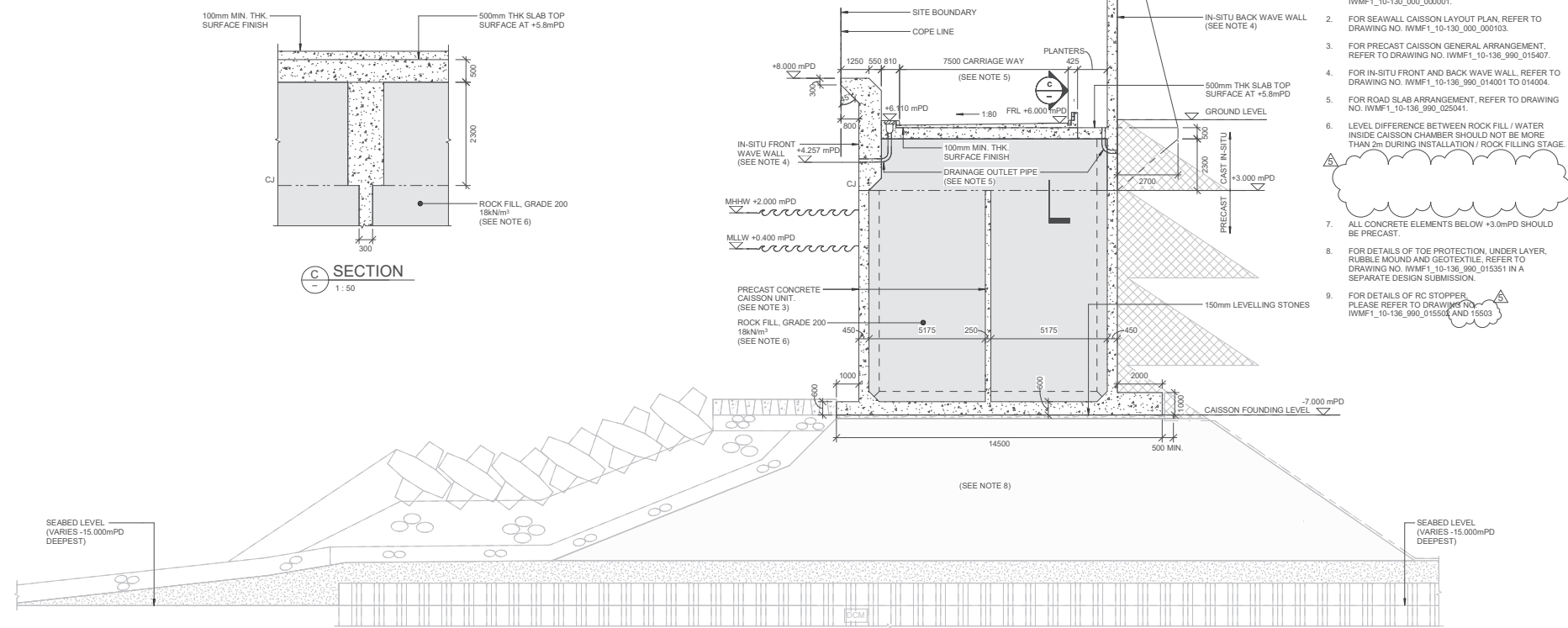
**(1) DETAIL**  
1:50



**(2) DETAIL**  
1:50



**(C) SECTION**  
1:50



**(B) SEAWALL TYPE E**  
1:100

**NOTES:**

- FOR GENERAL NOTES, REFER TO DRAWING NO. IWMF1\_10-130\_000\_000001.
- FOR SEAWALL CAISSON LAYOUT PLAN, REFER TO DRAWING NO. IWMF1\_10-130\_000\_000103.
- FOR PRECAST CAISSON GENERAL ARRANGEMENT, REFER TO DRAWING NO. IWMF1\_10-136\_990\_015407.
- FOR IN-SITU FRONT AND BACK WAVE WALL, REFER TO DRAWING NO. IWMF1\_10-136\_990\_014001 TO 014004.
- FOR ROAD SLAB ARRANGEMENT, REFER TO DRAWING NO. IWMF1\_10-136\_990\_025041.
- LEVEL DIFFERENCE BETWEEN ROCK FILL / WATER INSIDE CAISSON CHAMBER SHOULD NOT BE MORE THAN 2m DURING INSTALLATION / ROCK FILLING STAGE.
- ALL CONCRETE ELEMENTS BELOW +3.0mPD SHOULD BE PRECAST.
- FOR DETAILS OF TOE PROTECTION, UNDER LAYER, RUBBLE MOUND AND GEOTEXTILE, REFER TO DRAWING NO. IWMF1\_10-136\_990\_015351 IN A SEPARATE DESIGN SUBMISSION.
- FOR DETAILS OF RC STOPPER PLEASE REFER TO DRAWING NO. IWMF1\_10-136\_990\_015503 AND 15503.

Revision Schedule				
No.	Date	Description	Checked by	Approved by
0	31/10/19	Submission to CP&EC	ANIL	CP&EC
1	31/10/19	Submission to CP&EC	ANIL	CP&EC
2	30/10/19	Submission to CP&EC	ANIL	CP&EC
3	06/10/19	Submission to CP&EC	ANIL	CP&EC
4	11/10/19	Submission to CP&EC	ANIL	CP&EC
5	08/09/20	Submission to CP&EC	ANIL	CP&EC

Employer  
 環境保護署  
 Environmental Protection Department

Supervising Officer  
**AECOM**

Main Contractor  
**Keppel Seghers**  
 吉寶西格赫斯-振華聯合公司  
 KEPPEL SEGHERS - ZHEN HUA JOINT VENTURE

Designers  
**ARCADIS**  
**DLN**

Design Checker  
**SMC**  
 Member of the Surbana Jurong Group

Certification

Project Name  
 Contract No. EP/SP/66/12  
 Integrated Waste Management Facilities  
 Phase 1

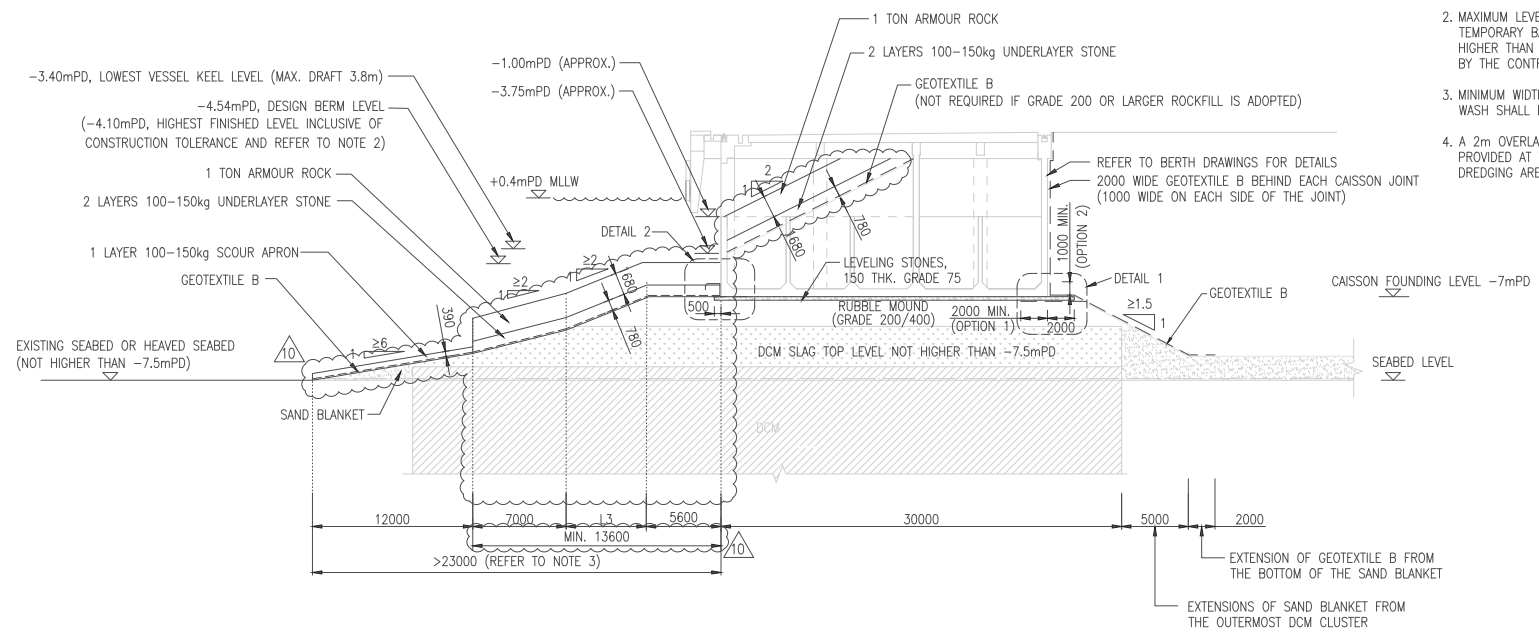
Design Package

Drawing Title  
 CIVIL & EXTERNAL WORKS  
 TYPICAL LAYOUT PLANS AND  
 SECTIONS SEAWALL TYPE E

Drawing Number IWMF1_10-136_990_015007	Revision 5
Date: 11 OCT 19	Scale (at A1) As indicated
Drawn by: Nick A	Status A1
Checked by: Martin H	Status PRE
Approved by: Kenny Yu	

**NOTES:**

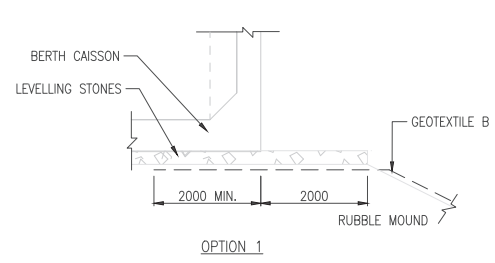
- UNLESS A WEIGHT RANGE IS SPECIFIED, ROCK ARMOUR, UNDERLAYER, SCOUR APRON ROCK ARE DESIGNATED BY A NOMINAL WEIGHT. WEIGHT OF ROCK SHALL BE NO LESS THAN 0.75 NOR MORE THAN 1.25 TIMES THE NOMINAL WEIGHT WITH 50% OF INDIVIDUAL ROCKS WEIGHING NOT LESS THAN THE NOMINAL WEIGHT IN ACCORDANCE WITH SPECIFICATION(PART B) CLAUSE 21.13S.
- MAXIMUM LEVEL OF ARMOUR CONSTRUCTION DURING TEMPORARY BARGE DELIVERY PERIOD NOT TO BE HIGHER THAN -5.0mPD OR A LEVEL AS ADVISED BY THE CONTRACTOR.
- MINIMUM WIDTH OF SCOUR APRON FOR PROPELLER WASH SHALL BE 23m.
- A 2m OVERLAPPING OF THE GEOTEXTILE SHALL BE PROVIDED AT THE INTERFACE BETWEEN DCM AND DREDGING AREA.



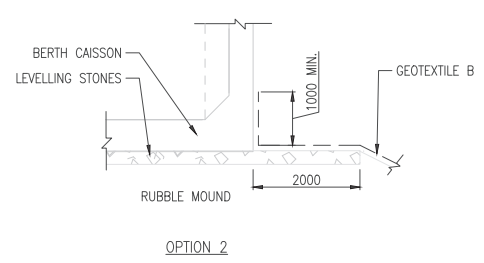
SETTING OUT POINT	L3
B4 to B5	≥1m
B5 to B6	≥3m
B6 to B7	≥6m

**NOTE FOR SETTING OUT:**  
 a. SETTING OUT POINTS B4 TO B7 ARE SHOWN IN DRAWINGS IWMF1\_10-136\_990\_000521 TO 526.

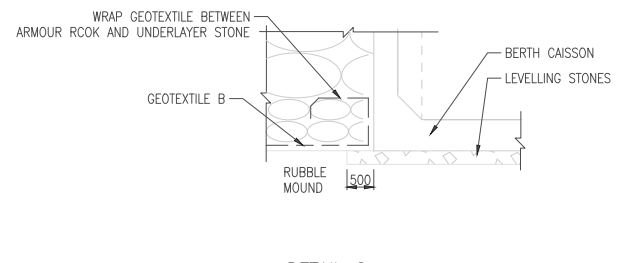
**TOE AND SCOUR APRON TYPICAL SECTION AND DETAILS – BERTH (SEABED LEVEL AFFECTED BY DCM HEAVING)  
 (SETTING OUT POINTS B4 TO B7)**



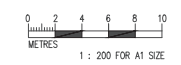
**DETAIL 1**  
N.T.S



**OPTION 2**



**DETAIL 2**  
N.T.S



Revision Schedule

No.	Date	Description	Chk'd	App'd
0	190819	DDA SUBMISSION	TC	KY
1	180919	DDA SUBMISSION	TC	KY
2	250919	DDA SUBMISSION	TC	KY
3	141019	DDA SUBMISSION	TC	KY
4	101219	DDA SUBMISSION	TC	KY
5	010420	DDA SUBMISSION	TC	KY
6	190520	DDA SUBMISSION	TC	KY
7	270520	DDA SUBMISSION	TC	KY
8	290520	DDA SUBMISSION	TC	KY
9	081020	DDA SUBMISSION	TC	KY
10	121020	DDA SUBMISSION	TC	KY

Employer

Supervising Officer

Main Contractor

Designers

Design Checker

Certification

Project Name  
 Contract No. EP/SP/66/12  
 Integrated Waste Management  
 Facilities Phase 1

Design Package  
 2.2.22 BERTH DESIGN

Drawing Title  
 TOE AND SCOUR APRON  
 TYPICAL SECTION AND DETAILS  
 BERTH  
 (SHEET 3 OF 3)

Drawing Number IWMF1_10-136_990_015543	Revision 10
Date: 19 AUG 2019	Scale (at A1) 1:200
Drawn by: ART V	Format A1
Checked by: TONY C	Status DES
Approved by: KENNY YU	



