

Contract No. HK/2009/01 Wan Chai Development Phase II Central – Wan Chai Bypass at Hong Kong Convention and Exhibition Centre

Silt Screen Deployment Plan

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0	19 Feb 10	Initial issue	DW	WTH
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2	25 Mar 10	Incorporating Comments from IEC	DW	WTH
3	8 April 10	Incorporating Comments from Engineer	DW	WTH

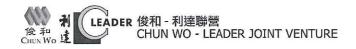


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1. GENERAL

1.1 Introduction

Prior to the commencement of any dredging and backfilling works in the vicinity of the existing seawater intakes, silt screens have to be installed to protect the intakes.

This deployment plan describes in details the design, method of installation, operation and maintenance of the proposed silt screen.

1.2 Reference Specification and Drawings

- a) General Specification Section 21 & 25
- b) Particular Specification Section 21 & 25
- c) Contract Drawing nos. 60041297/C1/200/1836B, Figure 5 at EP-356/2009

1.3 Construction Plants

The following plants shall be deployed:

	^	i -
i)	Crane	Lorr
,		

1 no.

ii) Mobile Crane

1 no.

iii) Motor Sampan

1 no.

Adequate resources shall be employed to suit the construction programme.

1.4 Safety

The works shall be carried out in accordance with the Project Safety Plan and shall comply with the requirements of the Marine Department and Labour Department. Specific risk assessment shall be prepared and submitted separately.

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2. Silt Screen Design

- 2.1 In general, there are three types of silt screen. Type 1 silt screen is designed for those seawater intakes located on vertical seawalls, i.e. seawater intakes of Telecom House, HK Academy for Performing Arts, Shui On Centre, Wan Chai Tower / Revenue Tower, Immigration Tower, Great Eagle Centre, China Resources Building, Sogo Tsim Sha Tsui, WSD. Type 2 silt screen is designed for seawater intakes of Hong Kong Convention and Exhibition Centre located under the promenade deck. Type 3 silt screen is designed for the submarine seawater intake near Avenue of Stars. Silt screens of either Type 1, Type 2 or Type 3, depending on the actual site condition, will also be installed for WSD saltwater intakes at WSD7 (Kowloon South), WSD19 (Sheung Wan) or any other intakes as highlighted in EP-356/2009 Table 1 and Figure 4 subject to the site instruction from the Engineer. The location plans for Type 1 to 3 silt screens are enclosed in Appendix A.
- 2.2 Type 1 silt screen consists of a steel frame and a layer of geotextile screening. The steel frame will be fixed to the vertical seawall by anchor bolts. The geotextile screening will be tied on to the steel frame by nylon ropes and attached to the vertical seawall on both top and bottom sides. A hinged opening will be provided at the top of the steel frame as access for water monitoring inside the silt screen. The layout and general arrangement of Type 1 silt screen is enclosed in Appendix B.
- 2.3 Type 2 silt screen consists of a layer of geotextile screening tied on 300mm diameter buoys and extended to the seabed level secured by steel chain ballast. The buoys will be further positioned by nylon ropes tied on existing structures. Type 2 silt screen will be installed underneath the perimeter of the promenade piled deck of the pump house of Hong Kong Convention and Exhibition Centre (HKCEC) Phase I and both ends of the silt screen will be attached to the vertical seawall adjacent to the promenade piled deck. The layout and general arrangement of Type 2 silt screen is enclosed in **Appendix C**. Alternatively, Type 1 silt screen will be installed for the intakes of HKCEC Phase I to replace Type 2 silt screen depending on the actual site condition during the course of the reclamation works.
- 2.4 Type 3 silt screen consists of 2 types of silt screen namely 'standing type' and 'hanging type' combined together. Standing type consists of a

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steel frame and a layer of geotextile screening on all 3 sides of the steel frame. The top frame will not be covered by geotextile to allow sufficient flow of water into the intake. The steel frame will be placed to the seabed to surround the seawater intake. The steel frame will be further secured to the seabed by steel cable tied to concrete sinkers. Hanging type is similar to Type 2 silt screen consists of a layer of geotextile screening tied on 300mm diameter buoys and extended to below the top level of the standing type silt screen. The bottom of the hanging type silt screen will be tied to ballast steel chain. The purpose of the hanging type silt screen is to prevent silt from sucking into the intake through the top opening of the standing type silt screen. The layout and general arrangement of Type 3 silt screen is enclosed in **Appendix D**.

2.5 Refer **Appendix E** for the specification of the proposed geotextile for Type 1, 2 and 3 silt screens.

3. Silt Screen Installation

3.1 Type 1 Silt Screen

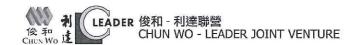
- 3.1.1 Carry out an underwater conditional survey to locate the existing water intakes by divers.
- 3.1.2 Verify the location, depths and sizes of the intake pipes and measure the dimension and position of the silt screen and mountings required.
- 3.1.3 Prefabricate the steel frame with steel mesh for fencing as determined in the previous step.
- 3.1.4 To mitigate the corrosion by seawater, all steel members should be hot-dip galvanized and the plastic coated steel mesh will be use before prefabrication.
- 3.1.5 Fabrication works will follow the layout drawing (See Appendix B)
- 3.1.6 A temporary steel working platform will be erected on site for installation of the steel frame.

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- 3.1.7 Prefabricate the steel frame with steel mesh for fencing as determined in the previous step.
- 3.1.8 Form the anchor's holes by air drill.
- 3.1.9 The upper steel plate footing with 4nos. anchor bolts will pre-install on the existing seawall.
- 3.1.10 Each steel frame will be separate to two portions for transportation and assembly on site.
- 3.1.11 A crane lorry will be used for lift and fix the steel frame to the location.
- 3.1.12 The top level of the steel frames is approximate +3.00mPD.
- 3.1.13 Use a chain block pulley system to lift the steel frame from the top of the seawall for installation adjustment.
- 3.1.14 Workers fix and weld the steel frame onto the pre-installed steel plates.
- 3.1.15 Workers fix the lower steel plate footings onto the existing seawall using anchor bolts.
- 3.1.16 The geotextile screening with steel chain ballast will be tied on to the steel frame by nlyon ropes.
- 3.1.17 The outer silt screen can be removed and replaced during maintenance by workers using a chain block pulley system to lift the screen directly from the water.
- 3.2 Type 2 Silt Screen / Type 3 Silt Screen (Hanging Type)
- 3.2.1 Carry out an underwater condition survey to locate the existing seawater intakes by divers.
- 3.2.2 Verify the location, depths and sizes of the intake pipes and measure the dimension and position of the silt screen and mountings required.

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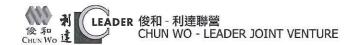


- 3.2.3 Tie the silt screen to the buoys and steel chain ballast before transportation.
- 3.2.4 Transport the silt screen to the location for fixing via a marine pontoon.
- 3.2.5 Workers tie the buoys to the railings of the promenade deck / existing structures with nylon ropes.
- 3.2.6 Put the buoys to the water and then slowly put the silt screen with the steel chain ballast into sea.
- 3.2.7 The silt screen can be removed and replaced during maintenance by workers using a chain block pulley system to lift the screen directly from the water.

3.3 Type 3 Silt Screen (Standing Type)

- 3.3.1 Standing type silt screen shall be installed prior to the installation of hanging type silt screen.
- 3.3.2 Carry out an underwater conditional survey to locate the existing water intakes by divers.
- 3.3.3 Verify the location, depths and sizes of the intake pipes and measure the dimension and position of the silt screen and mountings required.
- 3.3.4 Prefabricate the steel frame with steel mesh for fencing as determined in the previous step.
- 3.3.5 To mitigate the corrosion by seawater, all steel members should be hot-dip galvanized and the plastic coated steel mesh will be use before prefabrication.
- 3.3.6 Fabrication works will follow the layout drawing (See **Appendix D**)
- 3.3.7 Prefabricate the steel frame with steel mesh for fencing as determined in the previous step.

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- 3.3.8 A mobile crane will be used for lift and fix the steel frame to the location. Divers will assist the positioning of the silt screen underwater.
- 3.3.9 Place concrete sinkers to the seabed by mobile crane and tie the steel frame to the concrete sinkers with steel cables by divers.
- 3.3.10 The outer silt screen can be removed and replaced during maintenance by divers.

4. Maintenance of Silt Screen

- 4.1 Site supervisors will be assigned to check the condition of the silt screens daily during the course of the marine works. An inspection checklist (see **Appendix G**) will be prepared and filled in by the site supervisors. All checklists will be kept on site for record purpose. Divers will be deployed to check the condition of the Type 3 standing type silt screen regularly.
- 4.2 Nearby marine works will stop immediately if silt screens are found damaged. Type 1 and 2 silt screens will be lifted up from the water by a chain block pulley system, and the damaged outer silt screen will be replaced by workers. Damaged outer silt screen of Type 3 silt screen shall be replaced by divers. Nearby marine works will resume after repairing of the damaged silt screens.
- 4.3 Refuse around the silt screens will be collected at regular intervals on a daily basis so that water behind the silt screens be kept free from floating debris.
- 4.4 Sufficient spare geotextile screening will be kept on site for replacing of damaged silt screens. The spare geotextile screening shall be kept in place to avoid direct contact with water and sunlight.

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Appendix A

Location Plan for Type 1 to 3 Silt Screen

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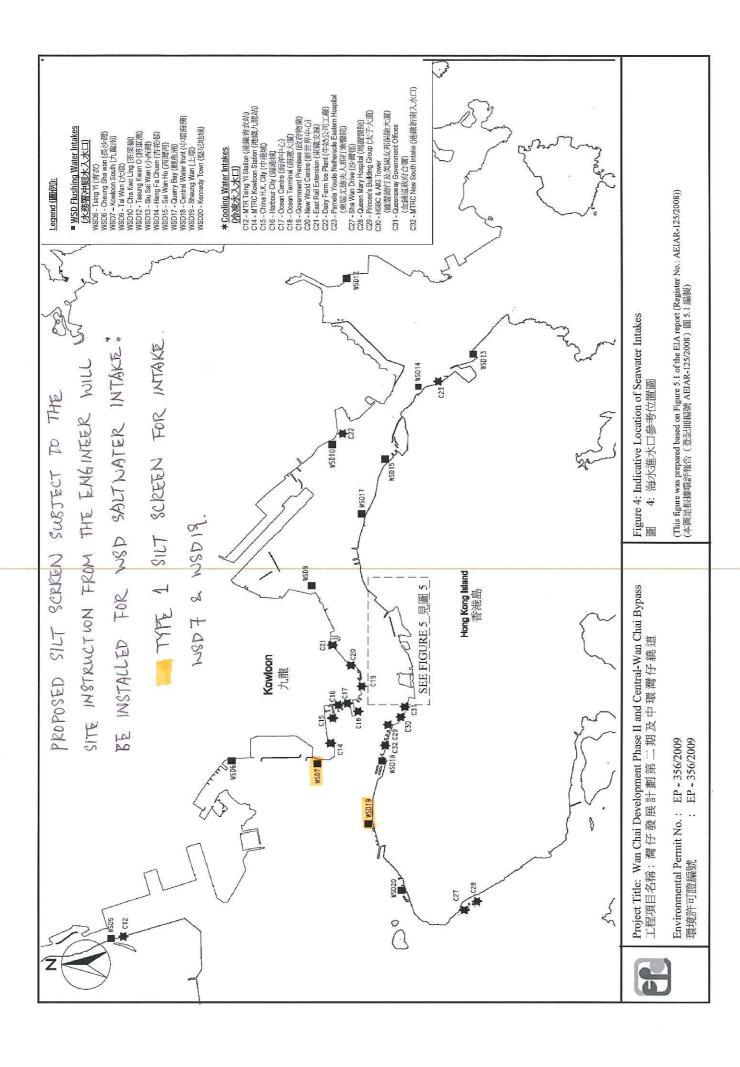
TYPE 2 SILT SCREEN FOR INTAKE FOR INTAKE WILL BE 1 SILT SCREEN TOR INTAKE: SILT SCREEN EITHER TYPE 1 OR TYPE 2 SILT SCREEN WILL BE INSTALLED FOR INTAKE (3) DEPENDING 0,0,0,0,0 SITE CONDITION INSTALLED PROPOSED TYPE 0 HONG KONG CONVENTION AND EXHIBITION CENTRE EXTENSION (香港會離展覧中心新展) TELECOM HOUSE / HK ACADEMY FOR PERFORMING / SHUI ON CENTRE [電影大廈 / 春港演藝學院開安中心) HONG KONG CONVENTION AND EXHIBITION CENTRE PHASE I (香港會議展覧中心第一期) WAN CHAI TOWER / REVENUE TOWER / IMMIGRATION TOWER (灣行政府大廈 / 稅務大樓 / 入境事務大樓) GREAT EAGLE CENTRE / CHINA RESOURCES BUILDING (鷹君中心 / 華潤大厦) SUN HUNG KAI CENTRE (新鴻基中心) PROPOSED EXHIBITION STATION (叛建港鐵會展站) EXCELSIOR HOTEL & WORLD TRADE CENTRE / NO.27-63 PATERSON STREET (香港恰東酒店 /世貿中心 / 百德新街 27-63 號) WINDSOR HOUSE (皇室堡) PROPOSED HAVA EXTENSION (叛建香港海藝學院有選) THE ACTUAL ← - - - FUTURE SENSITIVE RECEIVER (AFTER PROJECT COMMISSIONED) 將來的檢感受體 (本項目工程施工後)← - - EXISTING SENSITIVE RECEIVER 現有的敏感受體 REMARK .. 3 WSD FLUSHING WATER INTAKE (水務署沖順水入口) ⑤ wan CHAI (灣仔) COOLING WATER INTAKE 冷卻水入口 CITY GARDEN (城市花園) PROVIDENT CENTRE (和富中心) WAN CHAI (灣仔) Legend (圖例): 9

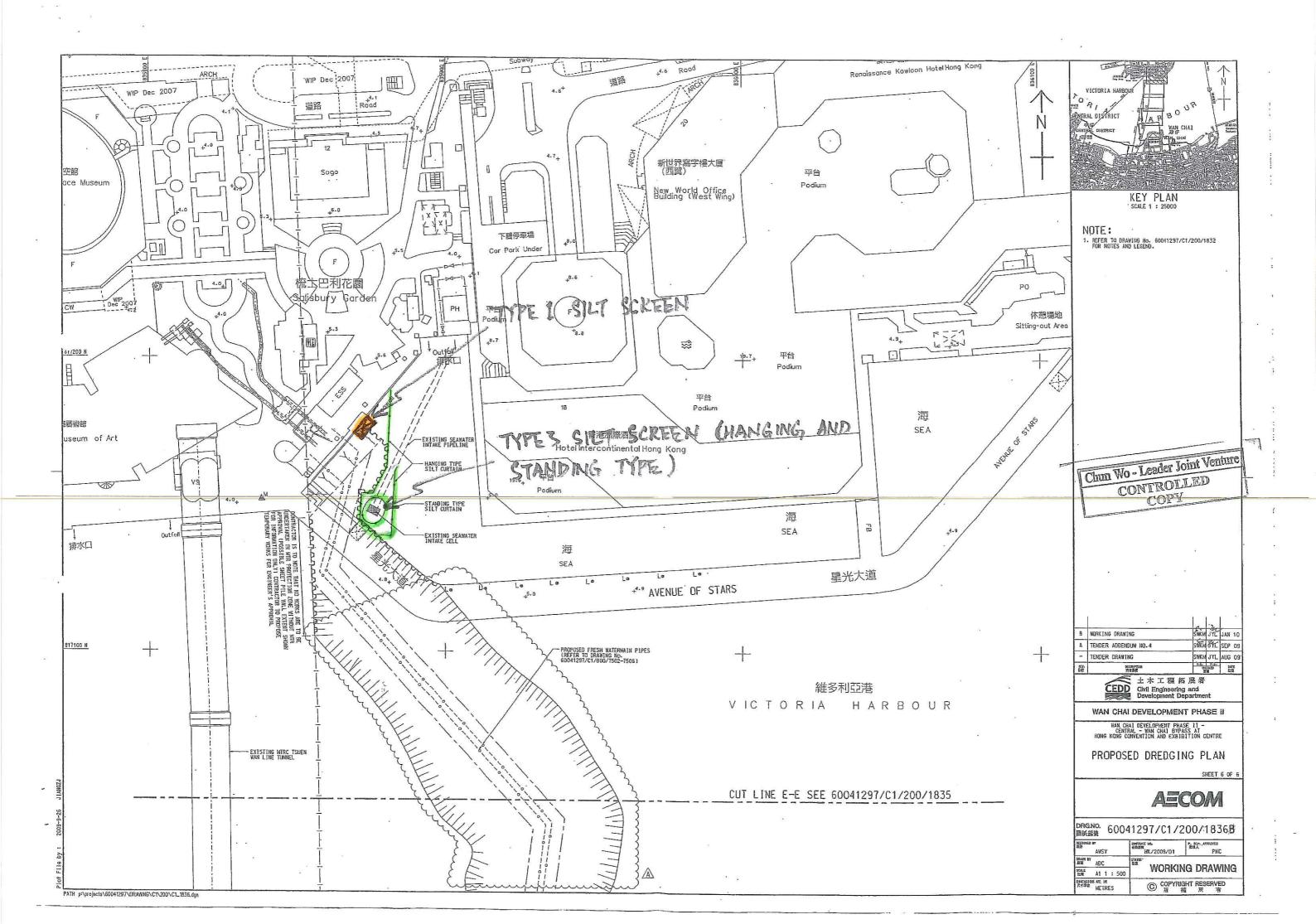
(This figure was prepared based on Figure 5.2 of the EIA report (Register No.: AEIAR-125/2008)) (本國是根據觀許報告(強記冊編號 AEIAR-125/2008)圖 5.2 編製)

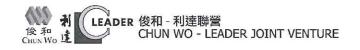
Figure 5: Indicative Locations of Seawater Intakes 圖 5: 海水進水口參考位置圖

Project Title: Wan Chai Development Phase II and Central-Wan Chai Bypass工程項目名稱:灣仔發展計劃第二期及中環灣仔繞道

Environmental Permit No.: EP-356/2009 環境許可證編號 : EP-356/2009



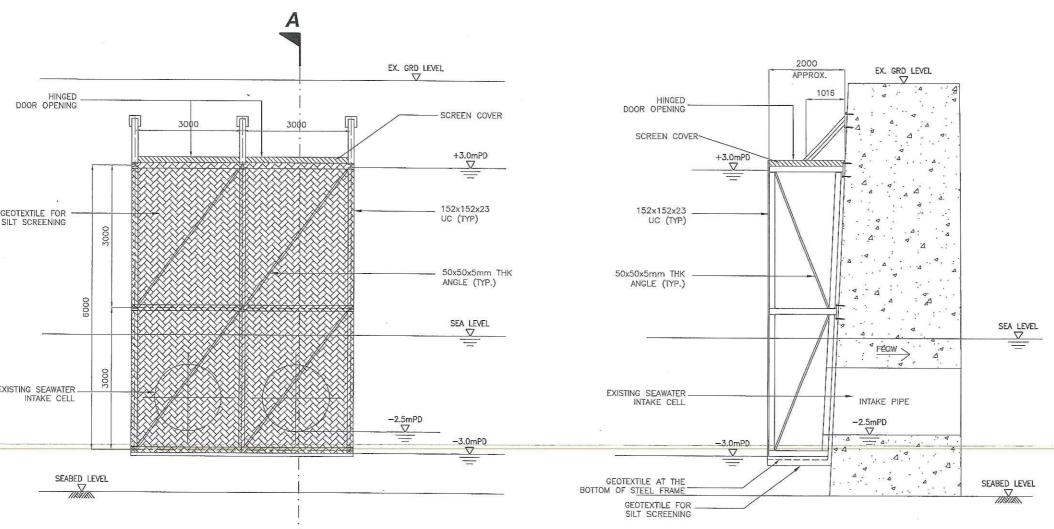




Appendix B

Type 1 Silt Screen

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SECTION A-A SCALE 1 : 150

REVISED KY 18-03-10 CHECKED PRINT KY 03-03-10 By Date Rev Description

2 REVISED

1. ALL STEELWORK SHALL BE GRADE 43A.

M LEADER Chun Wo - Leader JV

KY 25-03-10



土木工程拓展署 Civil Engineering and Development Department

AECOM

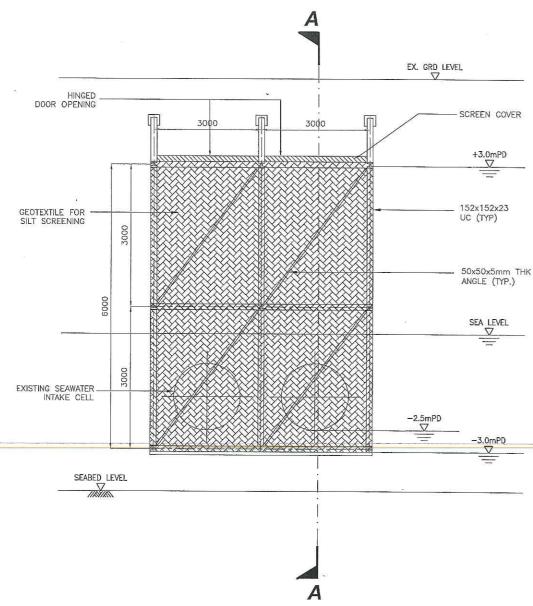
WAN CHAI DEVELOPMENT PHASE II

WAN CHAI DEVELOPMENT PHASE II -CENTRAL - WAN CHAI BYPASS AT HONG KONG CONVENTION AND EXHIBITION CENTRE

TYPE 1 SILT SCREEN

HK/2009/01/DW-RM-03A

SCALE 1 : 1000 03-03-2010 COPYRIGHT RESERVED



ELEVATION OF TYPICAL DETAILS FOR SILT SCREEN OVER INTAKE PIPES

SCALE 1 : 150

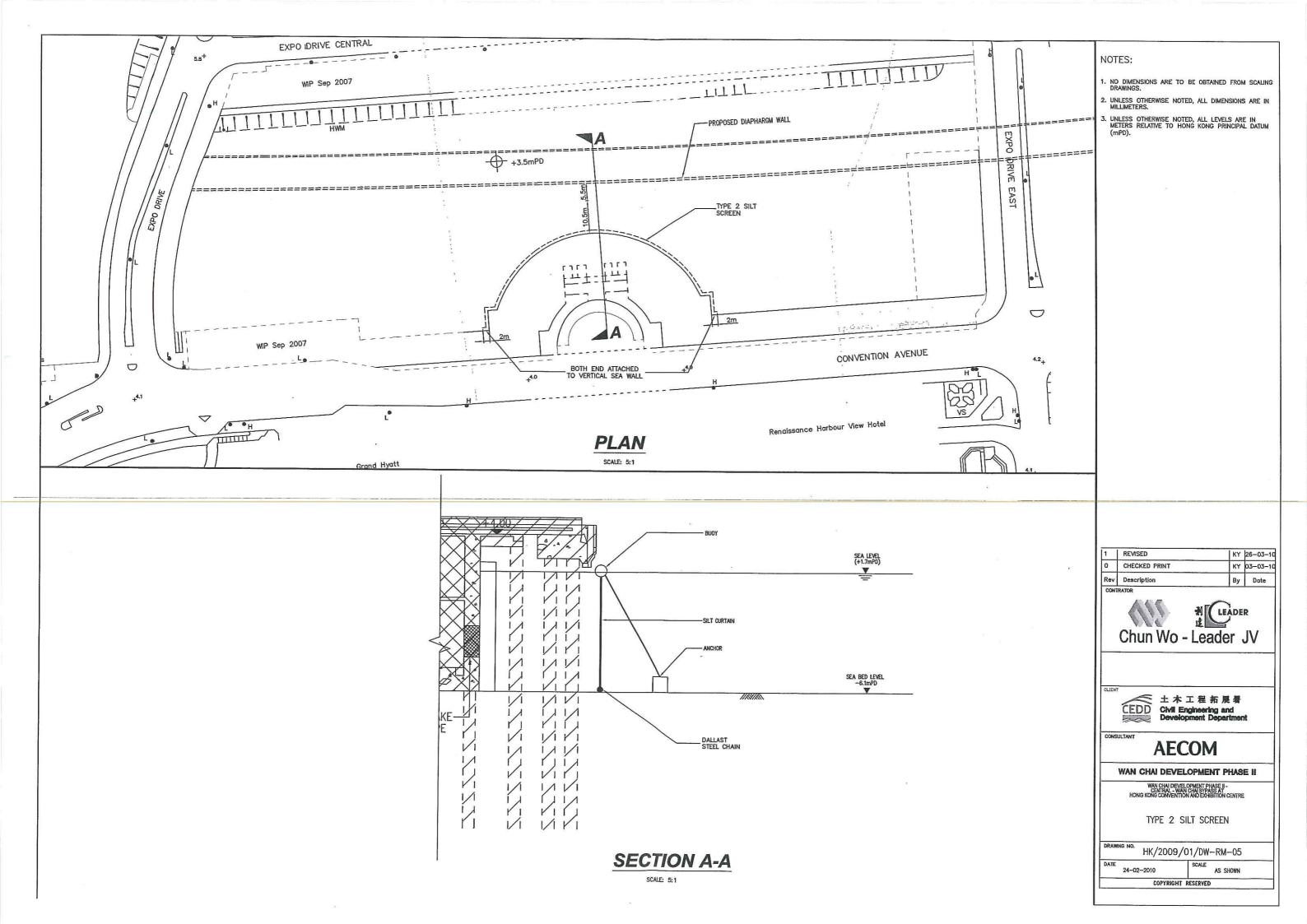


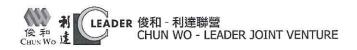
Appendix C

Type 2 Silt Screen

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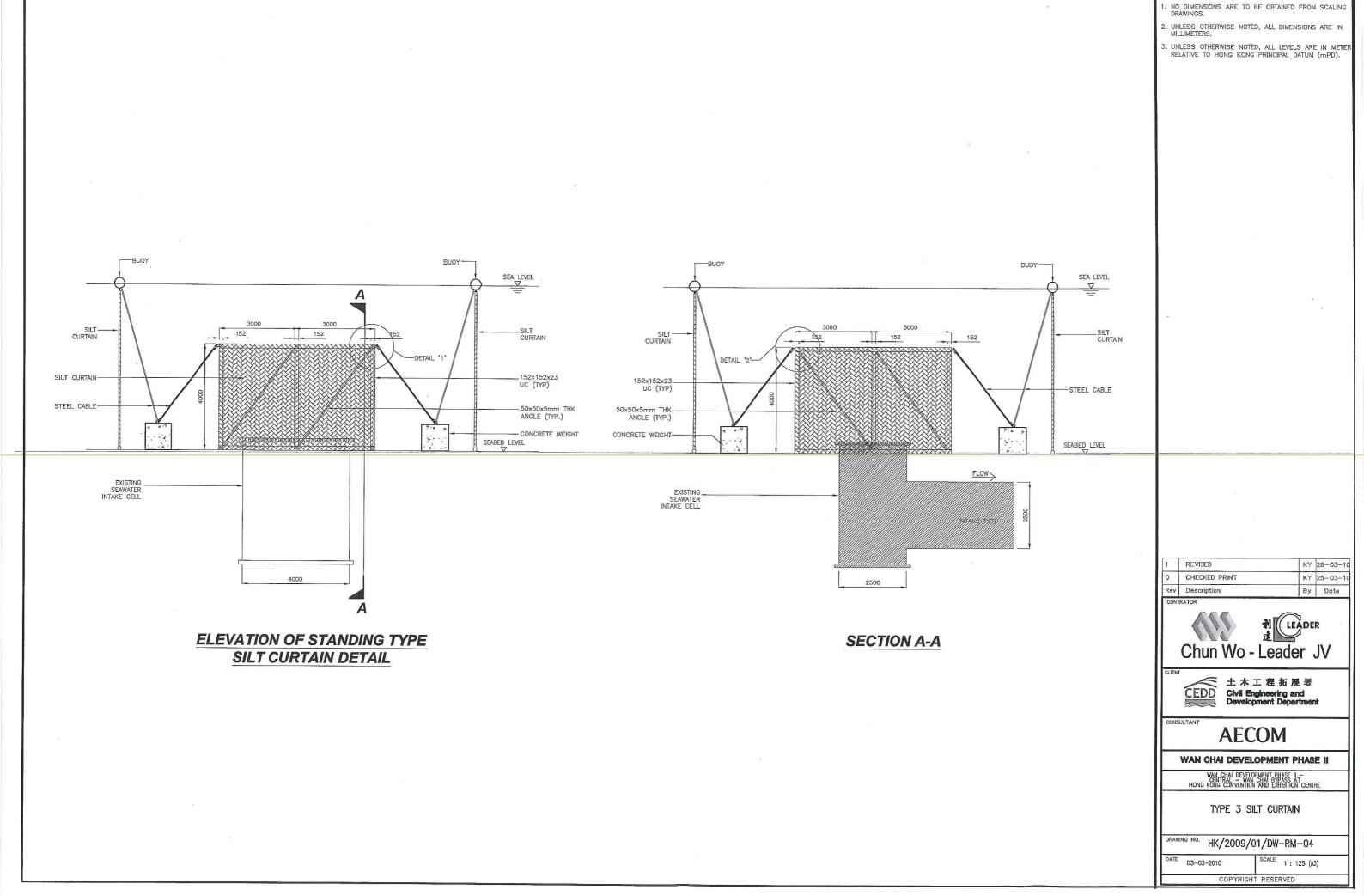


Appendix D

Type 3 Silt Screen

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NOTES:



Appendix E

Specification of Proposed Geotextile for Type 1, 2 and 3

Silt Screens

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bontec

a bonde tächnical fabrics product

SG 100/100

Technical data sheet according to internal specifications Bonar TF: version 03 dd. 17/02/03
Accompanying documents CE marking: version 01 dd. 01/10/02

1137 1137-CPD-601 03

		The second secon		
separation	filtration	reinforcement	protection	drainage

	test method	value	tolerance
Mechanical properties			
Tensile strength MD	EN ISO 10319	110 kN/m	- 9,9 kN/m
Tensile strength CD	EN ISO 10319	110 kN/m	- 9,9 kN/m
Elongation MD	EN ISO 10319	20 %	+/- 4,6 %
Elongation CD	EN ISO 10319	11 %	+/- 2,53 %
Static puncture resistance - CBR	EN ISO 12236	12,5 kN	- 2,5 kN
Dynamic perforation resistance - cone drop	EN 918	10 mm	+ 2 mm
Hydraulic properties			
Water permeability normal to the plane	EN ISO 11058	23 x 10 ⁻³ m/s	- 6,9 x 10 ⁻³ m/s
Water flow normal to the plane (*)	EN ISO 11058	23 l/m².s	- 6,9 l/m².s
Characteristic opening size	EN ISO 12956	190 µm	+/- 57 μm
Physical properties			
Thickness under 2 kPa (*)	EN 964/1	1,53 mm	+/- 0,31 mm
Weight (*)	EN 965	475 g/m²	+/- 47,5 g/m²
Composition	100 %	polypropylene woven ge	eotextile

20 200 0 0000		_
Durability	 geotextile has to be covered within 2 weeks after installation 	
	 predicted to be durable for a minimum of 25 years in natural 	
	soil with 4 < pH < 9 and soil temperatures < 25 °C.	

AND	F			
roads	railways	foundations & retaining walls	drainage systems	erosion control systems
EN 13249:2000	EN 13250:2000	EN 13251:2000	EN 13252:2000	EN 13253:2000
				A-2
reservoirs & dams	canals	tunnels & under- ground structures	solid waste	liquid waste
EN 13254:2000	EN 13255:2000	EN 13256:2000	EN 13257:2000	EN 13265:2000

- This geotextile is intended for use in both functions & applications highlighted with a bold border.

 Roll dimensions are 5,25 m x 100/200 m. Other dimensions on demand.

 Bonar Technical Fabrics reserves the right to alter product specifications without prior notice. It is the responsibility of all users to satisfy themselves that
- Although not guaranteed, these results do to the best of our knowledge offer a true and accurate record of the product's performance.
 Bonar Technical Fabrics cannot accept responsibility for the performance of these products as the conditions of use are beyond our control.
 Not mandated characteristics for CE marking.



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BOME Term & Fabrus Ltd.

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separation	
Mechanical proper	rties
Tensile strength MD	
Tensile strength CD	
Elongation MD	
Elongation CD	200
Static puncture resistant	ce – C
Dynamic perforation res	
Hydraulic properti	
Water permeability norm	
Water flow normal to the	
Characteristic opening s	
Physical propertie	
Thickness under 2 kPa	(*)
Weight (*)	
Composition	
Durability	· ·
AND	
roads	
EN 13249:2000	

RETENCATE MIRAFI

Mirafi[®] X Woven Polypropylene Geotextiles

Property		Unit	500X	550X	(600X)€	-
Mechanical properties					_	
Wide width tensile strength						
ISO 10319, ASTM D4595				20		
Mean ultimate tensile strength	MD	kN/m	25	35	50	
Mean ultimate tensile strength	CD	kN/m	25	35	50	
Extension at peak strength	MD	%	20	20	20	
Extension at peak strength	CD	%	20	20	20	
Grab tensile strength						
ASTM D4632						
Mean tensile strength	MD	kN	1.0	1.2	1.5	
Mean tensile strength	CD	kN	1.0	1.2	1.5	
Extension at peak strength	MD	%	15	15	15	
Extension at peak strength	CD	%	10	10	15	
CBR puncture strength						
ISO 12236, ASTM D6241						
Vlean puncture strength		kN	3.2	4.2	5.5	
UV resistance after 500 hrs						
ASTM D4355						
Strength retention	ale our a discount	%	70	70	70	
Hydraulic properties						
Apparent opening size — ASTM D4751		mm	0.425	0.425	0.425	
Water permeability – ASTM D4491						
Mean flow rate		I/m²/s	5	5	5	
Mean permittivity		S ⁻¹	0.05	0.05	0.2	
lominal roll width		m	4	4	4	
lominal roll length		m	200	200	200	
stimated roll weight		kg	115	140	160	

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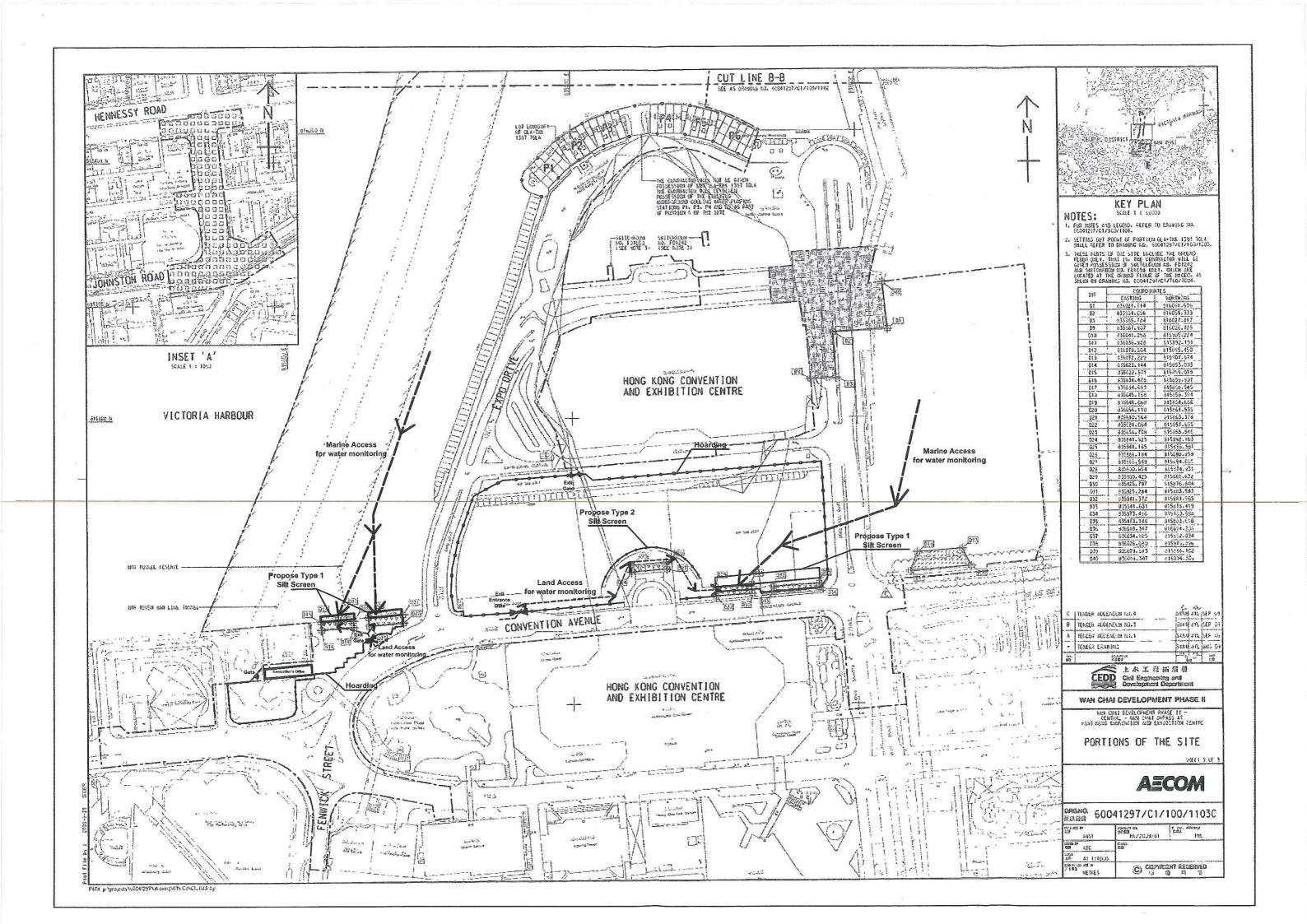


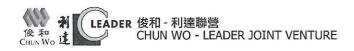
Appendix F

Arrangement of Access Provision for Water Monitoring

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Appendix G

Silt Screen Inspection Checklist

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Contra Wan C Central	Contract No. HK/2009/01 Wan Chai Development F Central - Wan Chai Bypa	Contract No. HK/2009/01 Wan Chai Development Phase II Central - Wan Chai Bypass at Hong Kong Convention and Exhibition Centre	ibition Centr	<u>ب</u>					
Client: Consultant: Main Contr	Client: Consultant: Main Contractor:	Civil Engineering and Development Department AECOM Chun Wo - Leader JV	ent						
Silt Sc	reen / Silt	Silt Screen / Silt Curtain Daily Inspection Checklist							
Silt Sci	Silt Screen / Silt Curtain ID:	Jurtain ID:							
Location: Inspection	Location: Inspection Date and Time:	nd Time:							
-									
Item		Description	Condition		Immediate Action Required?*	Action	Target Rectify	Remark	
			Yes	No	Yes	No	Date		-
	l Any float	Any floating debris / refuse within silt screen / curtain?							
C N	2 Supportir	2 Supporting frame / buoys in good condition?							
Gi	3 Tying Wi	3 Tying Wire / rope in good condition?							
7	4 Geotextil	4 Geotextile intact and in good condition?							
3)	5 Sinkers in	5 Sinkers in good condition?		_					_
•	5 Any obst	6 Any obstruction to water flow between geotextile?							
(÷								
Checked by:	ed by:	1 .	Endorsed by:		On behalf of	Jc			
		Chun Wo Leader JV			AECOM				
Note:	*	For silt screen / silt curtain with defects which need to be rectified immediately, related marine work has to be stopped until rectification works completed to the satisfaction of the Engineer.	h need to be 1 ion of the Eng	rectified gineer.	immediately	', related m	arine work has	to be stopped until	