

Airport City Link

Silt Curtain and Cofferdam Deployment Plan

April 2022

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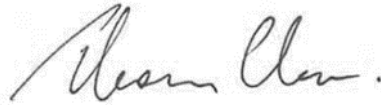
Airport City Link

Silt Curtain and Cofferdam Deployment Plan

April 2022

This Submission of Silt Curtain and Cofferdam Deployment Plan
has been reviewed and certified by
the Environmental Team Leader (ETL) in accordance with
Conditions 1.9 and 2.5 of Environmental Permit No. EP-581/2020
of the Project.

Certified by:



Ir Thomas Chan
Environmental Team Leader (ETL)
Mott MacDonald Hong Kong Limited

Date 1 April 2022

Your Ref: -
Our Ref: 60664934/C/FYW2204011

By Email

Airport Authority Hong Kong
HKIA Tower, 1 Sky Plaza Road,
Hong Kong International Airport,
Lantau, Hong Kong

Attn: Alan Chan (Manager, Civil)

1 April 2022

Dear Sir,

Contract C21C02 – Independent Environmental Checker Consultancy Services for Airport City Link
Silt Curtain and Cofferdam Deployment Plan

Reference is made to the Permit Holder's submission of Silt Curtain and Cofferdam Deployment Plan in accordance with Condition 2.5 of the Environmental Permit (No: EP-581/2020) of the Project certified by the ET Leader on 1 April 2022.

We would like to inform you that we have verified the captioned submission in accordance with the requirement stipulated in Condition 1.9 of EP-581/2020.

Should you have any queries, please feel free to contact the undersigned at 3922 9366.

Yours faithfully,
AECOM Asia Co. Ltd.



Y W Fung
Independent Environmental Checker

Issue and Revision Record

Revision	Date	Prepared by	Approved by	Description

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1 Introduction

1.1 Background

An Environmental Permit (Permit No.: EP-581/2020) has been issued to Airport Authority Hong Kong (AAHK) for Airport City Link (ACL). Pursuant to Condition 2.5 of the Environmental Permit (EP), a Silt Curtain and Cofferdam Deployment Plan shall be prepared and deposit to the Director no later than two months before the commencement of marine works involving deployment of silt curtains and cofferdams of the Project.

Part of the bridge is located in the marine area (marine portion). Gammon Engineering & Construction Company Limited (GECCL) is responsible for this marine viaduct construction, meanwhile the land area by other contractor. The marine portion of the site is situated in a marine area between Airport Island and Hong Kong Port (HKP) Island.

GECCL was appointed by AAHK as the Contractor to construct a marine portion of Airport City Link (ACL) and to establish a Silt Curtain and Cofferdam Deployment Plan (SCCDP) for the relevant marine works of the Project.

1.2 Project Description

The marine portion of Airport City Link (the project) is situated between the Airport Island and HKP Island at the south of the existing SkyPier and serves as a vehicular and pedestrian connection between SKYCITY and HKP Passenger Clearance Building.

The project comprises of pier 3 - pier 8, where silt curtain and cofferdam will be installed for pier construction. An approx.400m-long section will span over the marine channel between the Airport Island and HKP Island. The viaduct will run in parallel and along the immediate south of the planned Intermodal Transfer Terminal - Bonded Vehicular Bridge and Associated Roads (ITT-BVB), with its span length and pile cap arrangement same as that of ITT-BVB. Pier 1-2 and the rest are on land side which do not involve marine works.

1.3 Purpose and Scope

As specified in Condition 2.5 of the EP:

“The Permit Holder shall, no later than 2 months before the commencement of marine works involving deployment of silt curtains and cofferdams of the Project, deposit 3 hard copies and 1 electronic copy of a silt curtain and cofferdam deployment plan (SCCDP) with the Director. The SCCDP shall include the construction programme and details on the design, location, operation and maintenance of silt curtain(s) and cofferdam to be deployed during the construction of the Project. The Plan shall include an implementation schedule (IS) in table form to clearly list out the key mitigation measures to be implemented, the implementation party, the specific location, timing and environmental performance required for the mitigation measures.”

This SCCDP has been prepared in accordance with the EP conditions and requirements explicitly and implicitly set in the Project Profile and the approved EM&A manual.

1.4 Report Structure

Following this introductory section, this SCCDP is structured as follows:

Section 2	Construction Programme for Construction Works involving Deployment of Silt Curtain and Cofferdam
Section 3	Design and Location
Section 4	Operation and Maintenance
Section 5	Regular Checking and Monitoring

2 Construction Programme for Construction Activities involving Deployment of Silt Curtain and Cofferdam

2.1 General

Deployment of cofferdam and silt curtain has been recommended for marine construction in the Project Profile (PP) (Section 1.6, 5.5, 6.3). The marine works activities during construction phase as stipulated in **Section 2.2** and **Section 2.3** will involve deployment of silt curtain and cofferdam respectively.

Construction programme involving deployment of silt curtain and cofferdam can be referred to the **Appendix A**.

Based on the latest construction method proposed by the GECCL, temporary access platforms will be installed for bored piling works. The associated potential environmental impacts have been reviewed in the *Construction Works Schedule and Location Plans* and are concluded to be minimal. Therefore, deployment of silt curtain during installation of temporary access platform is not considered necessary.

2.2 Construction Activities Involving Deployment of Silt Curtain

2.2.1 Marine Piling Works

As per the PP, silt curtains would be installed to surround the piling area prior to setting up piling equipment on barge, installation of steel pile casing. During the bored piling works at Pier 3 to 8, including grabbing, drilling by Reverse Circulation Drilling (RCD), air-lifting, reinforced cage installation and concreting, the silt curtain will be kept in place.

2.2.2 Installation of Cofferdam

At Pier 3 to 8, the cofferdam will be installed for the pipe cap construction directly after the completion of the bored piles of a pier.

During the installation of cofferdam, the silt curtain will be kept in place at Pier 3 to 8. The cofferdam is water tight, only partially submerged in the water and above the seabed level. After setting up the cofferdam, this will serve as a dry working environment for falsework installed at the bottom layer of the cofferdam, while formwork of pile cap will be installed above the falsework. Concreting of pile cap will be carried out inside the cofferdam. Room of capacity is in place inside the cofferdam to prevent any spillage. Detail cofferdam design will be discussed in **Section 3.2.1**.

As the cofferdam is compatible to serve the same function of silt curtain, silt curtain will be removed after the installation of cofferdam and the dewatering process inside the cofferdam.

2.3 Construction Activities Involving Deployment of Cofferdam

2.3.1 Construction of Pile Caps

As mentioned in **Section 2.2.2** above, after completion of the bored piles of a pier, cofferdam (which is fabricated in the form of pre-casted steel panel) will be installed for pile cap construction.

The cofferdam is water tight, only partially submerged in the water and above the seabed level. After setting up the cofferdam, this will serve as a dry working environment for falsework installed at the bottom layer of the cofferdam, while formwork of pile cap will be installed above the falsework. Concreting of pile cap will be carried out inside the cofferdam.

2.4 Subsequent Construction Activities for Piers after Completion of Pile Caps

After the construction of pile cap for marine section, pier column will be constructed on the pile cap above water level. The size of the pier column is smaller than the pile cap, a supporting platform with railing and toe board protection surrounded will be installed on the pile cap for safety purpose and prevention measure of substance drop into the sea. As such, deployment of silt curtain will not be involved for pier construction after the installation of cofferdam and dewatering process inside the cofferdam at Pier 3 to 8.

3 Design and Location

3.1 Silt Curtain

3.1.1 Manufacturer / Supplier

The proposed silt curtain components (including all individual parts and accessories) are procured from a reputable supplier with a proven track record (at least 10 years) on manufacture / supply of such components. The supplier is quality certified (i.e. ISO 9001 or equivalent) and its products have appropriate certification of quality / conformance to the manufacturer's specifications. Details are provided in **Appendix B**.

3.1.2 Silt Curtain Design and Location

The silt curtain will be deployed at Pier 3 to 8 to completely enclose the completed temporary access platform(s), steel pile casing(s) and cofferdam(s) throughout the bored piling works and installation of cofferdam until the completion of the dewatering process inside the cofferdam.

The location of silt curtain is shown as **Appendix C**.

Hanging Type silt curtain is proposed and to be installed. Indicative diagrams of silt curtain setup for Pier 3 to 8 are shown in **Figure 3.1** to **Figure 3.2**.

General specifications apply to Hanging Type silt curtain, includes:

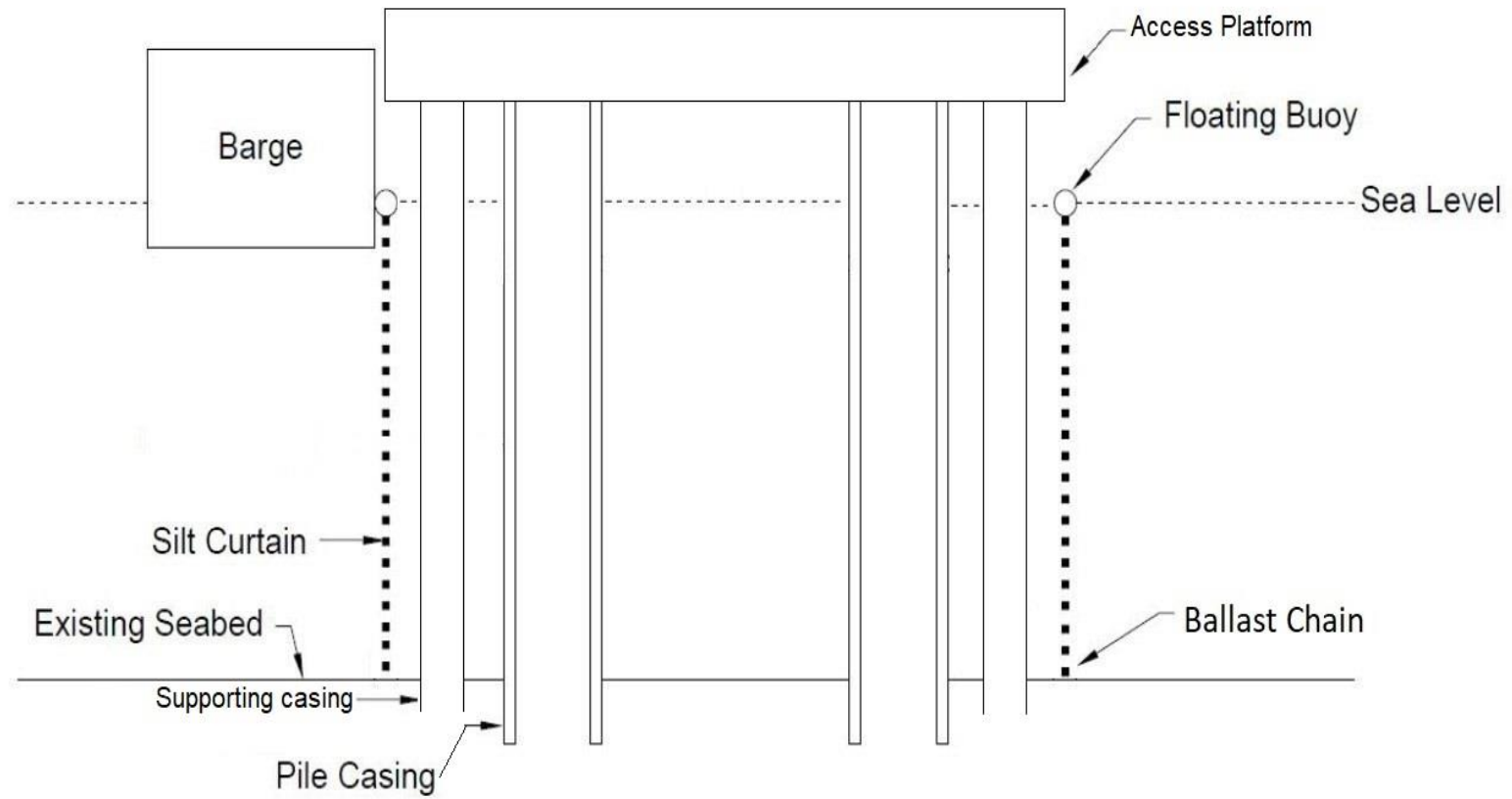
- The silt curtain fabric comprises a geotextile such as woven polypropylene or equivalent;
- The silt curtain panels are connected via strength webbing;
- The silt curtain depth is the depth at the location of deployment, to cover water depth during high tide. Some slack is provided to reduce the gap near the seabed during high tide.

3.1.2.1 Hanging Type Silt Curtain

For the Hanging Type silt curtain, the components are shown in **Figure 3.3** and the following specifications apply:

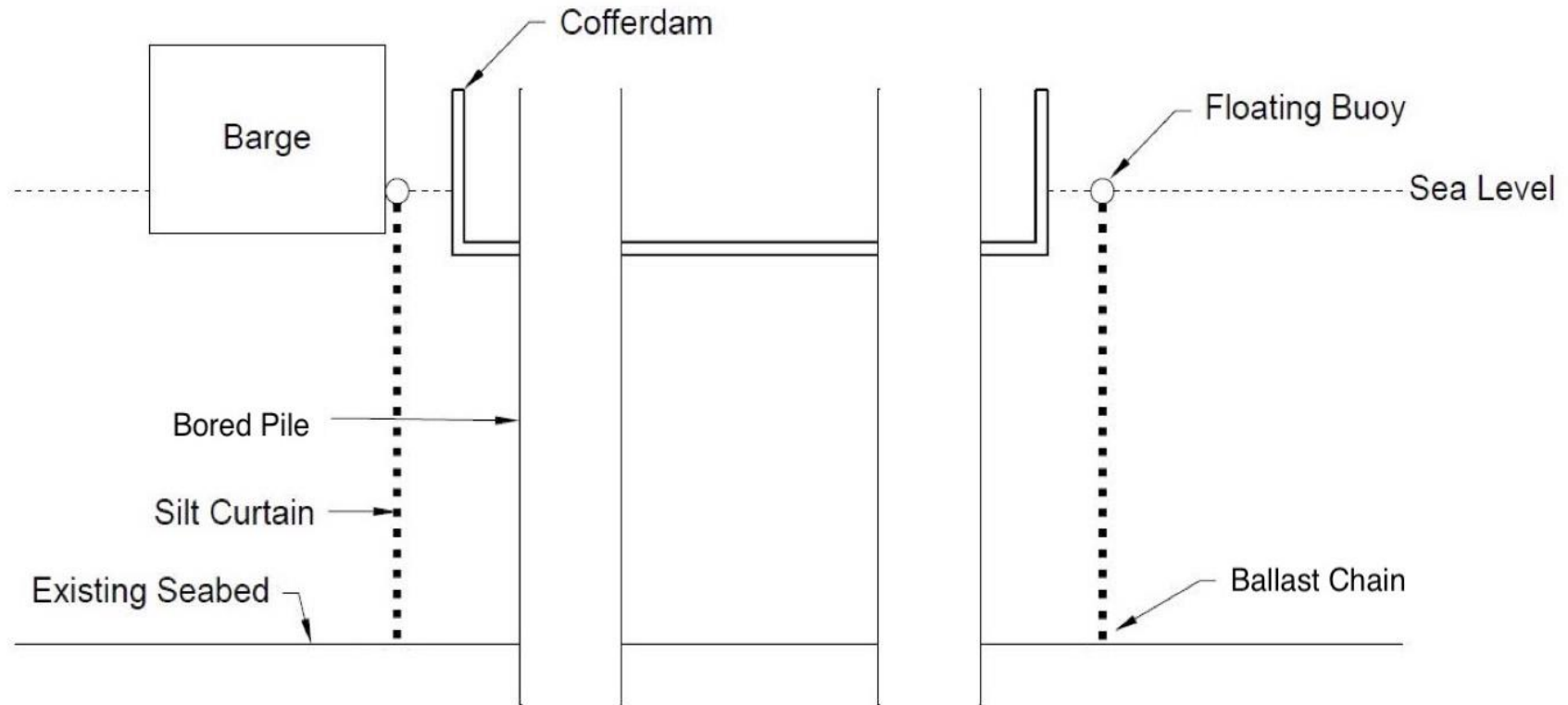
- The floatation is contained within a sleeve or collar with adequate buoyancy to support the full weight of the silt curtain and maintain a freeboard of at least 10cm above the water surface;
- The bottom end of the silt curtain is weighted by a ballast chain incorporated into the hem of the silt curtain as to keep the silt curtain vertical during deployment;
- Warning lights / marker buoys are fitted to the silt curtain to warn other marine vessels not to approach or run into the silt curtain, subject to the agreement of Marine Department.

Figure 3.1: Diagram of Hanging Type Silt Curtain Set Up during Marine Bored Piling Works



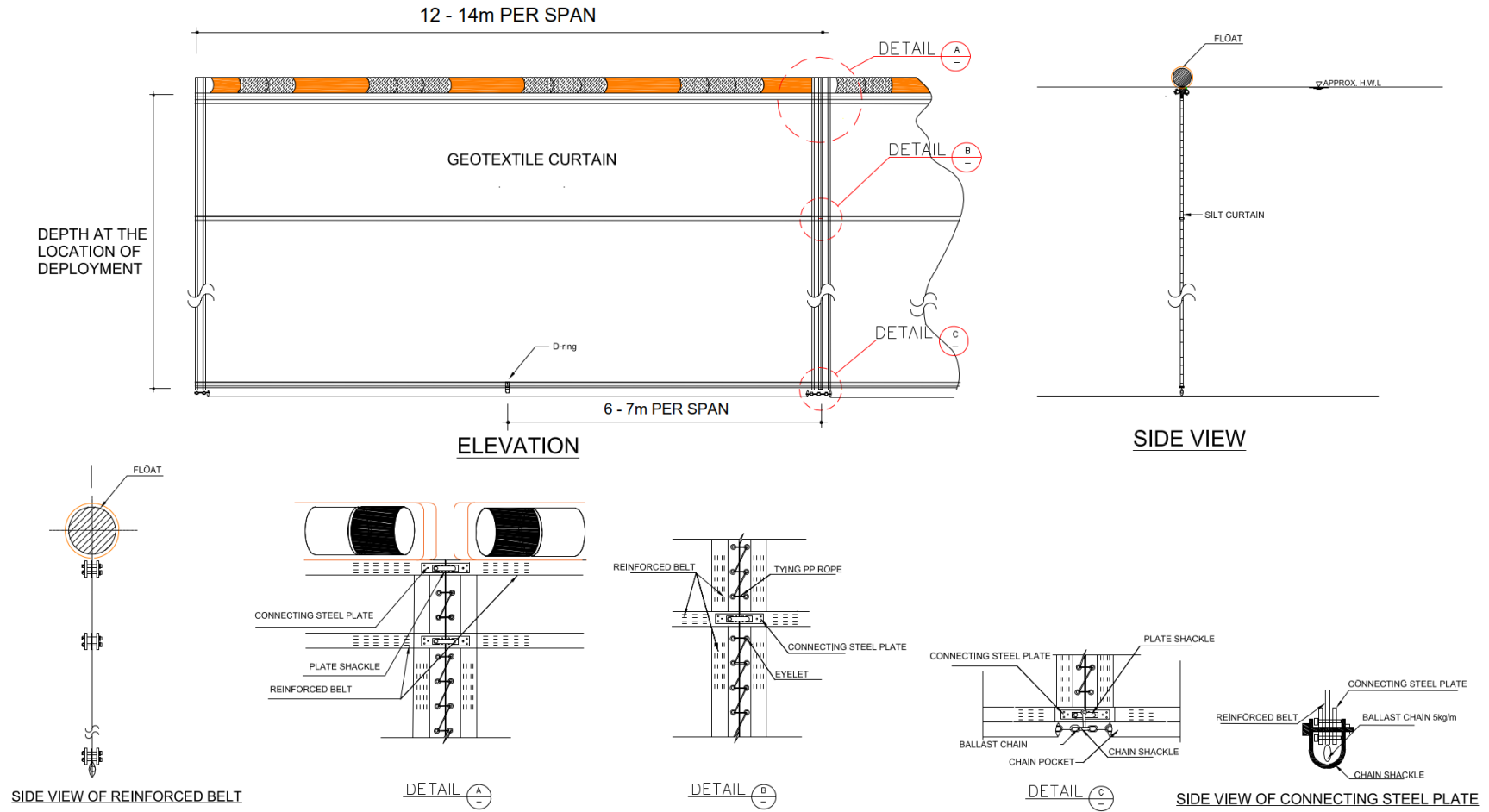
Hanging Type Silt Curtain Set Up during Marine Bored Piling Works

Figure 3.2: Diagram of Hanging Type Silt Curtain Set Up during Installation of Cofferdam and Dewatering Process inside the Cofferdam



Hanging Type Silt Curtain Set Up during Installation of Cofferdam and Dewatering Process inside the Cofferdam

Figure 3.3: Hanging Type Silt Curtain Components



3.2 Cofferdam

3.2.1 Cofferdam Design

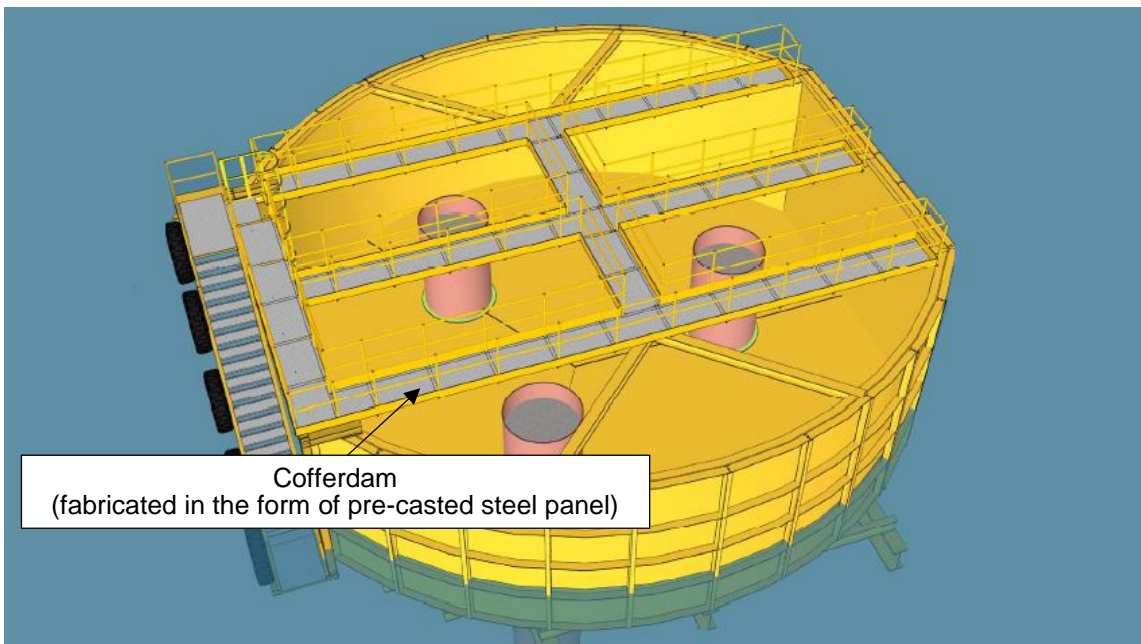
For the Project, pre-casted steel panel will be fabricated serving as “cofferdam” as shown in **Figure 3.4**. The steel frame at the top of the submersible panel will be supported by the top of the bored pile. The height of the pre-casted steel panel will extend at least 2m above the high tide mark to avoid ingress due to wave action. After dewatering inside the submersible panel, a steel bracket will be welded and water-sealed plastic back-rod stuck along the perimeter of the bored pile casing below sea level. Screw jacks will be placed on the top of the steel bracket before removing the submersible panel by unbolting it into halves.

The location of cofferdam is shown in **Appendix C**.

3.2.2 Sequence for Installation

The cofferdam with steel frame underneath is assembled on the marine barge, then lowered as a whole on top of the screw jacks and accommodating all piles. During dewatering, the cofferdam will be sealed by a back-rod with concrete plug against water ingress through the annulus between the bored pile casing and cofferdam.

Figure 3.4: Graphical Illustration of Cofferdam



4 Operation and Maintenance

4.1 Deployment

4.1.1 Silt Curtain

Silt curtain will be deployed at Pier 3 to 8 prior to marine bored piling.

The furled silt curtain will be launched into the sea by derrick / crane barge. Silt curtain will be carefully lowered to the seabed at the specified intervals. Care will be taken to ensure that the silt curtain is in the correct positions and the geotextile fabric is long enough to surround the piling site and reach the seabed. Checking will be conducted on the 'lay' of the curtain to confirm the positioning and slack allowances are correct.

4.1.2 Cofferdam

Once the piles are constructed above high tide level, the cofferdam will be lifted and accommodated around the piles. After sealing up the gaps inside the cofferdam, dewatering will be carried out. Sea water inside the cofferdam will be pumped into the sea within the silt curtain area prior to any construction activities within the cofferdam.

4.2 Operation

4.2.1 Silt Curtain

Silt curtain will remain in place throughout the marine piling works and will only be removed after installation of cofferdam and dewatering process inside the cofferdam (during the dewatering process of the cofferdam, sea water inside the cofferdam will be pumped into the sea within the silt curtain area prior to any construction activities within the cofferdam).

During the transition from access platform to cofferdam, the silt curtain (refer to **Figure 3.1** to **Figure 3.3**) will be located at the same place due to the presence of completed bored piles (the silt curtain will be constrained by the bored piles) after the access platform is removed, and during cofferdam installation.

Throughout operation of the silt curtain, regular checking and monitoring will be carried out (see **Section 5**).

During adverse weather conditions (e.g. typhoon signal No.3 or higher), no marine works will be conducted and the silt curtain will be retracted where possible to avoid unnecessary damage. After typhoon signal No.3 is lowered, the silt curtain will be re-deployed prior to re-initiation of marine works around the bridge piers. The Contractor will ensure the silt curtain is undamaged or will repair or replace the affected silt curtain before relevant marine works are re-initiated.

4.2.2 Cofferdam

After the cofferdam is installed, it will be kept in place until the pile cap is completed. The inside environment of the cofferdam will be kept dry. A polythene sheet will be placed at the bottom inside the cofferdam. Rebar fixing and concreting will be carried out inside the cofferdam.

4.3 Maintenance

4.3.1 Silt Curtain

Any damage or faults identified in the silt curtain will be repaired immediately. Where the damage / fault is minor, the Contractor will undertake in-situ maintenance and repair by qualified divers without the need for retracting the silt curtain. Where such in-situ maintenance and repair is conducted, the Contractor will ensure that another diver is on standby, the appropriate warning flags / signals are in place, and the captain or foreman of the maintenance / construction vessel has communication channels open and ready to promptly alert other vessels to avoid the affected silt curtain area during the maintenance and repair. In case of mud plume flowing out from the silt curtain causing by the works is observed, repairing of silt curtain will be carried out immediately prior to resume the relevant marine works.

Spare parts of silt curtain will be prepared and stored on-site for replacement/ repair. Where the damage / fault is extensive or cannot be easily repaired in-situ, the Contractor will retrieve the silt curtain and replace with new ones. In such circumstances, the relevant marine works will be suspended until the replacement is done.

4.3.2 Cofferdam

To maintain a watertight seal, any gaps and water seepage will not be allowed into the cofferdam. Any identified gaps will be sealed immediately. The watertight seal will be carried out before any construction of pile cap.

4.4 Removal

4.4.1 Silt Curtain

After installation of cofferdam and dewatering process inside the cofferdam (during the dewatering process of the cofferdam, sea water inside the cofferdam will be pumped into the sea within the silt curtain area prior to any construction activities within the cofferdam), the silt curtain will be removed by crane, before rolling up and lifting the silt curtain and marker buoys / lights onto the derrick / crane barge. Care will be taken to avoid the silt curtain skirt from disturbing the seabed mud.

4.4.2 Cofferdam

Once the pile cap is casted with the designed initial concrete strength reached, the screw jack underneath the pre-casted steel panel will be released by a diver and the joint unbolted to allow removal of the entire cofferdam in three pieces. The pre-casted steel panel will be reused in different marine pile caps to fully utilize all temporary works materials. The lifting of pre-casted steel panel pieces will be carried out individually by mobile crane and carefully lifted off onto the barge without disturbance to the seabed.

5 Regular Checking and Monitoring

5.1 Inspections

5.1.1 Silt Curtain

Regular checking of the silt curtain will be conducted throughout the deployment of the silt curtain. The two types of checks that will be conducted are:

Visual – the Contractor to check that the silt curtains are maintained in the correct positions with no obvious defects / entanglement, the marker buoys / lights (where applicable) are present and operational, and there is no observable muddy water passing through the silt curtain system. Any floating refuse trapped by the silt curtain will also be removed as part of the visual inspection.

Diver – for conducting more thorough underwater inspections to check that the silt curtain fabric is intact, the silt curtain depths are correct, and there is no damage / breakage in load lines.

The checking frequency is summarised in **Table 5.1**. All checks will follow the inspection checklists shown in **Appendix D** and will be appropriately signed off by the Contractor.

Table 5.1: Inspection Requirement and Frequency

Inspection Requirement	Purpose	Visual Inspection Frequency	Diver Inspection Frequency
Upon initial installation	To confirm the silt curtain has been properly installed		Once
During operation	To maintain regular check of silt curtain performance / integrity		Quarterly
When there is observed / suspected sediment release	To identify cause of sediment release and confirm any remedial actions taken	Daily	At least once for each instance
Upon re-installation (where applicable)	To confirm the silt curtain has been properly re-installed		Once for each instance of re-installation

Weekly and ad hoc site inspections carried out by the ET, and also monthly site inspection conducted by the Independent Environmental Checker (IEC), will include visual checks on the silt curtain location and effectiveness. Where the silt curtains deployed are identified by the ET and/or IEC to be ineffective or inadequate for controlling sediment release, the Contractor will make appropriate adjustments or provide additional silt curtains as necessary to improve and meet the water quality requirements of the Project.

5.1.2 Cofferdam

The structural integrity of the cofferdam will be checked as part of the Contractor's daily site safety checks and preparations. Visual checks will also be carried out by the ET during weekly and ad hoc site inspections, where IEC will conduct visual checks on a monthly basis.

5.2 Recording Keeping

All inspections carried out by the Contractor will be recorded on the silt curtain inspection checklists are shown in **Appendix D**. All checklists will be signed by the Contractor and kept on-board the responsible maintenance / construction vessel and made available to the ET and IEC upon request for checking and auditing purpose. Diver inspection records will also be signed by

the qualified diver. A summary of the records of the daily visual and the diver inspections including photographic records, as well as any rectification action taken, will be included in the Contractor's monthly environmental reports.

An implementation schedule of key requirement of relevant mitigation measures is provided in **Appendix E**.

Appendices

- A. Construction Programme involving Deployment of Silt Curtain and Cofferdam
- B. Silt Curtain Supplier Specifications
- C. Silt Curtain and Cofferdam Locations
- D. Silt Curtain Inspection Checklists
- E. Implementation Schedule of Recommended Major Environmental Mitigation Measures

A. Construction Programme involving Deployment of Silt Curtain and Cofferdam

AAHK Contract
Airport City Link - Marine Portion
Construction Programme involving Deployment of Silt Curtain and Cofferdam

Item	Activities	2022												2023												2024								
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
1	Buildings Department submission approval and consent	■																																
Marine Portion																																		
2	Preparation works	■																																
3	Piling													■																				
4	Pile Cap													■																				
5	Pier													■																				
6	Segment													■												■								

Legend:

■ Construction activities with silt curtain. (Refer to Section 4.4 of the Silt Curtain and Cofferdam Deployment Plan, silt curtain will be removed after the installation of cofferdam and dewatering process inside the cofferdam at Pier 3 to 8.)

■ Construction with cofferdam

B. Silt Curtain Supplier Specifications

G and E - Silt Curtain



G and E has established silt curtain fabrication facility in Korea, making full use of professional factory set up, trained and skill workers, availability of quality geotextile and components, efficient operation and fast delivery from Busan to Hong Kong. G and E Silt Curtain (GESC series) has standard unit and customized model.



Typical proto-type

We can supply silt curtain systems with:

- Customize design & drawing based on requirements
- Engineer to site condition constraint
- Fabricate to specific depth and length
- Supplement with accessories and installation components



Handling of the silt curtain



Fabrication of silt curtain



Factory in Ansung, Korea

The silt curtain will be delivered in pre-assembled package, including the float, geotextile curtain, ballast chain, other accessories, readied for immediate deployment , anchor system is optional.

Silt Curtain Types

G and E Silt Curtain system comes in various types to suit all environments. There are:

- **Hanging type** - typical floating system to enclosed work area
- **Standing type** - suspended in mid water to allow marine traffic
- **Barge type** – for attachment to vessel or marine structure
- **Cover head type** - for coastal calm area
- **Frame type** - for enclosure of grab bucket
- **Double chain type** – a waving skirt to accommodate tidal change



Hanging type



Hanging type - Woven PP geotextile



Standing type



Double chain type



Barge type



Cover head type



Small span type

There are various sizes of float (buoyancy necessity), different grades of geotextile (strength requirement), a variety of steel plates (connection integrity), reinforcement belt (stiffening the curtain body) and several bottom chain (adequate ballast weight) to configure the most appropriate system.

Silt Curtain Accessory

Optional accessories include sub-float to counter balance wave action, marker buoy to identify anchor position, marker light to signal alignment, fluke & ton bag anchor to replace anchor block as well as PP rope, shackle and anchor wire.



Anchor wire & cable



Marker light



Marker buoy



Sand bag anchor



Rope & shackle

Typical Design Drawing of Silt Curtain

Please refer to drawings attached.



Fluke anchor



Sub float



G and E Company Limited

14th Floor, Kiu Yin Commercial Building, 361-363 Lockhart Road, Wanchai, Hong Kong

Tel: 2570 0103 Fax: 2570 0089 e-mail: wing@g-and-e.com

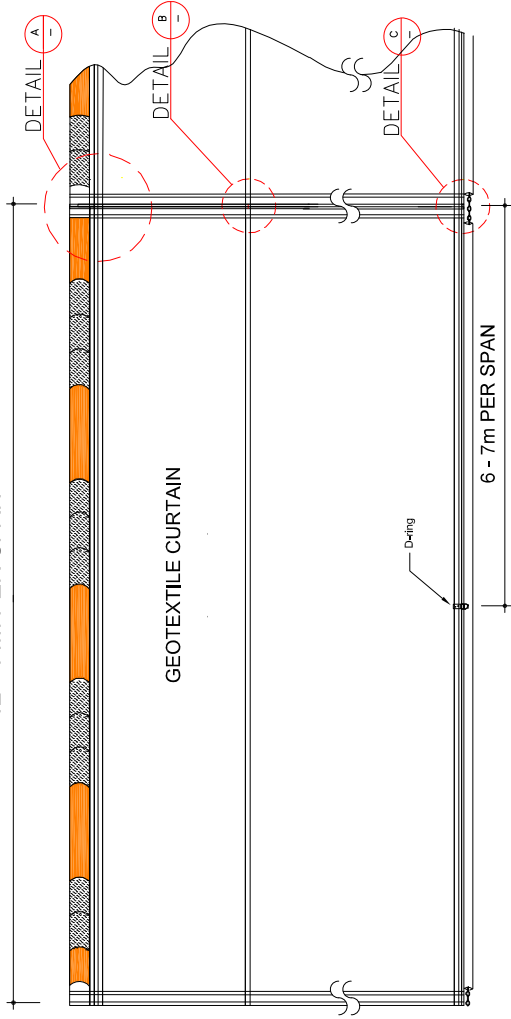
website: www.g-and-e.com



ver. 1 Sep 2018

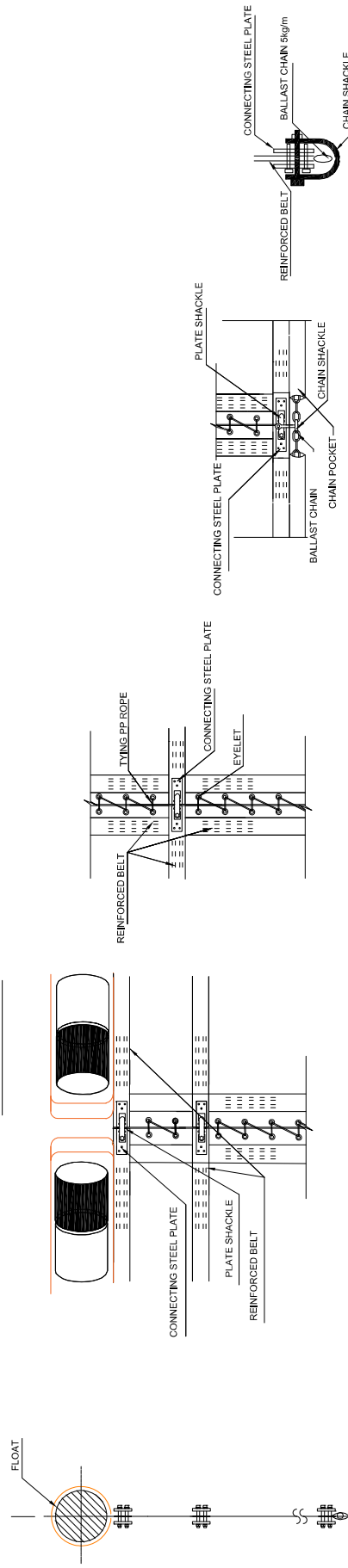
HANGING TYPE SILT CURTAIN (normal plate)

12 - 14m PER SPAN



ELEVATION

SIDE VIEW



PROJECT NO. --

DRAWN

TCY

DRAWING NO. GESCH/01

DATE

6 JUNE 2020

DRAWING TITLE:

TYPICAL DETAILS OF HANGING TYPE SILT CURTAIN

DETAIL A

DETAIL B

DETAIL C

SIDE VIEW OF REINFORCED BELT

SIDE VIEW OF CONNECTING STEEL PLATE





Silt Curtain Specification



GESC Silt Curtain Specification

Silt curtain system	Material	GESC-SG110
Curtain Geotextile	Woven Polypropylene PP	SG110/110
Float element	High density Polystyrene	300 - 600 mm diameter
Steel Plate	50-80 μ m Galvanized mild steel	Plate or Ring
Ballast Chain	0.2% carbon mild steel coal tar coating	2 - 5 kg/m
Eyelet	0.2% carbon mild steel oil based painting	25 mm
Shackle	50-80 μ m Galvanized mild steel	14, 19 & 25 mm
PP rope	Polypylene	16 & 18 mm

Woven Polypropylene PP (Bontec SG110/110)

Low & Bonar Geotextile	Unit	Test Method	SG110/110
Geotextile Tensile Strength	kN/m	EN ISO 10319	110
Geotextile Elongation	%	EN ISO 10319	10
Geotextile Flow Rate	l/m ² sec	EN ISO 11058	25
Apparent Opening Size	mm	EN ISO 12956	0.23



Geotextile Specification



GESC Silt Curtain Specification

Silt curtain system	Material	GESC-DM15	GESC-DM20	GESC-DM30
Curtain Geotextile	Woven Polyester PET	DM15	DM20	DM25
Float element	High density Polystyrene	300 - 600 mm diameter		
Steel Plate	50-80 μ m Galvanized mild steel	Plate or Ring		
Ballast Chain	0.2% carbon mild steel coal tar coating	2 - 5 kg/m		
Eyelet	0.2% carbon mild steel oil based painting	25 mm		
Shackle	50-80 μ m Galvanized mild steel	14, 19 & 25 mm		
PP rope	Polypylene	16 & 18 mm		

Geonia Geotextile	Unit	Test Method	DM15	DM20	DM30
Tensile Strength	kN/m	ASTM D4595	150/150	200/200	300/300
Elongation	%	ASTM D4595	15	15	15
Flow Rate	l/m ² /sec	ASTM D4491	1	1	1
Permittivity	/sec	ASTM D4491	0.02	0.02	0.02
Apparent Opening Size	mm	ASTM D4751	0.075	0.075	0.075

GEONIA® PET Woven Geotextile Technical Data Sheet
www.egeonia.com

High Strength Polyester Woven Geotextiles for Soil Reinforcement Applications

DM-15

Mechanical Properties	Test Method	Unit	Value
Physical Properties			
Tensile Strength at break	MD ISO 10319	kN/m	≥ 150
Tensile Strength at break	CD ISO 10319	kN/m	≥ 150
Tensile Elongation at break	MD ISO 10319	%	≤ 15
Tensile Elongation at break	CD ISO 10319	%	≤ 15
Hydraulic Properties			
Flux (h:50mm)	ISO 11058	$l/m^2 \text{sec}$ (mm/sec)	≥ 1
Permittivity (h:50mm)	ISO 11058	sec^{-1}	≥ 0.02
Apparent Opening Size (O_{95})	ASTM D4751	μm	≤ 75
Packing (Standard export packing)		Unit	Value
Roll Width		m	5.40
Roll Length		m	300
Roll Weight		kg	778
Roll Area		m^2	1,620
20ft Container		m^2	21,060
40ft Container		m^2	42,120

Above data sheet is our standard properties for the reference usage. DAEYOUN GEOTECH will not be responsible caused by any discrepancy with above data sheet. Please contact us if you need specified data sheet.

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GEONIA® PET Woven Geotextile Technical Data Sheet
www.egeonia.com

High Strength Polyester Woven Geotextiles for Soil Reinforcement Applications

DM-20

Mechanical Properties	Test Method	Unit	Value
Physical Properties			
Tensile Strength at break	MD ISO 10319	kN/m	≥ 200
Tensile Strength at break	CD ISO 10319	kN/m	≥ 200
Tensile Elongation at break	MD ISO 10319	%	≤ 15
Tensile Elongation at break	CD ISO 10319	%	≤ 15
Hydraulic Properties			
Flux (h:50mm)	ISO 11058	l/m^2sec (mm/sec)	≥ 1
Permittivity (h:50mm)	ISO 11058	sec^{-1}	≥ 0.02
Apparent Opening Size (O_{95})	ASTM D4751	μm	≤ 75
Packing (Standard export packing)		Unit	Value
Roll Width		m	5.40
Roll Length		m	300
Roll Weight		kg	1,049
Roll Area		m^2	1,620
20ft Container		m^2	16,200
40ft Container		m^2	32,400

Above data sheet is our standard properties for the reference usage. DAEYOUN GEOTECH will not be responsible caused by any discrepancy with above data sheet. Please contact us if you need specified data sheet.

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 MADE IN KOREA



GEONIA® PET Woven Geotextile Technical Data Sheet
www.egeonia.com

High Strength Polyester Woven Geotextiles for Soil Reinforcement Applications

DM-30

Mechanical Properties		Test Method	Unit	Value
Physical Properties				
Tensile Strength at break	MD	ISO 10319	kN/m	≥ 300
Tensile Strength at break	CD	ISO 10319	kN/m	≥ 300
Tensile Elongation at break	MD	ISO 10319	%	≤ 15
Tensile Elongation at break	CD	ISO 10319	%	≤ 15
Hydraulic Properties				
Flux (h:50mm)		ISO 11058	$l/m^2 \text{sec}$ (mm/sec)	≥ 1
Permittivity (h:50mm)		ISO 11058	sec^{-1}	≥ 0.02
Apparent Opening Size (O_{95})		ASTM D4751	μm	≤ 75
Packing (Standard export packing)			Unit	Value
Roll Width			m	5.40
Roll Length			m	300
Roll Weight			kg	1,486
Roll Area			m^2	1,620
20ft Container			m^2	11,340
40ft Container			m^2	22,680

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Bontec® SG 110/110

Heavy weight Polypropylene Woven Geotextiles

Technical data sheet

Product description

Polymer	Density	Melting Point	Construction
100% Polypropylene	0,91 kg/dm ³	165 °C	Tapes

Properties

Mechanical Properties	Standard	Performance	Tolerance
Tensile strength - MD	EN ISO 10319	110 kN/m	-9,9 kN/m
Tensile strength - CMD	EN ISO 10319	110 kN/m	-9,9 kN/m
Elongation at maximum load - MD	EN ISO 10319	10 %	+/-2,3 %
Elongation at maximum load - CMD	EN ISO 10319	8 %	+/-1,8 %
Static puncture resistance (CBR)	EN ISO 12236	12,5 kN	-2,5 kN
Dynamic perforation resistance (cone drop)	EN ISO 13433	10 mm	+2,0 mm
Tensile strength at 2% elongation - MD	EN ISO 10319	15 kN/m	
Tensile strength at 2% elongation - CMD	EN ISO 10319	25 kN/m	
Tensile strength at 5% elongation - MD	EN ISO 10319	45 kN/m	
Tensile strength at 5% elongation - CMD	EN ISO 10319	60 kN/m	

Hydraulic Properties	Standard	Performance	Tolerance
Water permeability normal to the plane (Vlh50)	EN ISO 11058	25 l/m ² s	-8 l/m ² s
Characteristic Opening Size (O90)	EN ISO 12956	230 µm	+/-69,0 µm

Physical Properties	Standard	Performance	Tolerance
Weight	EN ISO 9864	464 g/m ²	+/-46,4 g/m ²
Length (+/- 1%) x width (+/- 1%)		100 x 5,25 m	
Truck Load Volume (+/- 10%)		30450 m ³	
Roll diameter (+/- 10%)		45 cm	

Durability	Standard	Performance	
Predicted minimal durability in years in natural soils with 4 < pH < 9 and soil temperatures < 25°C	Applicable application standard: Annex B	100	
Maximum allowed time between installation and covering of the geosynthetic	EN 12224	2 weeks	

The Quality Management System of Bonar has been approved to the ISO 9001 Quality Management System Standard. Certificates are available on request.



The information set forth in this data sheet reflects the best knowledge of the time of publication. The document is subject to change pursuant to new developments and findings. The same reservation applies to the properties of the products described. No liability is undertaken for results obtained by usage of the products and information.

Version date: 1/09/2017
5
Version n°



Silt Curtain
Component Material and Coating



Silt Curtain
Component Material and Coating

Item	Material	Coating
Eyelet	0.2% Low Carbon Mild Steel	Painting (oil-based paint)
Steel Plate		Galvanized (50 - 80 μ m)
Reinforced Steel Plate		Hot Dip Galvanize (over 80 μ m)
Bolt & Nut		Galvanized (50 - 80 μ m)
Ballast Chain		Coal Tar Painting
Shackle		Galvanized (50 – 80 μ m)



ISO 9001:2015 Certificate

REGISTRATION CERTIFICATE

this is to certify that the management system of

G and E Company Limited.

have been assessed by AJA EUROPE and registered against the requirements of

ISO 9001:2015

scope of registration

General Construction installation work Service and sales of Construction material such as Geosynthetics

14/F Kiu Yin Commerical Building 361-363 Lockhart Road, Wan Chai, Hong Kong

28	Sites Registered	AJAEU/21/16729
EAC		Certificate Number
22nd January 2014	8th May 2021	27th March 2024
Date Original Registration	Date Of Re-registration	Expiry Date
27th January 2024	N/A	N/A
Next Re-Audit Due Date	Revision Date	Previous Expiry Date

Alfonso Pagliuca, President & Founder, AJA Europe Ltd



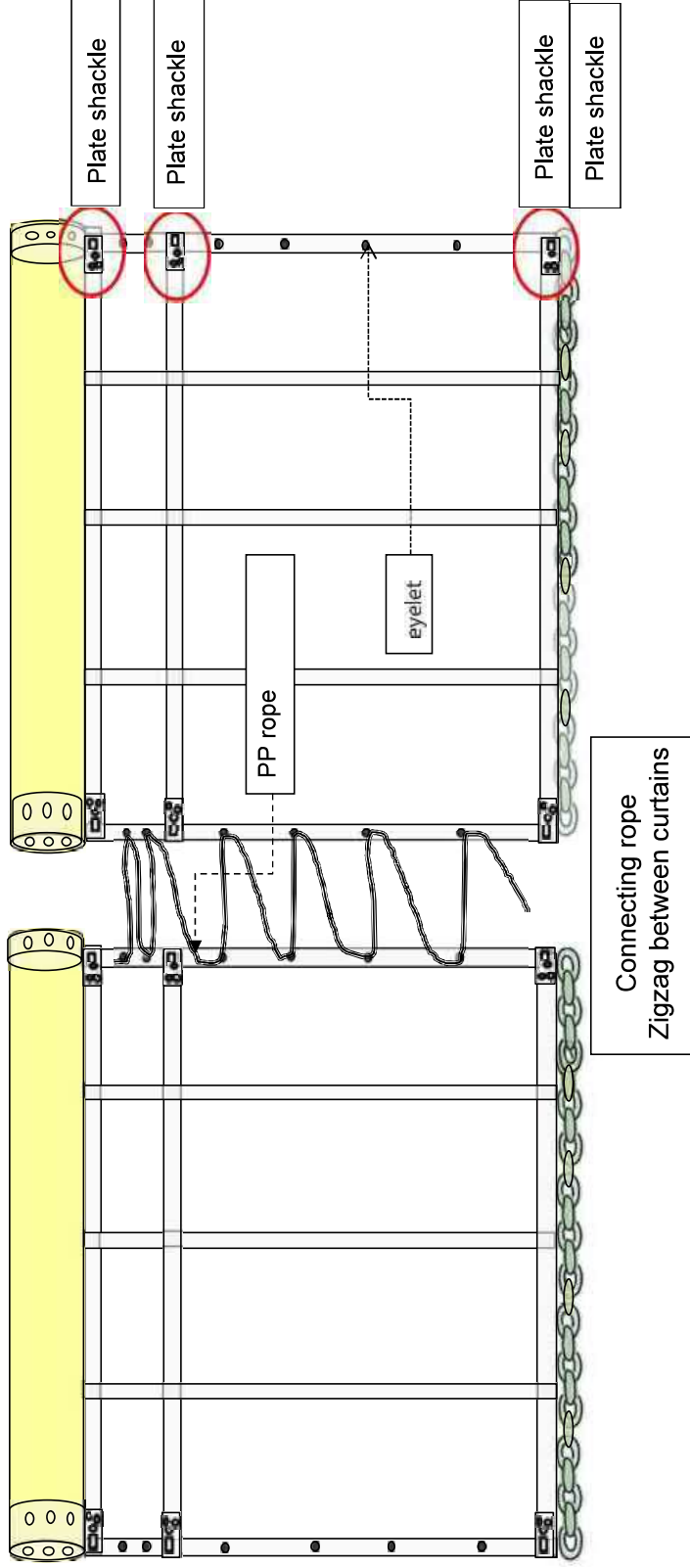
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Silt Curtain Installation & Caution & Maintenance

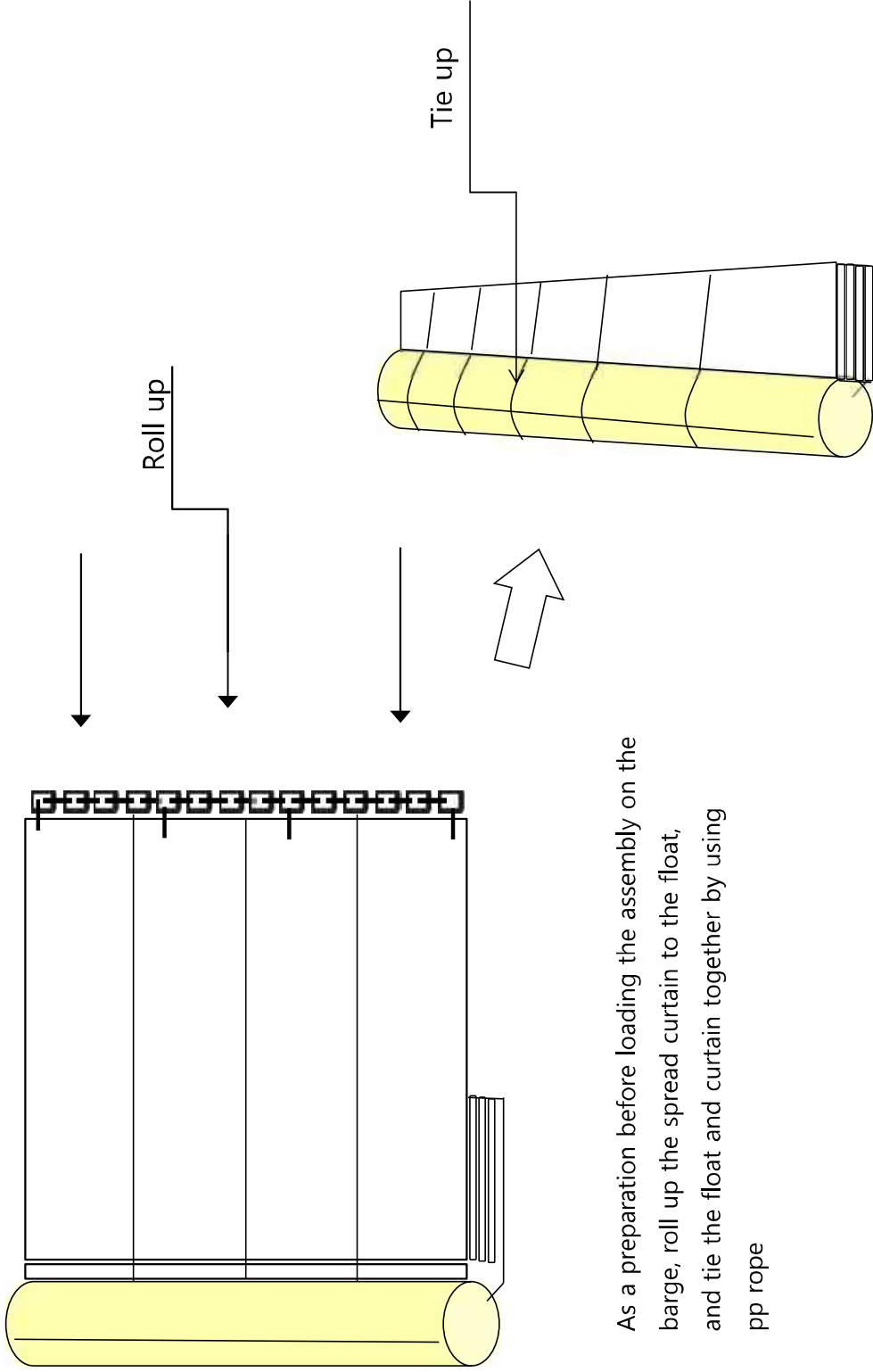
Installation Guide (Connecting curtain and curtain)



* Number of connections (between curtain and curtain)

	No. of plate shackle	No. of eyelet
2m height of curtain	3	6
3m height of curtain	4	9
4m height of curtain	4	12
5m height of curtain	5	15
6m height of curtain	5	18

Installation Guide (Temporary tying curtains)



As a preparation before loading the assembly on the barge, roll up the spread curtain to the float, and tie the float and curtain together by using pp rope

Caution

Caution

Designate a person who is in charge of management of the Silt Protector.

If an environment that exceeds the design conditions is estimated, remove the Silt Protector immediately, or the unit may be damaged. If the Silt Protector requires a repair, take necessary actions soon. If it is left without being repaired, the function of the unit may be affected adversely or the damage may expand so that it cannot be repaired.

In case the Silt Protector has been dislocated from the proper position or the layout has been deformed, restore it to original position or formation immediately. Otherwise, serious accident may be caused.

Be careful not to damage the float and curtain when removing sea shells and plants from these components.

The float is made of Styrofoam which is inflammable . Keep fire away from this component.

Preconditions for maintenance

This Silt Protector has been designed based on the precondition that it must be removed in environmental conditions that exceed the design condition, Therefore, in case it was not removed in such condition, it must be inspected after such environmental condition has ended, and must be repaired as soon as possible if necessary.

Check the unit periodically, and any component that have been deteriorated due to aging must be repaired or replaced with new one.

Table 1 presents the conditions on which this Silt Protector is designed.

Table 1 Design conditions

Item	Condition	Item	Condition
Speed of wind	m/second	Diameter float	m
Speed of current	m/second	Length of curtain	m
Wave Height	m/second	Serviceable life	months
Period of wave	Seconds	Range of tide	H.W.L + m L.W.L . m
Wave length	m	Sediment	

Maintenance 1

Maintenance

Daily inspection

The Silt Protector should be visually monitored by patrol during the period it is placed in the water. The patrol is performed on the boat for the purpose of preventing ships from running against the unit and of finding abnormality in earlier phase. (once per day)

Caution: In case the Silt Protector has a serious trouble, Failure to do the daily check may cause serious trouble in addition to the loss of its normal pollution protection performance.

Periodic inspection

In addition to visual inspection on the boat, periodically dive to check the unit thoroughly. (Once per every three month)

Caution: In case the Silt Protector has been damaged, failure to do the periodical check may cause the loss of its normal pollution protection performance and a damage that cannot be repaired to occur.

Extra inspection

After typhoon or other abnormal weather, check the unit for the purpose of finding possible damages or troubles earlier. This check is performed basically on the boat, but dive to check the unit if necessary.

Caution: In case the Silt Protector has been seriously damaged, failure to do the extra check may cause the loss of its normal pollution protection performance and a damage that cannot be repaired to occur.

Sea shell removal

If it is found that the freeboard of the float is less than 1/2 of its diameter due to increase of the total weight with the growth of sea shells and plants on the float and curtain, dive to clean these components. It is recommended to monitor the change of the freeboard of the float. check it at the periodical inspection, and record the growth of the sea organisms. (perform these works as necessary.)

Caution: Failure to do the cleaning may increase the weight of the Silt Protector resulting in sinking it to cause loss of the function. Be careful not to damage the Silt Protector when cleaning the unit.

Maintenance 2

Flow of maintenance works

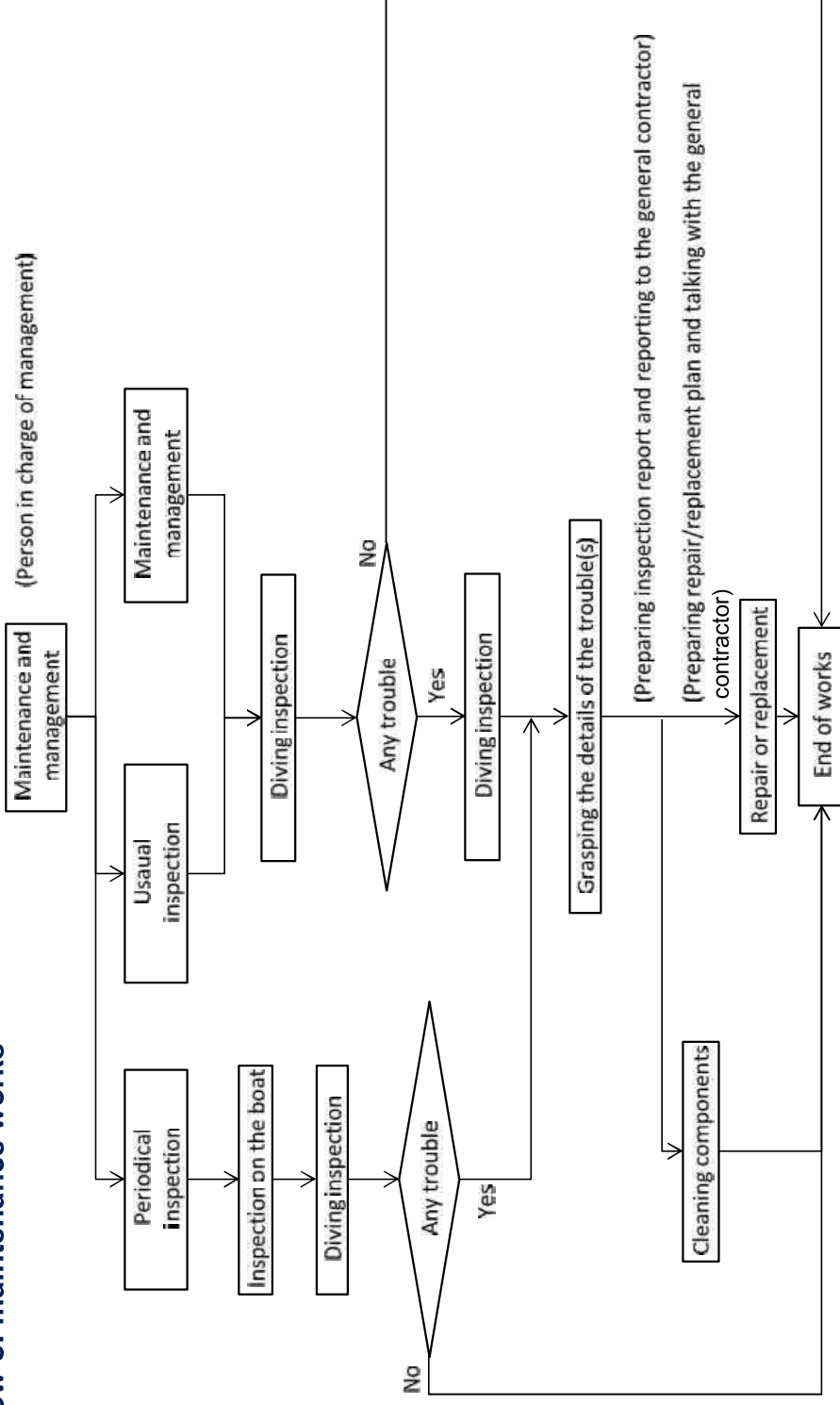




Photo References



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website: www.g-and-e.com



Date	October 2018
Project	Contract No. HY/2014/07 Central Kowloon Route - Kai Tak West
Client	Highways Department
Consultant	Arup - Mott MacDonald JV
Main Contractor	Gammon Construction Ltd
Works	Turbidity Control around Piles
Material	Silt Curtain
Quantity	37 spans



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Date	May 2021
Project	Contract No. C19W10 Intermodal Transfer Terminal - Bonded Vehicular Bridge
Client	Hong Kong International Airport
Consultant	Mott MacDonald
Main Contractor	Will Pak Engineering Ltd
Works	Turbidity Control
Material	Silt Curtain
Quantity	20 spans



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Date	December 2020
Project	Contract No. ND/2019/04 Fanling North New Development Area, Phase 1: Fanling Bypass Eastern Section
Client	Civil Engineering & Development Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	DCK JV
Works	Turbidity Control
Material	Silt Curtain
Quantity	14 spans



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Date	January 2021
Project	Contract No. HKE 19_38014 Lamma Power Station Extension
Client	HK Electric
Consultant	Arcadis
Main Contractor	Paul Y. Construction Co. Ltd
Works	Turbidity Control
Material	Silt Curtain
Quantity	3 spans



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Date	December 2018
Project	Contract No. YL/2017/03 Development of Lok Ma Chau Loop; Land Decontamination and Advance Engineering Works
Client	Civil Engineering and Development Department
Consultant	Black & Veatch Hong Kong Ltd
Main Contractor	Sang Hing - Kuly Joint Venture
Works	Turbidity Control
Material	Silt Curtain
Quantity	14 spans



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Date	June 2020
Project	Contract No. 13/WSD/17 First Stage of Desalination Plant at TKO
Client	Water Supplies Department
Consultant	Black & Veatch Hong Kong Ltd
Main Contractor	China State Construction Engineering (Hong Kong) Limited
Works	Turbidity Control
Material	Silt Curtain
Quantity	31 spans



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Date	October 2020
Project	Development of Industrial Estate 2.0 Project C - Advanced Manufacturing Center
Client	Hong Kong Science and Technology Parks Corporation
Consultant	Wong & Ouyang (Building Services) Ltd
Main Contractor	Gammon Construction Ltd Friendly Benefit Engineering Ltd
Works	Turbidity Control
Material	Silt Curtain
Quantity	9 spans



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Date	August 2020
Project	EP/SP/66/12 Integrated Waste Management Facilities Phase 1
Client	Environmental Protection Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	Zhen Hua Engineering Co. Ltd
Works	Marine Park Protection
Material	Silt Curtain
Quantity	25 spans



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Date	March 2020
Project	Contract No. EP/SP/9/91 Development and Management of West New Territories (WENT) Landfill
Client	Environmental Protection Department
Consultant	Black & Veatch Hong Kong Ltd
Main Contractor	SUEZ NWS R&R (Hong Kong) Ltd
Works	Site Drainage Outfall Silt Control
Material	Silt Curtain
Quantity	1 span



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Date	June 2018
Project	Lago Nam Van, Macau
Client	Direcção dos Serviços De Protecção Ambiental of Macau
Consultant	WSP
Main Contractor	Sunley Engineering & Construction (Macau) Co Ltd
Works	Environmental Mitigation Measure
Material	Silt Curtain
Quantity	20 spans



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Tel: 852-2508 0058 Fax: 852-2570 0089
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Date	January 2019
Project	C340B Main works for Barra Station, Macau
Client	MTR Railway Operations (Macau) Company Limited
Consultant	AECOM Asia Ltd
Main Contractor	China State Construction Engineering Ltd
Works	Tubidity Control
Material	Silt Curtain
Quantity	12 spans



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Date	May 2019
Project	Contract No. NE/2016/01 Site Formation and Infrastructure Works for Development of Anderson Road Quarry
Client	Civil Engineering and Development Department
Consultant	AECOM Asia Co Ltd
Main Contractor	Chun Wo Development Holdings Ltd Tinkle Construction Engineering Co Ltd
Works	Site Drainage Outfall Silt Control
Material	Silt Curtain
Quantity	4 spans



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Date	October 2018
Project	Contract No. HY/2014/07 Central Kowloon Route - Kai Tak West
Client	Highways Department
Consultant	Arup - Mott MacDonald JV
Main Contractor	Gammon Construction Ltd
Works	Turbidity Control
Material	Silt Curtain
Quantity	30 spans



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Date	July 2017
Project	"ALL Hands on Deck", Reduce Ocean Gabbage Campaign
Client	Worldwide Fund for Nature Hong Kong
Consultant	G and E Company Limited
Main Contractor	G and E Company Limited
Works	Refuse Boom
Material	Silt Curtain
Quantity	3 spans



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Date	March 2014
Project	Contract No. HK/2009/02 Wan Chai Development Phase II Central - Wan Chai Bypass Wan Chai East
Client	Civil Engineering and Development Department
Consultant	AECOM (Asia) Ltd
Main Contractor	Chun Wo - CRGL Joint Venture
Works	Turbidity Control
Material	Silt Curtain
Quantity	13 spans



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Date	April 2017
Project	Contract No. HKHA20120023 Public Rental Housing, Shek Mun Estate
Client	Housing Authority
Consultant	Housing Authority
Main Contractor	Hin Sum Engineering Co. Ltd
Works	Turbidity Control
Material	Silt Curtain
Quantity	2 spans



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Date	October 2016
Project	Contract C3201 Three Runway System Project Deep Cement Mixing Works (Package 1)
Client	Hong Kong Airport Authority
Consultant	Atkins in association with Mott MacDonald
Main Contractor	Penta Ocean-China State - Dong Ah JV
Works	Turbidity Control
Material	Silt Curtain Barge Type
Quantity	154 spans



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Date	June 2014
Project	Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section
Client	Highways Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	Dragages - Bouygues JV
Works	Turbidity Control
Material	Silt Curtain
Quantity	85 spans



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Date	March 2016
Project	Asia Pacific Gateway (APG) - Tseung Kwan O Section
Client	China Mobile International Limited
Consultant	Environmental Resources Management
Main Contractor	Maritime Mechanic Ltd
Works	Turbidity Control
Material	Silt Curtain
Quantity	12 spans



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Date	May 2014
Project	HY/2012/07 Tuen Mun - Chek Lap Kok Link- Sothern Connection Viaduct Section
Client	Highway Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	Gammon Construction Ltd
Works	Turbidity Control
Material	Silt Curtain
Quantity	44 spans



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Date	February 2014
Project	HY/2012/07 Tuen Mun - Chek Lap Kok Link- Sothern Connection Viaduct Section
Client	Highway Department
Consultant	AECOM Asia Co. Ltd
Main Contractor	Gammon Construction Ltd
Works	Silt Curtain
Material	Woven Geotextile Bontec SG110/110
Quantity	10,500 sqm



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Date	April 2015
Project	Contract No. 16/WSD/11 Replacement and Rehabilitation of Water mains, Stage 4 Phase 2
Client	Water Supplies Department
Consultant	AECOM Asia Company Limited
Main Contractor	Pipe Tech Ltd
Works	Turbidity Control
Material	Silt Curtain
Quantity	6 spans



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Date	March 2015
Project	Contract No. P552 Deep Cement Mixing Trial Works
Client	Hong Kong Airport Authority
Consultant	Atkins - Mott MacDonald
Main Contractor	Penta Ocean Construction Co Ltd
Works	Turbidity Control
Material	Silt Curtain Barge Type
Quantity	8 Spans



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Date	September 2013
Project	DC/2011/01 Drainage Maintenance and Construction in Mainland South Districts (2011-2015)
Client	Drainage Service Department
Consultant	Drainage Service Department
Main Contractor	Paul Y. Construction Co. Ltd
Works	Inflow Interceptor
Material	Silt Curtain
Quantity	16 spans



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Date	December 2015
Project	Contract No. HK/2012/08 Wan Chai Development Phase II - Central Wan Chai Bypass at Wan Chai West
Client	CEDD
Consultant	AECOM Asia Co. Ltd
Main Contractor	China State Construction Engineering Co. Ltd
Works	Turbidity Control
Material	Silt Curtain
Quantity	27 spans



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Date	May 2013
Project	Contract No. HK/2012/08 Wan Chai Development Phase II - Central Wan Chai Bypass at Wan Chai West
Client	CEDD
Consultant	AECOM Asia Co. Ltd
Main Contractor	China State Construction Engineering Co. Ltd
Works	Silt Curtain
Material	Woven Geotextile Bontec SG110/110
Quantity	42,000 sqm

C. Silt Curtain and Cofferdam Locations

D. Silt Curtain Inspection Checklists

Daily Visual Inspection Checklist for Silt Curtains

Contract No.: _____

Date: _____

Time: _____

Weather: _____

Inspection Items	Result	If Unsatisfactory, provide details on the following				
		Affected Section(s) / Location(s)	Description of Unsatisfactory Item	Proposed Action	Date of Completion of Action	Confirmed / Completed By (name and signature)
Geotextile						
Curtain remains intact and without gap	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain in upright position	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain has no loose / flapping parts	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					

Inspection Items	Result	If Unsatisfactory, provide details on the following				
		Affected Section(s) / Location(s)	Description of Unsatisfactory Item	Proposed Action	Date of Completion of Action	Confirmed / Completed By (name and signature)
No floating refuse trapped by the silt curtain	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
No sediment plume through the silt curtain observed	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Ancillary Components						
Floaters are intact and not submerged	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Marker buoys / lights are in correct positions and undamaged	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
No parts are detached from the silt curtain system	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					

Checked By (name & signature): _____

Diver Inspection Checklist for Silt Curtains

Contract No.: _____

Date: _____

Time: _____

Weather: _____

Inspection Items	Result	If Unsatisfactory, provide details on the following				
		Coordinates / Locations of Affected Section(s)	Description of Unsatisfactory Item	Proposed Action	Date of Completion of Action	Confirmed / Completed By (name and signature)
Geotextile						
Curtain remains intact and without gap	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain in upright position	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain has no loose / flapping parts	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					

Inspection Items	Result	If Unsatisfactory, provide details on the following				
		Coordinates / Locations of Affected Section(s)	Description of Unsatisfactory Item	Proposed Action	Date of Completion of Action	Confirmed / Completed By (name and signature)
Curtain is securely attached at joints	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain fittings (e.g. chains, bands, plates, joint connectors etc.) are intact and in position	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain extends to seabed level during low tide	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Curtain hem is not weighted down by sediment deposition	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					
Ancillary Components						
No parts are detached from the silt curtain system	<input type="checkbox"/> Satisfactory <input type="checkbox"/> Unsatisfactory					

Checked By (diver's name & signature): _____

E. Implementation Schedule of Recommended Major Environmental Mitigation Measures

SCCDP Ref.	Recommended Major Environmental Mitigation Measures	Objectives of the Recommended Measures	Implementation Agent	Location	Implementation Stage
S.2.2	<p>The following marine works activities during construction phase involve deployment of silt curtain:</p> <ul style="list-style-type: none"> - Marine piling works As per the PP, silt curtains would be installed to surround the piling area prior to setting up piling equipment on barge, installation of steel pile casing. During the bored piling works, including grabbing, drilling by Reverse Circulation Drilling (RCD), air-lifting, reinforced cage installation and concreting, the silt curtain will be kept in place. - Installation of Cofferdam For Pier 3 to 8, the cofferdam will be installed for the pipe cap construction directly after the completion of the bored piles of a pier. During the installation of cofferdam, the silt curtain will be kept in place at Pier 3 to 8. As the cofferdam is compatible to serve the same function of silt curtain, silt curtain will be removed after the installation of cofferdam and the dewatering process inside the cofferdam. 	<p>Mitigate potential water quality impact during marine piling works, installation and dewatering process of cofferdam.</p>	Contractor	See Appendix C	<p>Construction Phase (During marine piling, installation and dewatering process of cofferdam)</p>
S.2.3	<p>The following marine works activities during construction phase involve deployment of cofferdam:</p> <ul style="list-style-type: none"> - Construction of pile caps 	<p>Mitigate potential water quality impact during marine bridge pile caps construction</p>	Contractor	See Appendix C	<p>Construction Phase (during marine pile cap works)</p>
S.3.1.2	<p>Design of Silt Curtain</p> <p>For Pier 3 to 8, the silt curtain will be deployed to completely enclose the completed temporary access platform(s), steel pile casing(s) and cofferdam(s) throughout the bored piling works and installation of cofferdam until the completion of the dewatering process inside the cofferdam. Hanging Type silt curtain is proposed.</p> <p>General specifications apply to Hanging Type silt curtain, includes:</p> <ul style="list-style-type: none"> - The silt curtain fabric comprises a geotextile such as woven polypropylene or equivalent; - The silt curtain panels are connected via strength webbing; - The silt curtain depth is the depth at the location of deployment, to cover water depth during high tide. Some slack is provided to reduce the gap near the seabed during high tide. <p>Hanging Type Silt Curtain</p> <p>For the Hanging Type silt curtain, the following specifications apply:</p> <ul style="list-style-type: none"> - The floatation is contained within a sleeve or collar with adequate buoyancy to support the full weight of the silt curtain and maintain a freeboard of at least 10cm above the water surface; - The bottom end of the silt curtain is weighted by a ballast chain incorporated into the hem of the silt curtain as to keep the silt curtain vertical during deployment; 	<p>Ensure design of silt curtain is effective for mitigation of water quality impacts</p>	Contractor	See Appendix C	<p>Construction Phase (For Pier 3 to 8, prior to the marine piling)</p>

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	<ul style="list-style-type: none"> - Warning lights / marker buoys are fitted to the silt curtain to warn other marine vessels not to approach or run into the silt curtain, subject to the agreement of Marine Department. 				
S.3.2.1	<p><u>Design of Cofferdams</u></p> <ul style="list-style-type: none"> • The height of the pre-casted steel panel will extend at least 2m above the high tide mark to avoid ingress due to wave action. 	Ensure design of cofferdam is effective for mitigation of water quality impacts	Contractor	See Appendix C	Construction Phase (before marine pile cap works)
S.4.1.1	<p><u>Deployment of Silt Curtain</u></p> <ul style="list-style-type: none"> • For Pier 3 to 8, silt curtain will be deployed prior to marine bored piling. • The furled silt curtain will be launched into the sea by derrick / crane barge. 	Ensure proper deployment of silt curtain	Contractor	See Appendix C	Construction Phase (For Pier 3 to 8, prior to the marine piling)
S.4.1.2	<p><u>Deployment of Cofferdams</u></p> <ul style="list-style-type: none"> • Once the piles are constructed above high tide level, the cofferdam will be lifted and accommodated around the piles. 	Ensure proper installation of cofferdam	Contractor	See Appendix C	Construction Phase (before marine pile cap works)
S.4.2.1	<p><u>Operation of Silt Curtain</u></p> <ul style="list-style-type: none"> • Silt curtain will remain in place throughout the marine piling works and will only be removed after installation of cofferdam and dewatering process inside the cofferdam of Pier 3 to 8 (during the dewatering process of the cofferdam, sea water inside the cofferdam will be pumped into the sea within the silt curtain area prior to any construction activities within the cofferdam). • During adverse weather conditions (e.g. typhoon signal No.3 or higher), no marine works will be conducted and the silt curtain will be retracted where possible to avoid unnecessary damage. After typhoon signal No.3 is lowered, the silt curtain will be re-deployed prior to re-initiation of marine works around the bridge piers. The Contractor will ensure the silt curtain is undamaged or will repair or replace the affected silt curtain before relevant marine works are re-initiated. 	Ensure effective operation of the silt curtain	Contractor	See Appendix C	Construction Phase (For Pier 3 to 8, during marine piling, installation and dewatering process of cofferdam)
S 4.2.2	<p><u>Operation of Cofferdams</u></p> <ul style="list-style-type: none"> • After the cofferdam is installed, it will be kept in place until the pile cap is completed. The inside environment of the cofferdam will be kept dry. 	Ensure effective operation of the cofferdam	Contractor	See Appendix C	Construction Phase (during marine pile cap works)
S.4.3.1	<p><u>Maintenance of Silt Curtain</u></p> <ul style="list-style-type: none"> • Any damage or faults identified in the silt curtain will be repaired immediately. 	Ensure effective operation of the silt curtain	Contractor	See Appendix C	Construction Phase (during marine piling, installation and

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	<ul style="list-style-type: none"> Where the damage / fault is minor, the Contractor will undertake in-situ maintenance and repair by qualified divers without the need for retracting the silt curtain. Where such in-situ maintenance and repair is conducted, the Contractor will ensure that another diver is on standby, the appropriate warning flags / signals are in place, and the captain or foreman of the maintenance / construction vessel has communication channels open and ready to promptly alert other vessels to avoid the affected silt curtain area during the maintenance and repair. In case of mud plume flowing out from the silt curtain causing by the works is observed, repairing of silt curtain will be carried out immediately prior to resume the relevant marine works. Where the damage / fault is extensive or cannot be easily repaired in-situ, the Contactor will retrieve the silt curtain and replace with new ones. In such circumstances, the relevant marine works will be suspended until the replacement is done. 				dewatering process of cofferdam)
S.4.3.2	<p><u>Maintenance of Cofferdams</u></p> <ul style="list-style-type: none"> Any identified gaps will be sealed immediately. The watertight seal will be carried out before any construction of pile cap. 	Ensure effective operation of the cofferdam	Contractor	See Appendix C	Construction Phase (during marine pile cap works)
S.4.4.1	<p><u>Removal of Silt Curtain</u></p> <ul style="list-style-type: none"> After installation of cofferdam and dewatering process inside the cofferdam (during the dewatering process of the cofferdam, sea water inside the cofferdam will be pumped into the sea within the silt curtain area prior to any construction activities within the cofferdam), the silt curtain will be removed by crane, before rolling up and lifting the silt curtain and marker buoys / lights onto the derrick / crane barge. Care will be taken to protect the silt curtain skirt from disturbing the seabed mud. 	Avoid damage to silt curtain	Contractor	See Appendix C	Construction Phase (after the installation of cofferdam and dewatering process inside the cofferdam)
S.4.4.2	<p><u>Removal of Cofferdams</u></p> <ul style="list-style-type: none"> Once the pile cap is casted with the designed initial concrete strength reached, the screw jack underneath the pre-casted steel panel will be released by a diver and the joint unbolted to allow removal of the entire cofferdam in three pieces. The lifting of pre-casted steel panel pieces will be carried out individually by mobile crane and carefully lifted off onto the barge without disturbance to the seabed. 	Avoid disturbance to the seabed	Contractor	See Appendix C	Construction Phase (after marine pile cap works)
S.5.1.1	<p><u>Regular Inspection of Silt Curtain</u></p> <ul style="list-style-type: none"> Regular checking of the silt curtain will be conducted throughout the deployment of the silt curtain. The two types of checks that will be conducted by the Contractor are: <ul style="list-style-type: none"> Visual 	Ensure effective operation of the silt curtain	<ul style="list-style-type: none"> Contractor ET IEC 	See Appendix C	Construction Phase (during marine piling, installation and dewatering process of cofferdam)

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	<ul style="list-style-type: none"> - Diver • All checks will follow the inspection checklists in the submissions and will be appropriately signed off by the Contractor. • Weekly and ad hoc site inspections carried out by the ET, and also monthly site inspection conducted by the Independent Environmental Checker (IEC), will include visual checks on the silt curtain location and effectiveness. 				
S.5.1.2	<p><u>Regular Inspection of Cofferdam</u></p> <ul style="list-style-type: none"> • The structural integrity of the cofferdam will be checked as part of the Contractor's daily site safety checks and preparations. • Visual checks will also be carried out by the ET during weekly and ad hoc site inspections, where IEC will conduct visual checks on a monthly basis. 	Ensure effective operation of the cofferdam	<ul style="list-style-type: none"> • Contractor • ET • IEC 	See Appendix C	Construction Phase (during marine pile cap works)